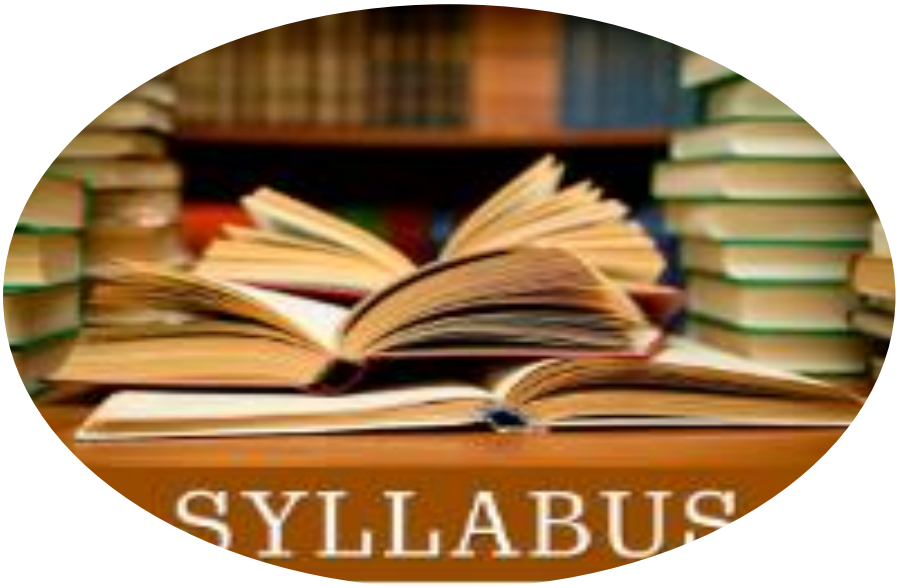
SKR & SKR GOVT. COLLEGE FOR WOMEN, KADAPA.
(AUTONOMOUS)
Reaccredited with 'B' Grade by NAAC
Y.S.R. Kadapa District – 516001, Andhra Pradesh, India.
Affiliated to Yogi Vemana University

AUTONOMOUS

SYLLABUS

UG & PG

2023-2024



2023-24

ENGLISH

SEMESTER – I

Course1:A Coursein Communication and SoftSkills
Theory Credits:4 4 hrs/week

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UNIT-I :ListeningSkills

ImportanceofListening
TypesofListening
Barriersto Listening
EffectiveListening

UNIT-II :Phonetics

SoundsofEnglish: Vowels andConsonants
Syllable
WordStress
Intonation

UNIT-III:Grammar

Concord
Articles
Prepositions
Tenses
Questiontags

UNIT-IV:SpeakingSkills

Greetings&Introduction
AskingandGivingInformation
Yes,WeCan BarackObama
Agreeing/Disagreeing
A LeaderShouldKnow HowtoManage FailureDr. A.P.J.AbdulKalam

UNIT-V:SoftSkills

SWOC
Attitude
EmotionalIntelligence
Netiquette
InterpersonalSkills

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2023-24

ENGLISH

Semester-2

Course1:ACourse inReading&WritingSkills

Theory Credits:4 4 hrs/week

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I. UNIT

Poetry	:1. I am not that Woman	Kishwar Naheed
Skills	:2.Vocabulary: Conversion ofWords	
	:3. OneWordSubstitutes	
	:4.Collocations	

II. UNIT

Prose	:1.Shyness, my Shield	M. K. Gandhi
Non-DetailedText	:2.FlorenceNightingale	AbrarMohsin
Skills	:3.SkimmingandScanning	

III. UNIT

Prose	:1.TheNightTrainatDeoli	RuskinBond
Poetry	:2.The Road Not Taken	RobertFrost
Skills	:3.Reading Comprehension (TopDown, Bottom Up and SchemaTheory)	
	:4.NoteMaking/Taking	

IV.UNIT

Poetry	:1.Poet, Lover, Bird watcher	NissimEzekiel
Skills	:2.ExpansionofIdeas	
	:3.Notices,Agendas and Minutes	

V.UNIT

Non-DetailedText	:1.AnAstrologer's Day	R.K.Narayan
Skills	:2.CurriculumVitaeandResume	
	:3.Letters	
	:4.E-Correspondenc	

2022-23

ENGLISH

English Syllabus-Semester-III (Modified)

English Praxis Course-III

A Course in Conversational Skills

Learning Outcomes

By the end of the course the learner will be able to :

- Speak fluently in English
- Participate confidently in any social interaction
- Face any professional discourse
- Demonstrate critical thinking
- Enhance conversational skills by observing the professional interviews

I. UNIT

Speech	**: 1. In London**	**M.K.Gandhi**
Skills	: 2. Greetings	
	: 3. Introductions	

II. UNIT

Speech	: 1. Yes, We Can	Barack Obama
Interview	: 2. A Leader Should Know How to Manage Failure Dr.A.P.J.Abdul Kalam/ India Knowledge at Wharton	
Skills	: 3. Requests	

III. UNIT

Interview	: 1. Nelson Mandela's Interview	With Larry King
Skills	: 2. Asking and Giving Information	
	: 3. Agreeing and Disagreeing	

IV. UNIT

Interview	: 1. JRD Tata's Interview	With T.N.Ninan
Skills	: 2. Dialogue Building	
	: 3. Giving Instructions/Directions	

V. UNIT

1. **Speech**	: 1. You've Got to Find What You Love	Steve Jobs
Skills	: 2. Debates	
	: 3. Descriptions	
	: 4. Role Play	

SYLLABUS 2023-24
GENRAL TELUGU
COMMON FOR BA/B.COM/B.SC
SEMESTER - I
COURSE - I : SAHITEESOURABHAM

Unit- 1 PRACHEENA KAVITWAM (Ancient Poetry)
Rajneeti- Nannayya - Andhra Mahabharata Sabhaparvam Prathamasvasam (Verses 26-57
Nannayya - Poet's Introduction
Democracy - Nadu, Today
Politics - Syllabus theme
Message of the political curriculum
Unit -II (Modern Poetry) ADHUNIKA SAHITYAM
GABBILAM - Joshua - Part One (Padyaalu 1-40)
Gurram Joshua Poet Introduction, Poem
Background of poetry
Gabbilam Curriculum Theme
Curriculum message
Unit-III KATHA (Story)
Alarasa Puttillu- Kalyana Sundari Jagannath
Author's introduction
Storyline, Message
plot
Character portrayal
Unit –IV NAVALA (Novel)
Journey of the Incompetent - Gopichand
Gopichand - Author's Introduction
Background of the novel
Novel theme, character portrayal
A novel message
Unit –V (Jeevitha charitra) (Biography)
Three Vajmaya peaks Tirumala Ramachandra
Poetry of Tirumala Ramachandra
Don't be lazy
Veturi Prabhakara Shastri
Manavalli Ramakrishna is a poet
Grammar
Guna Sandh,i thirika Sandhi, vriddhi Sandhi, yanadesa sandhi, akara Sandhi, ukara Sandhi

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DEPARTMENT OF TELUGU

SYLLABUS 2023-24
GENRAL TELUGU
COMMON FOR BA/B.COM/B.SC
SEMESTER -II

COURSE 2: SRUJANATMA RACHANA

Theory Credits: 3 4 hrs/week

1. VYAKTHEEKANA NAIPUNYALU (Expression Skills)

Language- Definitions, Characteristics

Language- Need, Benefits

Language- production arguments

Varna - word - sentence

II. ANUVADA RACHANA (Translation work)

Translation - Definitions, Requirement

Translation methods

Translation Issues - Geographical, linguistic, cultural issues.

The practice is to translate a 'paragraph' from English to Telugu and from Telugu to English

III. MADHYAMALAKU RACHANA (Writing for the media)

Journalism is news writing, editorial, review

Sound medium – Radio writing (story), podcast (documentary)

Visual Media- Television (Camera) Writing [Skit, Anchoring]

Writing for print medium / audio medium / visual medium to be done by students

IV. TELUGU VYASA RACHANA (Telugu Essay Writing)

Telugu Essay - Definitions, Characteristics

Witness Essay - Vernacular

Upadhyay Uwacha - Munimanikyam Narasimha Rao

Essay writing done by the student

V. TELUGU SANKETHIKATHA (Telugu Technology)

Introduction to Telugu script Unicode

Telugu Wikipedia

Telugu on social media

('e' magazines, websites, blogs)

Changes and additions to Telugu Wikipedia by students/

Doing Telugu writing on social media

SYLLABUS 2023-24
GENRAL TELUGU
COMMON FOR BA/B.COM/B.SC

SEMESTER - III
SEM:3 COURSE – 3 SRUJANAATHMAKA RACHANA,

PATYA PRANALIK

UNIT- I : VYAKTHEEKARANA NAIPUNYAALU

1.Vinathi patralu, Phiryadulu,

2.Lekhalu: adikaarika, vyakthigatalekhalu

3.Postarlu,karapatralu

UNIT- II :SRUJANATHMAKA RACHANA

1.Kavitha rachana,:Uthamakavitha –lakshanalu
2. katharachana ,Uthamakatha –lakshanalu
3 .vyasarachana: UthamaVyasam –lakshanalu

UNIT- III: ANUVADA RACHANA

1.Anuvadham nirvachanam,anuvadapaddathulu
2.Anuvadha samasyalu –bougolika,bhasha,saamskrutikasamasyalu ,parishkaraalu.
3.Abyasam: AnglamunundiTeluguku,Telugunundiaglamunakuokapeeranuanuvadimchatam.

UNIT- IV: MADYALAKU RACHANA -1

1.Mudranaa maadyamam(achumaadyamam) :Parichayam,paridhivikaasam.
2.Vividha rakaalapatrikaluparisеelana :patrika bhasha ,shyili,vaividyam.
3.Patrika rachana: Vartharachana ,sampaadakeeyalu,sameekshalu-avagaahana

UNIT- V: MAADYAMALAKU RACHANA -2(PRASAARA MAADYAMAM/ ELECTRONIC MEDIA)

1.Prasaara madyamaalu,:nirvachanam, rakaalu,vistruthi,prayojanaalu.
2.Sravana maadyamaalu – rachana: Radio rachana, prasangalu,naatikalu, prasaarasamaachaaram.
3. Drusyamadyamaalu – rachana: vyakyaanam(anchoring) television rachana

DEPARTMENT OF HINDI
SYLLABUS 2023-24
GENRAL HINDI
COMMON FOR BA/B.COM/B.SC
Semester –I

Gadya Sahitya (Prose)

Unit-I

1. Mitratha- Acharya Ramachandra Shukla

2.Sahit ke mahatta-Mahaveer Prasad Dvivedi

3.Binda-Mahadevi carma

Unit-II

1.Mukthidhan- Munshi Premchand

2.Purraskar- Jaya shankara Prasad

3. Aurrahpadhgayi-Dr.Kusunviyogi

Unit-III

1.Hindi Sahitya ka Itihas-Samanya Parichay

2. Kalvibhajan

Unit-IV

Kavyalayeen Shahdavali(English to Hindi,Hindi to English)

Ling, Vachan, Kaal ,Karak

Unit-V Patralekhan(Letter Writing)

1.Vyakthigath Patra

2.Aavedan Patra

(Chutti Patra, Pitaji ke naam Patra, Mitrake Naam par Patra, Anuvadak pad Ke liye Aavedan Patra)

DEPARTMENT OF HINDI
SYLLABUS 2023-24 GENRAL HINDI
COMMON FOR BA/B.COM/B.SC
Semester –II
Hindi Padya Sahitya

Unit-I -Pracheenkavitha

1.Kabeerdas -5 dohe
2.Soordas - Balvavnan
3.Thulasidas – 5 dohe

Unit-II Aadhunik Kavitha

1.Maathrubasha –By
Bhavatenda Harishchandra

2.Bhikshuk -By
Suryakanth thripathi nirala

3.Madabhroon By

(Raianitilak)

Unit-III Samanya nibhandh

1.Vidyarthi aur Anushasan
2.Vishwa Basha ke roopme Hindi
3.Pyavaran pradooshan

Unit-IV
Prayajannoolak Hindi - Parichay

Sarkari Patra-
Paribashaevam Patraka Namoona
1.Paripatra
2.Jnapan
3.Adhisoochana

Unit-V
1.Anuvaad- English to Hindi,Hindi to English (4 to 5 lines)

DEPARTMENT OF HINDI
SYLLABUS 2023-2024
GENRAL HINDI
COMMON FOR BA/B.COM/B.SC
Semester -III

I- Kavyadeep (Ancient and Modern Poetry)

1.Kabeerdas- Sakhee(2-20)

2. Soordas ka Balvarnan

3. MathruBhoomi- MythilisharanGuptaji

4. ThodthiPattar- SuryakanthThripatiNirala

5. DeshKagaj Par Bana NakshaNaheehai- SarwesudarDayal Saxena

II - Hindi Sahitya Ka Itihas (History of Hindi Litrature)

1. Bhaktikal

2.Gnanasrayi Sakha- Khaeer

3.Pramasrayi Sakha- Jyasee

I- SadharanNibandh (General Essays)

1.Samachar Patra

2.Bekari kiSamasya

3.Computer

4.Paryavaran AurPradhooshan

5.Sahitya aur Samaj

II- Anuvaad (Translation)

1.Anuvaad Abyas- English to Hindi (Four to Five Lines)

V- PrayojanMoolak Hindi (Funtional Hindi)

1.Paripatra

2. KaryalayGnapan 3. Adhisoochana

2023-24

Syllabus for (B.A./ B.Com. / B.Sc.) U.G. under CBCS
Second Language – Urdu
First year Degree Course Second Language Part - 1(b)

Paper – I: URDU POETRY

SEMESTER - I

UNIT – I
1. GHAZAL
MEER – *Raah-e-Daur-e-Ishq me Roota hai kya*
2. NAZM
Nazeer Akbarabadi – *Kaljug*

UNIT – II
1. GHAZAL
GHALIB – *Dard Minnat kash-e-Dawa na hua*
2. NAZM
SHIBLI – *Adl-e-Farooqi*

UNIT – III
1. GHAZAL
MOMIN – *Who jo Hum me Tum me Qaraar tha*
2. NAZM
IQBAL – *Chaand aur Tare*

UNIT – IV
1. GHAZAL
DAGH DEHLAVI – *Duniya me Aadmi ko Museebat Kahan nahi*
2. NAZM
AKBAR – *Naseehat-e-Akhlaqi*

UNIT – V
1. GHAZAL
JIGAR MURADABADI – *Koi Ye Kehde Gulshan Gulshan*
2. NAZM
FAIZ – *Lauh-o-Qalam*

SUGGESTED READING:

URDU SHAIRY KA FANNI IRTEQA – FARMAN FATEHPOOR

URDU

2023-24

URDU -Fiction

Semester -II

UNIT – I	**AFSANAWI ADAB KA TA'ARUF**
UNIT – II	**DASTAN** ***Shuru Qisse ka*** **(Baagh-oBahar: Meer Amman)**
UNIT – III	**NOVEL** ***Kaleem ka Mirza Zahirdaar Baig ke yahan Mehmaan Jana*** **(Taubatun Nasooh: Dy. Nazeer Ahmed)**
UNIT – IV	**DRAMA** ***Gud Ki Makhkhiyaan*** **(Dr. Kareem Roomani)**
UNIT – V	**AFSANA** ***Ek Aur Din*** **(Abdus Samad)**

2023-24

URDU

Syllabus for (B.A./ B.Com. / B.Sc.) U.G. under CBCS
Second Language – Urdu
Second Year Degree Course Second Language Part - 1(b)

Paper – III: Urdu Prose Fiction

SEMESTER - III

UNIT – I **AFSANAWI ADAB KA TA'ARUF**

UNIT – II **DASTAN**
Shuru Qisse ka **(Baagh-oBahar: Meer Amman)**

UNIT – III **NOVEL**
Kaleem ka Mirza Zahirdaar Baig ke yahan Mehmaan Jana
(Taubatun Nasooh: Dy. Nazeer Ahmed)

UNIT – IV **DRAMA**
Gud Ki Makhkhiyaan **(Dr. Kareem Roomani)**

UNIT – V **AFSANA**
Ek Aur Din **(Abdus Samad)**

SUGGESTED READING:

URDU SHAIRI KA TANQEEDI MUTA'A – SUMBUL NIGAAR
TAREEK-E-ADAB-E-URDU – NOORUL HASAN NAQUI
MUKHTASAR TAREEK-E-ADAB-E-URDU – EJAZ HUSSAIN

2023-24

SKILL COURSE (B.Sc./B. Com/B.A)

w.e.f. AY 2023-24

SEMESTER-I ANALYTICAL SKILLS

Theory Credits: 2 2 hrs/week

UNIT – 1: Arithmetic ability: Algebraic operations BODMAS, Fractions, Divisibility rules, LCM & GCD (HCF). Verbal Reasoning: Number Series, Coding & Decoding, Blood relationship, Clocks, Calendars.

UNIT – 2: Quantitative aptitude: Averages, Ratio and proportion, Problems on ages, Time-distance – speed. Business computations: Percentages, Profit & loss, Partnership, simple compound interest.

UNIT – 3: Data Interpretation: Tabulation, Bar Graphs, Pie Charts, line Graphs. Venn diagrams. Recommended Co-Curricular Activities Surprise tests / Viva-Voice / Problem solving/Group discussion.

Text Book: Quantitative Aptitude for Competitive Examination by R.S. Agrawal, S.Chand Publicatio

2023-24

SKILL COURSE (B.Sc./B. Com/B.A)
w.e.f. AY 2023-24
SEMESTER-I COMMUNICATION SKILLS
Theory Credits: 2 2 hrs/week

UNIT-I BASICS OF COMMUNICATION 1. Nature and importance of communication 2. Process of Communication 3. Principles of communication 4. Barriers to effective communication 5. Strategies for effective communication

UNIT-II PRESENTATION SKILLS 1. Preparation of a good presentation 2. Verbal communication in presentation 3. Non-verbal communication in presentation 4. Visual aids/Materials in presentation 5. Analyzing audience and managing questions

UNIT- III INTERVIEWS AND GROUP DISCUSSIONS 1. Interview and its types 2. Before, during and after an interview 3. Do's and Don'ts in an interview 4. Basic Interview questions 5. Structure and process of Group Discussions 6. Role functions, Do's and Don'ts

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2023-24

SKILL COURSE (B.Sc./B. Com/B.A)

w.e.f. AY 2023-24
SEMESTER-II

BUSINESS WRITING Theory
Credits: 2 2 hrs/week Course.

Unit 1:

Introduction to Business Writing: Importance and purpose of effective business writing; Characteristics of good business writing; Common challenges and misconceptions. Writing Clear and Concise Emails: Appropriate email etiquette in the professional environment, organizing email content and using effective subject lines, Understanding tone and formality in email communication.

Unit 2:

Memos and Interoffice Communication: Formatting and structure of memos, Writing memos for various purposes like updates, announcements, requests. Ensuring clarity and coherence in interoffice communication. Business Letters and Formal Correspondence: Structure and components of a business letter, writing persuasive and professional business letters, Responding to inquiries and complaints effectively.

Unit 3:

Business Proposals and Reports: Crafting business proposals for projects and initiatives, Formal report writing - format, sections, and organization, Analyzing data and presenting findings in reports. Writing for Digital Platforms: Business writing for websites, social media, and online communication, Leveraging technology for efficient and impactful business writing

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2023-24

SKILL COURSE(B.Sc./B. Com/B.A)
w.e.f. AY 2023-24
SEMESTER-II
DIGITAL LITERACY
Theory Credits: 2 2 hrs/week

Unit-1: operate the elements of a computer and performing operations on the computer Operate the elements of a computer including power cord, power switch, network connecting cable, USB ports, Mouse operations, Keyboard operations, interface icons, GUI elements, Editing options, perform operations including switching on the computer, logging in, locating a file, opening a file, printing a document, storing a file with proper extension, creating a folder/ sub folder in a volume on hard disk and desktop, shifting files from one folder to another, shutting off the computer

Unit-2: Access the Internet to browse information and E-mail operation Access the Internet, use a search engine, find information on the topic of interest, register for a web-based E-mail account, access E-mail with attachments, reply to an E-mail, forward an E-mail and delete an E-mail message

Unit-3: Make bill payments, other applications using Internet and word processing Make utility bill payments, booking bus/train tickets, bank transactions, personal transactions, job search through employment portals, mobile/DTH recharge, word processing basics, creating, editing and formatting of text, saving and printing of word document

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2023-24

Life Skill course

B.A., B. Com & B. Sc Programmes

Revised CBCS w.e.f 2020-21

LIFE SKILL COURSE

Indian Culture & Science

Total 30 hrs (02 h/wk, 02 Cr & Max 50 Marks)

Learning Outcomes:

By successful completion of the course, students will be able to:

1. Understand the evolution of India's culture
2. Analyze the process of modernization of Indian society and culture from past to future
3. Comprehend objective education and evaluate scientific development of India in various spheres
4. Inculcate nationalist and moral fervor and scientific temper

Syllabus:

Unit – I: Unity in Diversity in India: (09 hrs)

Coexistence of various religions since ancient times - Hinduism, Buddhism, Jainism and Atheism, and later Sikhism, Islam and Christianity

The Bhakti (Vishnavite and Saivaite) and Sufi Movements

The concepts of seela, karuna, kshama, maitri, vinaya, santhi and ahimsa Achievements in Literature, Music, Dance, Sculpture and Painting - Craftsmanship in cloth, wood, clay, metal and ornaments

Cultural diversity, Monogamy, Family system, Important seasonal festivals

Unit – II: Social Reforms and Modern Society: (09 hrs)

Reforms by Basaveswara - Raja Rama Mohan Roy – Dayananda Saraswathi –Swamy Vivekananda –Mahatma Gandhi - B. R. Ambedkar - Reforms in Andhra by Vemana,Veerabrahmam, Gurajada, Veeresalingam and GurramJashua (only reforms in brief, biographies not needed)

Modern Society: Family unity, Community service, Social Harmony, Civic Sense, Gender Sensitivity, Equality, National Fervor

Unit – III: Science and Technology: ((09 hrs)

Objectivity and Scientific Temper – Education on Scientific lines (Bloom's Taxonomy) - Online Education

Developments in Industry, Agriculture, Medicine, Space, Alternate Energy, Communications, Media through ages

Life Skill course

Elementary Statistics

Objective: To provide basic understating of general statistical tools and their elementary applications and to create awareness on Indian Statistical System.

Learning outcomes

Unit-I: To understand the concept of Statistics and its merits and demerits. Distinguishing primary and secondary data. Classification, Tabulation and Pictorial representation of data.

Unit - II: To understand the basic nature of data and how a single value describes the entire data set.Measuring the degree of departure of a distribution from symmetry and reveals the direction of scatterdness of the items.

Unit - III: To understand the spread of the data and to draw conclusions from the comparison of averages.
To understand the concept of correlation and regression and to learn the degree of association between two variables and establishing relationship between the variables.

Unit I: Meaning, scope and limitations of Statistics
Collection of data: Primary and Secondary, Classification and Tabulation, Construction of frequency distribution.
Graphical Representation: Histogram, Bar, Pie and Frequency polygon. (8hrs)

Unit II: *Measures of Central Tendency*: Features of good average, Arithmetic Mean, Median, Mode. Empirical relationship between Mean Median and Mode and skewness based on central values. (8hrs)

Unit III: *Measures of Dispersion:* Range, Quartile Deviation(QD), Mean Deviation(MD), Variance, Standard Deviation(SD), relationship between QD, MD and SD.Familiarizationof the concepts relating to Correlation and Linear Regression line. (8hrs)

2023-24

Life Skill course

HEALTH & HYGIENE

Unit I: Basics of Nutrition **10 Hrs.**

1. Nutrition – definition, importance, Good nutrition and mal nutrition; Balanced Diet: Basics of Meal Planning
2. Carbohydrates –functions, dietary sources, effects of deficiency.
3. Lipids –functions, dietary sources,effects of deficiency.
4. Proteins –functions, dietary sources, effects of deficiency.
5. Brief account of Vitamins- functions, food sources,effects of deficiency,
6. Macro and micro minerals –functions, effects of deficiency; food sources of Calcium, Potassium and Sodium; food sources of Iron, Iodine and Zinc
7. Importance of water– functions, sources, requirement and effects of deficiency.

Unit II: Health **10 Hrs.**

8. Health - Determinants of health, Key Health Indicators, Environment health & Public health; Health-Education: Principles and Strategies
9. Health Policy & Health Organizations: Health Indicators and National Health Policy of Govt. of India-2017; Functioning of various nutrition and health organizations in India viz., NIN (National Institution of Nutrition), FNB (Food and Nutrition Board), ICMR (Indian Council of Medical Research), IDA (Indian Dietetics Association),WHO-India, UNICEF-India
10. National Health Mission: National Rural Health Mission (NRHM) Framework, National Urban Health Mission (NUHM) Framework
11. Women & Child Health Care Schemes: Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+); Janani Shishu Suraksha Karyakaram (JSSK); Rashtriya Bal Swasthya Karyakram(RBSK); India Newborn Action Plan (INAP); Adolecent Heatlh- Rashtriya Kishor Swasthya Karyakram (RKSK)
12. Disaster Management – Containment, Control and Prevention of Epidemics and Pandemics – Acts, Guidelines and Role of Government and Public

Unit III: Hygiene **10 Hrs.**

13. Hygiene – Definition; Personal, Community, Medical and Culinary hygiene; WASH (**WA**ter, **S**anitation and **H**ygiene) programme
14. Rural Community Health: Village health sanitation & Nutritional committee (Roles & Responsibilities); About Accredited Social Health Activist (ASHA); Village Health Nutrition Day, Rogi Kalyan Samitis
15. Community & Personal Hygiene: Environmental Sanitation and Sanitation in Public places
16. Public Awareness through Digital Media - An Introduction to Mobile Apps of Government of India: NHP, Swasth Bharat, No More Tension, Pradhan Mantri Surakshit Mantritva Abhiyan (PM Suman Yojana), My Hospital (Mera aspataal), India fights Dengue, JSK Helpline, Ayushman Bhava, Arogya Setu, Covid 19AP

REFERENCES

- **Bamji, M.S., K. Krishnaswamy & G.N.V. Brahmam (2009)** *Textbook of Human Nutrition(3rd edition*) Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi
- **Swaminathan (1995)***Food & Nutrition*(Vol I, Second Edition) The Bangalore Printing &Publishing Co Ltd., , Bangalore
- **Vijaya Khader (2000)**Food, nutrition & health, Kalyan Publishers, New Delhi
- **Srilakshmi, B., (2010)***Food Science, (5th Edition)* New Age International Ltd., New Delhi
- Weblinks: https://nhm.gov.in/
    - National Rural Health Scheme:

2023-24

Life Skill course

Revised CBCS w.e.f 2020-21

LIFE SKILL COURSE

Personality Enhancement & Leadership

Total 30 hrs (02 h/wk, 02 Cr & Max 50 Marks)

Learning Outcomes:

By successful completion of the course, students will be able to:

1. Develop comprehensive understanding of personality
2. Know how to assess and enhance one's own personality
3. Comprehend leadership qualities and their importance
4. Understand how to develop leadership qualities

Syllabus:

Unit – I:(7 hrs)

Meaning of Personality – Explanations of Human Personality – Psychodynamic Explanations – Social Cognitive Explanation – Big Five traits of Personality

Unit – II: (8 hrs)

Assessment of Personality - Projective& Self Report Techniques - Building Self-Confidence – Enhancing Personality Skills

Unit – III:(10 hrs)

Leadership Characteristics – Types of Leaders – Importance of Leadership – Leadership Skills – Building and Leading Efficient Teams – Leadership Qualities of Abraham Lincoln, mahatma Gandhi, Prakasam Pantulu, Dr. B. R. Ambedkar & J.R.D.Tata

Co-curricular Activities Suggested: (05 hrs)

1. Assignments, Group discussions, Quiz etc
2. Invited Lecture by a local expert
3. Case Studies (ex., on students behavior, local leaders etc.)

Reference Books:

- Girish Batra, Experiments in Leadership, Chennai: Notion Press, 2018
- Mitesh Khatri, Awaken the Leader in You, Mumbai: Jaico Publishing House, 2013
- Carnegie Dale, Become an Effective Leader, New Delhi: Amaryllis, 2012
- Hall, C.S., Lindzey. G. & Campbell, J.B Theories of Personality. John Wiley & Sons, 1998

2023-24

Life Skill course

CBCS/ SEMESTER SYSTEM

(w.e.f 2020-21)

ANALYTICAL SKILLS

Syllabus **Total 30 Hrs**

Course Objective: Intended to inculcate quantitative analytical skills and reasoning as an inherent ability in students.

Course Outcomes:

After successful completion of this course, the student will be able to;

1) Understand the basic concepts of arithmetic ability, quantitative ability, logical reasoning, business computations and data interpretation and obtain the associated skills.

2) Acquire competency in the use of verbal reasoning.

3) Apply the skills and competencies acquired in the related areas

4) Solve problems pertaining to quantitative ability, logical reasoning and verbal ability inside and outside the campus.

UNIT – 1: (10 Hours)

Arithmetic ability: Algebraic operations BODMAS, Fractions, Divisibility rules, LCM & GCD (HCF).

Verbal Reasoning: Number Series, Coding & Decoding, Blood relationship, Clocks, Calendars.

UNIT – 2: (10 Hours)

Quantitative aptitude: Averages, Ratio and proportion, Problems on ages, Time-distance – speed.

Business computations: Percentages, Profit & loss, Partnership, simple compound interest.

UNIT – 3: (07 Hours)

Data Interpretation: Tabulation, Bar Graphs, Pie Charts, line Graphs. Venn diagrams.

Recommended Co-Curricular Activities (03 hrs)

Surprise tests / Viva-Voice / Problem solving/Group discussion.

Text Book:

Quantitative Aptitude for Competitive Examination by R.S. Agrawal, S.Chand Publications.

Reference Books

1. Analytical skills by Showick Thorpe, published by S Chand And Company Limited, Ramnagar, New Delhi-110055
2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.
3. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw Hill Publications.

2023-24

Life Skill course

A Mandatory Course for BA/BCom/BSc etc.

ENVIRONMENTAL EDUCATION

(Total hours of Teaching – 30 Hrs. @ 02 Hrs. per Week)

Course objective: A Generic Course intended to create awareness that the life of human beings is an integral part of environment and to inculcate the skills required to protect environment from all sides.

Learning outcomes: On completion of this course the students will be able to …..

1. Understand the nature, components of an ecosystem and that humans are an integral part of nature.
2. Realize the importance of environment, the goods and services of a healthy biodiversity, dependence of humans on environment.
3. Evaluate the ways and ill effects of destruction of environment, population explosion on ecosystems and global problems consequent to anthropogenic activities.
4. Discuss the laws/ acts made by government to prevent pollution, to protect biodiversity and environment as a whole.
5. Acquaint with international agreements and national movements, and realize citizen's role in protecting environment and nature.

Unit 1: Environment andNatural Resources **06 Hrs.**

1. Multidisciplinary nature of environmental education; scope and importance, need for public awareness
2. Structure and composition of Atmosphere, Hydrosphere, Lithosphere and Biosphere
3. Man as an integral product and part of the Nature.
4. A brief account of land, forest and waterresources in India and their importance.

5. Biodiversity : Definition; importance of Biodiversity , Levels of Biodiversity, genetic, species and ecosystem diversity.

Unit-2: Environmental degradation and impacts **10Hrs**

1. Human population growth and its impacts on environment; land use change, land degradation, soil erosion and desertification.
2. Use and over-exploitation of surface and ground water, construction of dams, floods, conflicts over water (within India).
3. Deforestation: Causes and effects due to expansion of agriculture, firewood, mining, forest fires and building of new habitats.
4. Non-renewable and renewable energy resources and their utilization.
5. A brief account of air, water, soil and noise pollutions; Biological, industrial and solid wastes in urban areas. Human health and economic risks.
6. Green house effect - global warming; ocean acidification, ozone layer depletion, acid rains and impacts on living organisms, agriculture and health.
7. Threats to biodiversity: Natural calamities, habitat destruction and fragmentation, over exploitation, hunting and poaching, introduction of exotic species, pollution, predator and pest control.

Unit 3: Conservation of Environment **10 Hrs**

1. Concept of sustainability and sustainable development with judicious use of land, water and forest resources; afforestation.
2. Control measures for various types of pollution; use of renewable and alternate sources of energy.
3. Solid waste management: Control measures of urban and industrial waste.
4. Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.
5. Environment Laws: Environment Protection Act; Act; Wildlife Protection Act; Forest Conservation Act.
6. International agreements: Montreal and Kyoto protocols; Environmental movements: Bishnois of Rajasthan, Chipko, Silent valley.

2023-24

Skill Development Courses

B.A., B. Com & B. Sc Programmes

Revised CBCS w.e.f. 2020-21

SKILL DEVELOPMENT COURSES

Arts Stream

Tourism Guidance

Total 30 hrs (02 h/wk, 02 Cr & Max 50 Marks)

Learning Outcomes:

By successful completion of the course, students will be able to:

1. *Understand the basic tourism aspects*
2. *Comprehend the requirements, role and responsibilities of profession of a Tourist Guide*
3. *Apply the knowledge acquired in managing different groups and guiding in a tour*
4. *Explain basic values related to tourism and heritage*

Syllabus:

Unit I: (06 hrs)

Tourism – What is Tourism - Characteristics of Tourist Places – Guidance in Tourism - Meaning of Guidance – Types of Tour Guidance - Government/Department Regulations

Unit II: (10 hrs)

Types of Guides – Characteristics of a Guide - Duties and Responsibilities of a Guide - The Guiding Techniques –Guide's personality- Training Institutions – Licence.

Leadership and Social Skills - Presentation and Communication Skills - Working with different age and linguistic groups - Working under difficult circumstances – Precautions at the site -Relationship with Fellow Guides and Officials.

Unit III: (10 hrs)

Guest Relationship Management- Personal and Official - Arrangements to Tourists – Coordinating transport - VISA/Passport -Accident/Death -Handling Guests with Special Needs/ Different Abilities –Additional skills required for Special/Adventure Tours - Knowledge of Local Security and Route Chart – PersonalHygiene and Grooming - Checklist - Code of Conduct

Co-curricular Activities Suggested: (04 hrs)

1. Assignments, Group discussion, Quiz etc.
2. Invited lecture/training by local tourism operators/expert/guides
3. Visit to local Tourism Department office and a tourist service office
4. Organisation of college level short-duration tours to local tourist sites.

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Skill Development Courses

A.P. State Council of Higher Education
B.A., B. Com & B. Sc Programmes

Revised CBCS w.e.f 2020-21

SKILL DEVELOPMENT COURSES

(To be offered from Semesters i to IV)

Arts Stream

PUBLIC RELATIONS

Total 30 hrs (02 h/wk, 02 Cr & Max 50 Marks)

Course Outcomes:

After successful completion of this course, the student will be able to:

1. *Understand the historical background and role Public Relations in various areas*
2. *Have insight into the use of the technological advancementsin Public Relations*
3. *Comprehend tools of Public Relations inorder to develop the required skills.*
4. *Understand the ethical aspects and future of Public Relations in India*
5. *Develop writing skills for news papers and creation of Blogs.*

Syllabus:

Unit I 06 Hrs	Public Relations-Meaning, Definition, Nature and Scope, Historical Background, Technological and Media Revolution and Role in Business, Government, Politics, NGOs and Industry.
Unit II 10 Hrs	Concepts of Public Relations-Press, Publicity, Lobbying, Propaganda, Advertising, Sales Promotion and Corporate Marketing Services, Tools of Public Relations-Press Conferences, Meets, Press Releases, Announcements, Webcasts
Unit III 10 Hrs	Public Relations and Mass Media, Present and future of Public Relations in India, Ethics of Public Relations and Social Responsibility, Public Relations and Writing-Printed Literature, Newsletters, Opinion papers and Blogs

Co-curricular Activities Suggested: (04 Hrs)

1. Invited lecture by local field expert/eminent personality on Public Relations
2. Visit to Press
3. Opinion Survey, Media Survey and Feedback
4. Case Studies
5. Organising mock press conferences, exhibitions
6. Assignments, Group discussion, Quiz etc.

Reference Books:

1. Brown, Rob, Public Relations and the Social Web, Kogan Page India, New Delhi, 2010.
2. Cutlipscottetal, Effective Public Relations, London, 1995.
3. Black Sam, Practical Public Relations, Universal Publishers, 1994.
4. S.M.Sardana, Public Relations: Theory and Practice.

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Skill Development Courses

Revised CBCS w.e.f 2020 - 21
To be Offered from Semester I to IV
SKILL DEVELOPMENT COURSE
COMMERCE STREAM

OFFICE SECRETARYSHIP

SYLLABUS

Learning Outcomes:

By the successful completion of course,the student will be able to;

1. *Understand the organizational hierarchy and outlines of functioning*
2. *Comprehend the role of office secretaryship in a small and medium organization*
3. *Acquire knowledge on office procedures and interpersonal skills*
4. *Apply the skills in preparing and presenting notes, letters, statements,reports in different situations.*

Syllabus

UNIT I: 06 hrs

Introduction – Organisational structure of a small and medium organization – Types of offices - Kinds of secretaries - The scope of office secretaryship

UNIT II: 10 hrs

The role of an office secretary -Duties and responsibilities- Usage of different devices - Flowchart and office manuals – Coordinating different wings of an office/organisaton – Arranging common meetings - Operations of banking and financial services - travel and hospitality management services

UNIT III: 10hrs

Office procedures – Filing– Circulating files - Preparation of notes, circulars, agenda and minutes of meetings – Issue of press notes - Maintenance of files and records - Inventory, office, human resources, financial and confidential - maintaining public relations.

Co curricular Activities: 04 hrs

1. Visit various organizations (Hospitals, Hotels, Hospitality centers)
2. Preparation of appointment letters, dismissal letters, memos, Issue of appreciation/ motivation letters,
3. Releasing of Press notes, notices and circulars
4. Arranging invited lectures from office executives,auditors and managers
5. Assignments, Group discussion, Quiz etc.

Reference books:

1. Rapidex Professional course - PustalMahal Group

2023-24

Skill Development Courses

B A, B Com & B Sc Programmes

Revised CBCS w.e.f. 2020-21
SKILL DEVELOPMENT COURSES
To be Offered from Semesters I to IV

COMMERCE STREAM

Syllabus of

INSURANCE PROMOTION

Total 30 hrs (02h/wk), 02 Credits & Max 50 Marks

Learning Outcomes:
By successful completion of the course, students will be able to;

1. *Understand the field level structure and functioning of insurance sector and it's role in protecting the risks*
2. *Comprehend pertaining skills and their application for promoting insurance coverage*
3. *Prepare better for the Insurance Agent examination conducted by IRDA*
4. *Plan 'promoting insurance coverage practice' as one of the career options.*

SYLLABUS:
Section I: 06 Hrs

Introduction of Insurance - Types of insurances. Growth of Insurance sector in India - Regulatory mechanism (IRDA) - Its functions

Section II: 10 Hrs

Life Insurance plans. Health insurance plans.Products and features. Contents of documents– Sales Promotion methods - Finding prospective customers –Counselling – Helping customers in filing - Extending post-insurance service to customers.

Section III : 10 Hrs

General Insurance - It's products (Motor, Marine,Machinery, Fire, Travel and Transportation) and features.Contents of documents.Dealing with customers – Explaining Products to Customers - Promoting Customer loyalty. Maintenance of Records.

Co-curricular Activities Suggested: (4 hrs)

1. Collection of pamphlets of various insurance forms and procedures
2. Invited Lectures by Development Officers concerned

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Skill Development Courses

B A, B Com & B Sc Programmes

Revised CBCS w.e.f. 2020-21
SKILL DEVELOPMENT COURSES

SCIENCE STREAM

Syllabus of
ELECTRICAL APPLIANCES

Total 30 hrs (02h/wk), ***02 Credits & Max Marks :50***

Learning Outcomes:
By successful completion of the course, students will be able to:

1. *Acquire necessary skills/hand on experience/ working knowledge on multimeters, galvanometers, ammeters, voltmeters, ac/dc generators, motors, transformers, single phase and three phase connections, basics of electrical wiring with electrical protection devices.*
2. *Understand the working principles of different household domestic appliances.*
3. *Check the electrical connections at house-hold but will also learn the skill to repair the electrical appliances for the general troubleshoots and wiring faults.*

SYLLABUS:

UNIT-I **(6 hrs)**
Voltage, Current, Resistance, Capacitance, Inductance, Electrical conductors and Insulators, Ohm's law, Series and parallel combinations of resistors, Galvanometer, Ammeter, Voltmeter, Multimeter, Transformers, Electrical energy, Power, Kilowatt hour (kWh), consumption of electrical power

UNIT-II **(10 hrs)**
Direct current and alternating current,RMS and peak values, Power factor, Single phase and three phase connections , Basics of House wiring , Star and delta connection , Electric shock, First aid for electric shock, Overloading , Earthing and its necessity, Short circuiting , Fuses , MCB , ELCB, Insulation, Inverter, UPS

UNIT-III **(10 hrs)**
Principles of working, parts and servicing of Electric fan, Electric Iron box, Water heater; Induction heater, Microwave oven; Refrigerator, Concept of illumination, Electric bulbs, CFL, LED lights, Energy efficiency in electrical appliances, IS codes & IE codes.

Co-curricular Activities (Hands on Exercises): (04 hrs)
[Any four of the following may be taken up]

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Skill Development Courses

B.A, B.Com & B.Sc. PROGRAMMES

Revised CBCS w.e.f. 2020-21
SKILL DEVELOPMENT COURSES
Science Stream

Syllabus of
PLANT NURSERY

Total 30 hrs (02h/wk), 02 Credits & Max Marks: 50

Learning Outcomes :

On successful completion of this course students will be able to;

1. *Understand the importance of a plant nursery and basic infrastructure toestablish it.*
2. *Explain the basic material, tools and techniques required for nursery.*
3. *Demonstrate expertise related to various practices in a nursery.*
4. *Comprehend knowledge and skills to get an employment or to become an entrepreneur in plant nursery sector.*

Syllabus:

Unit-1 :Introduction to plant nursery **06 Hrs.**

1. Plant nursery: Definition, importance.
2. Different types of nurseries –on the basis of duration, plants produced, structure used.
3. Basic facilities for a nursery; layout and components of a good nursery.
4. Plant propagation structuresin brief.
5. Bureau of Indian Standards (BIS-2008) related to nursery.

Unit- 2 :Necessities for nursery **09 Hrs.**

1. Nursery beds – types and precautions to be taken during preparation.
2. Growing media, nursery tools and implements, and containers for plant nursery, in brief.
3. Seeds and other vegetative material used to raise nursery.in brief.
4. Outlines of vegetative propagation techniques to produce planting material.
5. Sowing methods of seeds and planting material.

Unit-3 :Management of nursery **09 Hrs.**

1. Seasonal activities androutine operations in a nursery.
2. Nursery management – watering, weeding and nutrients; pests and diseases.
3. Common possible errors in nursery activities.
4. Economics of nursery development, pricing and record maintenance.
5. Online nursery information and sales systems.

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Skill Development Courses

B.A., B. Com & B. Sc Programmes

Revised CBCS w.e.f 2020-21

SKILL DEVELOPMENT COURSES

Arts Stream

JOURNALISTIC REPORTING

Total 30 hrs (02 h/wk, 02 Cr & Max 50 Marks)

Course Outcomes:

After successful completion of this course, the student will be able to:

1. *Understand the evolution of journalism with a focus on its development in India.*
2. *Comprehend the role of Press in the Indian democracy and various reporting methods.*
3. *Realise the ethical aspects of Journalism in India*
4. *Develop basic writing skills for news papers, Radio and Television.*

Syllabus:

Unit-I: 06 Hrs

Introduction to Journalism-Nature, Growth and Development in post independence era -Print Media, Mass Media and Electronic Media, Press as a Fourth Estate-Role of Press in Democracy.

Unit-II: 10 Hrs

Concept of News-News Values-Sources of News - News gathering ways: Press Conferences, Press Releases, Events, Meets, Interviewing-Types of Interviews and Interviewing Techniques- Methods of News Writing: Leads, News Stories and Body Development.

Unit- III 10 Hrs

Reporting-Kinds of Reporting-Objectives, Interpretative, Investigative, Legal, Developmental, Political, Sports, Crime, Economic, Commercial, Disaster, Technical and Scientific Reporting-Writing Special features: Photo features, Human interest features, Profiles, Column Writing, Writing for Radio and Television-Values and Ethics of Journalism.

Co-curricular Activities Suggested: (04 Hrs)

1. Collection and study of various English and Telugu Newspapers
2. Invited lecture/basic training by local experts
3. Visit to local Press office
4. Informally attending Press Conferences andMeets and taking notes
5. Assignments, Group discussion, Quiz etc.

ReferenceBooks:

1. Mencher Melvin, News Reporting and Writing, 1997, Columbia University Press.
2. Mazumdar Aurobindo, Indian Press and Freedom Struggle, 1993, Orient Longman.
3. Barun Roy, Beginners Guide to Journalism and Mass Communication, V&S Publishers, New Delhi.

A.P. State Council of Higher Education
B.A., B. Com & B. Sc Programmes

Revised CBCS w.e.f. 2020-21
SKILL DEVELOPMENT COURSES

Arts Stream

SURVEY & REPORTING

Total Hours : 30 (2h/w), Credits : 02, Max Marks: 50.

Learning Outcomes:

After successful completion of this course, the student will be able to:

1. *Understand the basics of survey and reporting needs and methods*
2. *Comprehend designing of a questionnaire*
3. *Conduct a simple and valid survey and Collect data*
4. *Organize and interpret data and Prepare and submit report.*

Syllabus:

Unit I 08Hrs	Survey: Meaning and Definition –Identifying need for survey - Identifying Sample –Characteristics of Sample - Types of Survey – Survey Methods – Advantages and Disadvantages of Survey – Essential Steps in Survey – Online Survey.
Unit II 09Hrs	Preparing Questionnaire: Types and Parts of Questionnaire – Qualities of good Questionnaire – Precautions inPreparing Questionnaire Administering/Piloting Questionnaire –Collection of data -Dealing with People – Maintaining objectivity/neutrality.
Unit III 10Hrs	Methods of Organizing data – Forms of data presentation - Tables and Figures – Basic Statistical Methods of Analysis of data –Percentages - Mean, Mode and Median –Simple Ways of showing Results– Tables/Graphs/Diagrams Report Writing: Forms of Reporting - Parts of a Report - Title page to Acknowledgements -Characteristics of a Good Report – Style of language to be used - Explaining Data in the Report – Writing fact-based Conclusions – making Recommendations – Annexing required material.

Recommended Co-curricular Activities (03 hrs):

1. Invited Lecture/Training by a Local Expert
2. Collection and study of questionnaires
3. Preparation of sample questionnaire and conduct a live sample survey
4. Preparation of a sample Report
5. Assisting a real time field survey and report writing
6. Assignments, Group discussion, Quiz etc.

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Skill Development Courses

B.A., B. Com., B.Sc. etc. Programmes
(Revised CBCS w.e.f.2020-2021)

Skill Development Courses
To be offered from Semesters I to IV

ARTS STREAM

Syllabus of

SOCIAL WORK

(Total 25 hrs (02h/wk), 02 Credits & Max. 50 Marks)

Learning Outcomes:

By successful completion of the course, students will be able to:

1. *Understand the basic concepts relating to social work practice, values, principles of social work and social problems in India*
2. *List out different approaches of providing help to the people in need.*
3. *Acquaint the process of primary methods of social work*
4. *Get to know the skills of working with individuals, groups and communities.*

Syllabus

Unit-I:(07Hrs)- Introduction to social work and concepts related to social work

Introduction to Social Work- Definition- Scope- objectives - Functions- social service, social welfare services, social reform, major social problems in India; Social work philosophy, values, objectives, principles, methods and fields of social work.

Unit-II:(09Hrs) Methods of Working with Individuals and Groups

Social case work –Definition-scope and importance of social case work, principles and process of social case work -Tools and techniques in social case work- Counselling skills. Social Group Work-Definition-scope- the need for social group work –Group work process - Principles of Group Work -Stages of Group Work-Facilitation skills and techniques.

Unit-III: (09Hrs)Workingwith Communitiesand Field Work in social work

Community – definition - characteristics- types- community organisation as a method of social work-definition-objectives-principles- phases of community organization -

concepts of community development, community participation and community empowerment.

Field work in social work – Nature, objectives and types of field work - Importance of field work supervision.

Suggested Co-curricular Activities:(05 hours)

1. Divide the students into groups, each group containing not exceeding 10 students depending upon the total number of students in a class or section. Each group can search in internetabout any one of the institutions which work for the welfare of children or women or elderly or scheduled caste and scheduled tribe children or differently abled persons or Juvenile homes or Correctional homes or hospitals or Mahila Pragathipranganam or Swadhar project or any social welfare project or non governmental organizations (NGOs) to have an idea about welfare agencies working for the needy.
2. Ask each group to exchange and discuss the information with other groups in the classroom with the information they collected on Internet.

Revised CBCS w.e.f. 2020-21

SKILL DEVELOPMENT COURSES

ARTS STREAM

Syllabus of

PERFORMING ARTS

Total 30 hrs (02h/wk), 02 Credits & Max. 50 Marks

Learning Outcomes:

After successful completion of this course, the student will be able to:

1. Acquire the basic knowledge in performing arts
2. Understand the modern stage and performance on the stage
3. Comprehend and improve the skills related to performing arts on the stage
4. Understand various Telugu folk arts and their significance
5. Know the modes of presentation and skills pertaining to folk arts.

SYLLABUS:

Unit-I: Introduction to performing Arts 06 Hrs

Arts – and its definition; Fine Arts; Arts - Learning &Imitation – Rasaas,Bhaavas and Rasa Sutra.Dasaroopakaas; Nrittha, Nrithya,Natya; Action – Kinds of Actions; Ancient Costume style .

Unit-II: Performing Arts – Stage Arts 10 Hrs

Origin of Drama (Theatre); Features of Stage; Varieties of Modern Telugu Drama; Famous Telugu Dramas.

Stage performance; Dramatic Actor and its definition; Actor–characteristics, Functions and Responsibilities.

Traits of an Actor – Diction, Articulation, Dialogue modulation, Time sense, Observation, Mime, Improvisation, Commentary,

Dress code, Make-up, lighting &Stage Direction.

Unit-III:Performing Arts – Forms 10 Hrs

Folk Arts, theirnature and significance – Brief introduction to Pagativeshaalu, Bommalaatalu, Veedhinaatakaalu, Yakshagaanaalu, Harikathalu, Burrakathalu, Oggukathalu, Chindu,Yakshagaanam, Kolaatamand Pulivesham.

Co-curricular Activities Suggested: (4 hrs)

Revised CBCS w.e.f. 2020-21
SKILL DEVELOPMENT COURSES

COMMERCE STREAM

AGRICULTURAL MARKETING

Total 30 hrs (02h/wk), 02 Credits & Max 50 Marks

Learning Outcomes:
By the successful completion of this course, the student will be able to;

1. *Know the kinds of agricultural products and their movement*
2. *Understand the types, structure and functioning of agricultural marketing system*
3. *Comprehend related skills and apply them in sample situations*
4. *Extend this knowledge and skills to their production/consumption environment*

SYLLABUS:

Unit- I: 06hrs

Introduction of Agriculture and agricultural products (including agriculture, horticulture, sericulture, floriculture, aquaculture- genetic culture and dairy product) - Agricultural Marketing - Role of marketing - Concepts - Goods and services - Movement of product from farm to consumer –Middlemen – Moneylenders - Types of agricultural markets (basic classification).

Unit- II: 09hrs

Basic structure and facilities of an agricultural market – Primary, secondary and tertiary markets–Functioning of Market Yards–Market information - RythuBharosaKendras (RBK) - Govtmarket policies and regulations- Contract farming -Govt Apps for marketing of agri products.

Unit- III: 10hrs

Planning production – assembling – grading - transportation– storage facilities.Price fixation. Dissemination of market information –and role of ICT.Marketing - Mix- Product element- Place element- Price element- Promotion element. Selection of target market. Government programs in support of Agricultural marketing in India.

Suggested Co-curricular Activities: 05hrs

1. Study visit to agricultural marketsand RythuBharosaKendras (RBK)
2. Invited lecture by field expert

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Skill Development Courses

SKILL DEVELOPMENT COURSE

COMMERCE STREAM

BUSINESS COMMUNICATION

Total 30 hrs (02hrs/wk), 02 Credits, Max 50 marks

Learning Outcomes:

Aftersuccessful completion of this course, students will be able to;

1. *Understand the types of business communication and correspondence*
2. *Comprehend the processes like receiving, filing and replying*
3. *Acquire knowledge in preparing good business communications*
4. *Acquaint with organizational communication requirements and presentations.*

SYLLABUS:

UNIT I : 06hrs

Introduction and Importance of communication an overview - meaning and process of communication - organizational communication and its barriers.

UNIT II: 10hrs

Types of Business Communications –Categories, methods and formats - Business vocabulary - Business idioms and collocations – OrganisationalHierarchy - Various levels of communication in an organization – Top-down, Bottom-up and Horizontal-Business reports, presentations– Online communications.

UNIT III: 10hrs

Receiving business communications -Filing and processing -Sending replies. Routine cycle of communications – Writing Communications - Characteristics of a good business communication -Preparation of business meeting agenda – agenda notes - minutes –circulation of minutes – Presentations of communication using various methods.

Recommended Co-curricularActivities (04hrs):

1. Collection of various model business letters
2. Invited lecture/field level training by a local expert
3. Reading of various business reports and minutes and its analysis
4. Presentations of reports, charts etc.
5. Assignments, Group discussion, field visit etc.

Revised CBCS w.e.f 2020-21
SKILL DEVELOPMENT COURSES
COMMERCE STREAM

ADVERTISING

Total 30 hrs (2hrs/wk) 02 credits & Maximum 50 Marks

Learning Outcomes:

After Successful completion of this course, the students are able to;

1. *Understand the field of Advertising*
2. *Comprehend opportunities and challenges in Advertising sector*
3. *Prepare a primary advertising model*
4. *Understand applying of related skills*
5. *Examine the scope for making advertising a future career*

Syllabus

UNIT I: 06hrs

Introduction of advertising concepts- functions - Types of advertising - Creative advertising messages - Factors determining opportunities of a product/service/Idea

UNIT II: 10 hrs

Role of advertising agencies and their responsibilities - scope of their work and functions - - Ethical issues - Identifying target groups -Laws in advertising. Advertising Statutory Bodies in India - Role of AAAI (Advertising Agencies Association of India), ASCI (Advertising Standard Council of India)

UNIT III: 10hrs

Types of advertising – Basic characteristics of a typicaladvertisement –Reaching target groups - Local advertising – Feedback on impact of advertisement - Business promotion.

Recommended Co-curricular Activities (04 hrs):

1. Collection and segmentation of advertisements
2. Invited Lectures/skills training on local advertising basics and skills
3. Visit to local advertising agency
4. Model creation of advertisements in compliance with legal rules
5. Assignments, Group discussion, Quiz etc.

Reference booksand Websites:

1.Bhatia. K.Tej - Advertising and Marketing in Rural India - Mc Millan India

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Skill Development Courses

Revised CBCS w.e.f. 2020-21
SKILL DEVELOPMENT COURSES

COMMERCE STREAM
Syllabus of
LOGISTICS AND SUPPLY CHAIN MANAGEMENT
Total 30 hrs (02h/wk), 02 Credits & Max 50 Marks

Learning Outcomes:
At the successful completion of the course, the student will able to;

1. *Summarize relationship between marketing and Logistic Management*
2. *Understand the concepts of Supply Chain Management in connection with products.*
3. *Understanding various types of seller and suppliers*
4. *Evaluate best logistic method among all means of transport operations*
5. *Analysis of different distribution strategies - online and physical distribution*
6. *Compare the Logistics in National and International Scenario.*
7. *Design and develop new methods and models of Logistics in SCM*

SYLLABUS:

Unit-1: Introduction to Logistics and Supply Chain Management (SCM):
Functions of Logistics - Structure of logistics - Logistics Costs - Modes of Logistics - Logistics in 21st Century -- Role of Supply Chain Management - Design and Development of Supply Chain Network - Different types of Supply Chain Networks

Unit-II: Logistics:
Customer Selection - Process -Customer Service and Customer Retention – Relationship Management - Integrating Logistics and Customer Relationship Management

Unit-III: Supply Chain Management:
Managing and Estimating Supply Chain Demand – Forecasting Techniques – Supplier Networks –Skills to Manage SCM - Recent Trends in SCM

Suggested Co-curricular Activities:

1. Invited lecture from Domain/Industry Experts
2. Field Visit (Manufacturing units, Suppliers)
3. Assignments, Seminars, Group Discussion, Quiz and Role Play
4. Poster presentations on SCM
5. Case Study Development

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Skill Development Courses

B.A, B.Com & B.Sc. PROGRAMMES

Revised CBCS w.e.f. 2020-21
SKILL DEVELOPMENT COURSES

Science Stream

Syllabus of

SOLAR ENERGY

Total 30 hrs (02h/wk), *02 Credits & Max Marks: 50*

Learning Outcomes:
After successful completion of the course, students will be able to:

1. *Acquire knowledge onsolarradiation principles with respect to solar energy estimation.*
2. *Get familiarized with various collecting techniques of solar energy and its storage*
3. *Learn the solar photovoltaic technology principles and different types of solar cells for energy conversion and different photovoltaic applications.*
4. *Understand the working principles of several solar appliances like Solar cookers, Solar hot water systems, Solar dryers, Solar Distillation, Solar greenhouses*

SYLLABUS:

UNIT-I – Solar Radiation: **(6 hrs)**

Sun as a source of energy, Solar radiation, Solar radiation at the Earth's surface, Measurement of Solar radiation-Pyroheliometer, Pyranometer, Sunshine recorder, Prediction of available solar radiation, Solar energy-Importance, Storage of solar energy, Solar pond

UNIT-II – Solar Thermal Systems: **(10 hrs)**

Principle of conversion of solar radiation into heat, Collectors used for solar thermal conversion: Flat plate collectors and Concentrating collectors, Solar Thermal Power Plant, Solar cookers, Solar hot water systems, Solar dryers, Solar Distillation, Solar greenhouses.

UNIT-III – Solar Photovoltaic Systems: **(10 hrs)**

Conversion of Solar energy into Electricity - Photovoltaic Effect, Solar photovoltaic cell and its working principle, Different types of Solar cells, Series and parallel connections, Photovoltaic applications: Battery chargers, domestic lighting, street lighting and water pumping

Co-curricular Activities (Hands on Exercises): (04 hrs)
[Any four of the following may be taken up]

1. *Plot sun chart and locate the sun at your location for a given time of the day.*
2. *Analyse shadow effect on incident solar radiation and find out contributors.*
3. *Connect solar panels in series & parallel and measure voltage and current.*
4. *Measure intensity of solar radiation using Pyranometer and radiometers.*
5. *Construct a solar lantern using Solar PV panel (15W)*
6. *Assemble solar cooker*
7. *Desigining and constructing photovoltaic system for a domestic house requiring 5kVA power*
8. Assignments/Model Exam.

2023-24

Skill Development Courses

B.A, B.Com & B.Sc. PROGRAMMES

Revised CBCS w.e.f. 2020-21
SKILL DEVELOPMENT COURSES

Science Stream

Syllabus of
FRUITS AND VEGETABLES PRESERVATION

Total 30 hrs (02h/wk), 02 Credits & Max Marks: 50

Learning Outcomes:

On successful completion of this course the students will be able to;

1. *Identify various types of fruits and vegetables and explain their nutritive value.*
2. *Understand the fragile nature of fruits and vegetables and causes for their damage.*
3. *Explain various methods of preservation for fresh fruits and vegetables.*
4. *Get to know the value-added products made from fruits and vegetables.*

Syllabus:

Unit – 1 : Introduction to fruits and vegetables 06 Hrs.

1. Fruits: Definition, elementary knowledge on types of fruits (fleshy and dry) with local /common examples.
2. Vegetables: Definition, elementary knowledge on types of vegetables (root, leafy, stem, flower and fruit) with local/ common examples.
3. Importance of fruits and vegetables in human nutrition.
4. Concept of perishable plant products – maturation and spoilage, shelf life; preservation – definition and need for preservation of fruits and vegetables.

Unit – 2 :Preservation of Fruit 09 Hrs.

1. Fruits – ripening and biological aging; storage and preservation concerns.
2. Preservation of fresh fruits at room temperature and in cold storage.
3. Fruit preservation at room temperatue as juices, squashes and syrups.
4. Preservation of fruits by application of heat; making of fruit products (jams, jellies and fruit slices in processing factories).
5. Preservation by dehydration (Eg. banana chips), application of sugar (Eg. mango candy), application of salt (pickling).
6. Fruit preservation by freezing – storage at the lowest temperatures.

Unit – 3 :Preservation of vegetables 09 Hrs.

1. Vegetables – losses after harvesting and causes; problems in handling and storage.
2. Modern methods of packaging and storage to reduce losses.
3. Trimming of vegetables and packing in cartons; dehydration technique -factory processing.
4. Making of vegetable products (flakes/chips of potato and onion; garlic powder).
5. Frozen vegetables – Carrots, Cauliflower, Okra and Spinach.
6. Preservation of sliced vegetables in factories by canning and bottling.
7.

Suggested Co-curricular activities (6 Hrs.)

1. Assignments/Group discussion/Quiz/Model Exam.
2. Invited lecture and demonstration by local expert
3. Exhibition of various types of locally available fruits and vegetables.
4. Hands on training on handling and packaging methods of fresh fruits and vegetables.
5. Hands on training on making fruit juices.
6. Display of various preserved fruit products available in local markets.
7. Hands on training on making of potato, yam, onion chips.
8. Display of various preserved vegetable products available in local markets.
9. Watching videos on preservation of fruits and vegetables.
10. Visit to Horticulture University or research station to learn about value added products of fruits and vegetables.

2023-24

Skill Development Courses

B A, B Com & B Sc Programmes

Revised CBCS w.e.f. 2020-21

SKILL DEVELOPMENT COURSES

To be Offered from Semesters I to IV

ZOOLOGY STREAM

Syllabus of

DAIRY TECHNOLOGY

Total 30 hrs (02h/wk), 02 Credits & Max 50 Marks

Learning Outcomes:

Aftersuccessful completion of the course, students will be able to;

1. Understand the pre-requisites for starting a Dairy farm
2. Recognize different breeds of Cows & buffaloes following safety precautions.
3. Prepare and give recommended feed and water for livestock
4. Maintain health of livestock along with productivity
5. Vaccination of cattle, nutrients requirements
6. Entrepreneurship i.e., Effectively market dairy products
7. Ensure safe and clean dairy farm and Standard safety measures to be taken in establishing am industry
8. Efficiently start and manage to establish or develop a Dairy Industry

SYLLABUS:

Section I (Introduction and Establishment of a Dairy Farm): 05 Hrs

1.1 Dairy development in India – Dairy Cooperatives (NDRI, NDDB, TCMPF)(1hr)

1.2 Constraintsof Present Dairy Farmingand Future Scope of Dairy Farmer.(1 hr)

1.3 Selection of site for dairy farm; Systems of housing – Loose housing system, Conventional Dairy Farm; Records to be maintained in a dairy farm. (2 hrs)

Section II (Livestock Identification and Management): 13 Hrs

2.1 Breeds of Dairy Cattle and Buffaloes – Identification of Indian cattle and buffalo breeds and Exotic breeds; Methods of selection of Dairy animals. (5 hrs)

2.2 Systems of inbreeding and crossbreeding. (2 hrs)

2.3 Weaning of calf, Castration, Dehorning, Deworming and Vaccination programme (3 hrs)

2.4 Care and management of calf, heifer, milk animal, dry and pregnant animal, bulls and bullocks. (3 hrs)

Section III (Feed Management, Dairy Management, Cleaning and Sanitation): 8 Hrs

3.1 Basic Principles of Feed, Important Feed Ingredients, Feed formulation and Feed Mixing(2 hrs)

3.2 Operation Flood –Definition of Milk and Nutritive value of milk and ICMR recommendation of nutrients –Per Capita Milk production and availability in India and Andhra Pradesh -Methods of Collection and Storage of Milk–Labelling and Storage of milk products (4 hrs)

3.3 Cleaning and sanitation of dairy farm – Safety precautions to prevent accidents in an industry. (2 hrs)

Co-curricular Activities Suggested: (4 hrs)

1. Group discussion&SWOT analysis
2. Visit to a Dairy Farm
3. Visit to Milk Cooperative Societies
4. Visit to Feed Milling Plants
5. Market Study and Identification of Government Schemes, Insurance and Bank Loans in relation to dairy farming

Reference books:

1. Dairy Science: Petersen (W.E.) Publisher – Lippincott & Company
2. Principles and practices of Dairy Farm –Jagdish Prasad
3. Text book of Animal Husbandry - G C Benarjee
4. Hand book of Animal Husbandry - ICAR Edition
5. Outlines of Dairy Technology – Sukumar (De) – Oxford University press
6. Indian Dairy Products – Rangappa (K.S.) & Acharya (KT) – Asia Publishing House.
7. The technology of milk Proceesing – Ananthakrishnan, C.P., Khan, A.Q. and Padmanabhan, P.N. – Shri Lakshmi Publications.
8. Dairy India 2007, Sixth edititon
9. Economics of Milk Production – Bharati Pratima Acharya Publishers.
10. http://www.asci-india.com/BooksPDF/Dairy%20Farmer%20or%20Entrepreneur.pdf
11. https://labour.gov.in/industrial-safety-health

2023-24

Skill Development Courses

B.A, B.Com & B.Sc. PROGRAMMES

Revised CBCS w.e.f. 2020-21
SKILL DEVELOPMENT COURSES

Science Stream

Syllabus of
FOOD ADULTERATION

Total 30 hrs (02h/wk), *02 Credits & Max Marks: 50*

Learning Outcomes:
After successful completion of the course, students will be able to:

1. *Get basic knowledge on*various *foods and about adulteration.*
2. *Understand the adulteration of common foods and their adverse impact on health*
3. *Comprehend certain skills of detecting adulteration of common foods.*
4. *Be able to extend their knowledge to other kinds of adulteration, detection and remedies.*
5. *Know the basic laws and procedures regarding food adulteration and consumer protection.*

SYLLABUS:

UNIT-I – Common Foods and Adulteration: **(07hrs)**

Common Foods subjected to Adulteration - Adulteration – Definition – Types; Poisonous substances, Foreign matter, Cheap substitutes, Spoiled parts. Adulteration through Food Additives – Intentional and incidental. General Impact on Human Health.

UNIT-II –: Adulteration of Common Foods and Methods of Detection: **(10hrs)**

Means of AdulterationMethods of Detection Adulterants in the following Foods; Milk, Oil, Grain, Sugar, Spices and condiments, Processed food, Fruits and vegetables. Additives and Sweetening agents (at least three methods of detection for each food item).

UNIT-III –:Present Laws and Procedures on Adulteration: **(08hrs)**

Highlights of Food Safety and Standards Act 2006 (FSSA) –Food Safety and Standards Authority of India–Rules and Procedures of Local Authorities.
Role of voluntary agencies suchas, Agmark, I.S.I.Qualitycontrol laboratories of companies, Private testing laboratories,Quality controllaboratoriesofconsumerco-operatives.
Consumer education,Consumer's problemsrightsandresponsibilities, COPRA 2019 - Offenses and Penalties – Procedures to Complain – Compensation to Victims.

Recommended Co-curricular Activities (including Hands on Exercises): **(05hrs)**

1. Collection of information on adulteration of some common foods from local market
2. Demonstration of Adulteration detection methods for a minimum of 5 common foods (one method each)
3. Invited lecture/training by local expert

B.A, B.Com and B.Sc Programmes
Revised CBCS w.e.f 2020-21

SKILL DEVELOPMENT COURSES

ARTS STREAM

Syllabus of

FINANCIAL MARKETS

Total 30 hrs (2hrs/wk) 02 credits & Maximum 50 Marks

Learning Outcomes:

After successful completion of this course, the students will be able to;

1. *Acquire knowledge of financial terms*
2. *Know the concepts relating to and markets and different avenues of investment*
3. *Understand the career skills related to Stock Exchanges*
4. *Comprehend the personal financial planning and money market skills*

Syllabus

UNIT-I: 06hrs
Indian Financial System- its components - Financial markets and institutions

UNIT-II: 10hrs
Capital Market - its function - organizations - elements - (shares, debentures, bonds, mutual funds) debt market - Equity market (SEBI) and secondary market (NSE)

UNIT-III: 10hrs
Money market - Organized - Unorganized - Sub market (call money, commercial bills, Treasury bill, Certificate of Deposit, Commercial papers)

Co-curricular activities: (04 hrs)

1. Collection and study of pamphlets, application forms etc.
2. Invited lectures on the field topics by local experts
3. IntroducingOnline classes from NSE
4. Field visitto mutual fund offices/share brokers
5. Observation, study and analysis of selected companies share prices
6. Assignments, Group discussion, quiz etc.

Reference books:

1.T.R. Jain R.L.Sarma - Indian Financial System- VK Global publisher
2. Jithendra Gala - Guide to Indian Stock markets Buzzing Stock publishing house

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Skill Development Courses

B.A,B.Com & B.Sc Programmes
Revised CBCS w.e.f 2020-21

SKILL DEVELOPMENT COURSES

ARTS STREAM

DISASTER MANAGEMENT

Total 30hrs (2hrs/week) 2 Credits Total 50 Marks

Learning Outcomes:

After successful completion of the course, the students are able to;

1. *Understand the nature, cause and effects of disasters*
2. *Comprehend the importance of Disaster Management and the need of awareness*
3. *Acquire knowledge on disaster preparedness, recoveryremedial measures and personal precautions*
4. *Volunteer in pre and post disaster management service activities*

Syllabus:

UNIT-I: 06 hrs

Introduction of Disaster - Different types of disasters- Natural- (flood, cyclone,earthquake, famineand pandemic) - Accidental- (Fire,Blasting,Chemical leakage, Rail,Aviation, Road boat tragedies and nuclear pollution) - Disaster Management Act 2005

UNIT-II: 09hrs

Causes and immediate effects of Disasters - Preparedness of disasters –Precautions – Dissemination of information - Nature and concepts - Role of National Disaster Management Authority and Role of Government and non governmental organizations in protecting human livestockand natural resources.-Use of technology -Role of Citizens and Youth in the prevention.

UNIT-III - 09 hrs

Post disaster effects - short term - Procedures for Rehabilitation and Recovery - Role of volunteers and Safety Precautions - Long term remedial and preventive measures – Collection, filing and storage of information - Case studies

Suggested co curriculum Activities: (06 hrs)

1. Invite lectures by local experts
2. Training on preparedness, post disaster services
3. Analysis of Case studies
4. Visit to a disaster management office and facility
5. Assignments, Group discussion, quiz etc.

References:

1. Jagbirsingh - Disaster Management Future challenges and opportunities- - K.W.Publishers

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Skill Development Courses

B A, B Com & B Sc Programmes

Revised CBCS w.e.f. 2020-21
SKILL DEVELOPMENT COURSES

COMMERCE STREAM

Syllabus of

ONLINE BUSINESS

Total 30 hrs (02h/wk), 02 Credits & Max 50 Marks

Learning Outcomes:
After successful completion of the course, students will be able to;

1. *Understand the online business and its advantages and disadvantages*
2. *Recognize new channels of marketing, their scope and steps involved*
3. *Analyze the procurement, payment process, security and shipping in online business*
4. *Create new marketing tools for online business*
5. *Define search engine, payment gateways and SEO techniques.*

SYLLABUS:

Section-I: 06 Hrs
Introduction to Online-business-Definition-Characteristics-Advantages of Online Business-Challenges- Differences between off-line business, e-commerce and Online Business.

Section-II: 10 Hrs
Online-business Strategies-Strategic Planning Process- Procurement -Logistics & Supply Chain Management- Customer Relationship management.

Section-III: 10 Hrs
Designing Online Business Website – Policies - Security & Legal Issues - Online Advertisements - Payment Gateways - Case Study

Co-curricular Activities Suggested: (4 hrs)

1. Assignments, Group discussion, Quiz etc.
2. Short practical training in computer lab
3. Identifying online business firms through internet
4. Invited Lectures by e-commerce operators
5. Working with Google and HTML advertisements.
6. Visit to a local online business firm.

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Skill Development Courses

B.A, B.Com & B.Sc Programmes
Revised CBCS w.e.f 2020 -21

SKILL DEVELOPMENT COURSES

COMMERCE STREAM

RETAILING

Total 30hrs (02hrs/wk) 02 credits & Maximum 50 Marks

Learning Outcomes:

After successful completion of this course,the students are able to;

1. *Know the retailing business, its growth in India and social impact*
2. *Understand the and organization and supply in retailing*
3. *Comprehend the opportunities and challenges in retailing*
4. *Learn the functions that support outlet operations, sales and services*
5. *Create a shopping experience model that builds customer loyalty and business promotion*

SYLLABUS:

Unit I: 06hrs

Introduction -Retailing - Definition– Role of Retailing- Types of Retailing – Factors influencing the Growth of Retailing in India.

Unit II: 10 hrs

Store location – factors influencing selection of location - Types of retail outlets - stores design & operations- Merchandise planning - Administrative mechanism

Unit III: 10hrs

Human resources in retailing - Job profile- Services to customers – Customer care - Communications with customers - Visual merchandising – enhancing customer loyalty and Sales promotion.

Recommended Co-curricularActivities (04 hrs):

1. Collection of information on local retailing
2. Invited lecture/skills training by a local expert
3. Visit near-by stores /Godowns/warehouses and prepare study projects
4. Field training during leisure hours
5. Assignments, Group discussion, Sharing of experience etc.

Reference books:

1. 1.Swapna pradhan.R.M - Retail Management - Tata Mg Graw Hill

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Skill Development Courses

B A, B Com & B Sc Programmes

Revised CBCS w.e.f. 2020-21
SKILL DEVELOPMENT COURSES

SCIENCE STREAM

Syllabus of
ENVIRONMENTAL AUDIT
Total 30 hrs (02h/wk), 02 Credits & Max 50 Marks

Learning Outcomes:
By successful completion of the course, students will be able to;

1. *Understand the basic concepts Environmental health*
2. *Learn and identify the industrial pollution*
3. *Explain the highlights in the regulatory aspects of Environmental law and policy*
4. *Understand the various phases of Environmental Audit*

UNIT – I
Industrial Pollution and its effects 06h
Climate – Weather and Air Pollution – Classification of water and water bodies – Water Quality Parameters – Water Pollution – Sources – Classification, nature and Toxicology of water pollutants. - Soil parameters –Soil pollution and impacts – Soil conservation

UNIT - II
Environmental Law & Policy: 09h
Highlights of the Acts, Institutional arrangements for: (1) The Water (Prevention & Control of Pollution) Act, 1974 amended in 1988; (2) The Air (Prevention and Control of Pollution) Act, 1981 amended in 1987; (3) The Water (Prevention and Control of Pollution) Cess Act, 1977 amended in 1991; (4) The Environment (Protection) Act, 1986; (5) The Public Liability Insurance Act, 1991; – Indian Policy Statement for abatement of Pollution, 1992.

UNIT - III
Environmental Audit - Scope & Requisites: 10h
Environmental Audit: Definition; Objectives; Scope, Coverage - GOI Notification on Environmental Audit - Benefits to Industry. Reporting Environmental Audit Findings - Importance of Environmental Audit Report to industry, public and the governments.

B A, B Com & B Sc Programmes

Revised CBCS w.e.f. 2020-21

SKILL DEVELOPMENT COURSES

To be Offered from Semesters I to IV

ZOOLOGY STREAM

Syllabus of

POULRY FARMING

Total 30 hrs (02h/wk), 02 Credits & Max 50 Marks

Learning Outcomes:

By successful completion of the course, students will be able to;

1. Understand the field level structure and functioning of insurance sector and it's role in protecting the risks
2. Comprehend pertaining skills and their application for promoting insurance coverage
3. Prepare better for the Insurance Agent examination conducted by IRDA
4. Plan 'promoting insurance coverage practice' as one of the career options.

SYLLABUS:

Section I (Introduction to Poultry Farming): 10Hrs

1.1 General introduction to poultry farming -Definition of Poultry; Past and present scenario of poultry industry in India.
1.2 Principles of poultry housing. Poultry houses. Systems of poultry farming.
1.3 Management of chicks, growers and layers. Management of Broilers.
1.4 Preparation of project report for banking and insurance

Section II (Feed and Livestock Health Management): 10 Hrs

2.1 Poultry feed management – Principles of feeding, Nutrient requirements for different stages oflayers and broilers. Feed formulation and Methods of feeding.
2.2 Poultry diseases – viral, bacterial, fungal and parasitic(two each); symptoms, control and management; Vaccination programme.

Section III(Harvesting of Eggs and Sanitation): 10 Hrs

3.1 Selection, care and handling of hatching eggs. Egg testing.Methods of hatching.
3.2 Brooding andrearing. Sexing of chicks.
3.3 Farm and Water Hygiene, Recycling of poultry waste.

Multidisciplinary Course(Science Stream)
w.e.f. AY 2023-24
SEMESTER-I
Introduction to Social Work
Credits: 2 2 hrs/week
. Syllabus

Unit-I:(07Hrs)- Introduction to social work and concepts related to social work Introduction to Social Work- Definition- Scope- objectives - Functions- social service, social welfare services, social reform, major social problems in India; Social work philosophy, values, objectives, principles, methods and fields of social work.

Unit-II:(09Hrs) Methods of Working with Individuals and Groups Social case work –Definition-scope and importance of social case work, principles and process of social case work -Tools and techniques in social case work- Counselling skills. Social Group Work-Definition-scope- the need for social group work –Group work process - Principles of Group Work - Stages of Group Work-Facilitation skills and techniques.

Unit-III: (09Hrs)Workingwith Communitiesand Field Work in social work Community – definition - characteristics- types- community organisation as a method of social work-definition-objectives-principles- phases of community organization - concepts of community development, community participation and community empowerment. Field work in social work – Nature, objectives and types of field work - Importance of field work supervision

Multidisciplinary Courses
w.e.f. AY 2023-24
SEMESTER-I (Arts and Commers Stream)
PRINCIPLES OF BIOLOGICAL SCIENCES
Credits: 2 _____ 2 hrs/week

UNIT-I Diversity of Life 1.1 Introduction to Biology, Branches of Biology, Basic Principles of Biology 1.2 Biological Classification-Two kingdom and Five kingdom classification, Viruses, Viroid's and Lichens 1.3 Diversity in the living world, Taxonomic categories, Taxonomic aids 1.4 Plant organization-The form, structure and function of plant vegetative and reproductive organs, Classification of Plant Kingdom, 1.5 Basis of Animal Classification, Classification of Animal Kingdom

UNIT-II Biomolecules and metabolisim 2.1 Ultra structure of cell and Cell organelles (Structure and Functions), Plant cell vs Animal cell 2.2 Plant Physiology: Photosynthesis, Respiration, Transportation, Mechanisms of Nitrogen fixation. 2.3 Plant growth and development, physiology of flowering. 2.4 Human Physiology: Digestion, Respiration, Circulation 2.5 Male and female reproductive organs, gametogenesis, fertilization.

UNIT-III Principles of Biology 3.1 Genetics: Mendel's laws of inheritance, Genetic disorders- Colour blindness, Sickle cell anaemia. 3.2 Evolution: Geological time scale for evolution of plants and vertebrates, Origin and evolution of plants and man 3.3 Common Human Diseases: causing organism, prevention and treatment- malaria, dengue, AIDS, cancer, corona. 3.4 Common Plant Diseases: causing organism, prevention and treatment- Black spot, Leaf spots, Powdery mildew, Blight, Canker. 3.5 Biotechnology: Tools and process of recombinant DNA technology, Applications of biotechnology in agriculture, food industry, medicine and transgenic animals.

2023-24
SEMESTER-I (For Arts Stream)
COURSE 1: FUNDAMENTALS OF SOCIAL SCIENCES
Theory Credits: 4 4 hrs/week

Unit – I – What is Social Science?

1. Definition and Scope of Social Science – Different Social Sciences

2. Distinction between Natural Science and Social Sciences

3. Interdisciplinary Nature of Social Sciences

4. Methods and Approaches of Social Sciences Unit – II – Emergence of Culture and History of India

1. Understanding Historical Evolution
2. Cultural Change through History
3. Evolution of Social Values
4. Modern Ethical Issues

Unit – III – Society and Social Behaviour

1. Definition, Nature and Scope of Psychology
2. Importance of Social Interaction
3. Need of Psychology for present Society
4. Thought process and Social behaviour

Unit – IV – Political Economy

1. Understanding Political Systems
2. Political Systems – Organs of State
3. Understanding over Economics
4. Economic Growth and Development

Unit - V – Essentials of Computer

1. Milestones of Computer Evolution - Computer – Block Diagram, Generations of Computers
2. Internet Basics – Internet History, Internet Service Providers – Types of Networks – IP – Domain Name Services – Applications
3. Ethical and Social Implications – Network and Security concepts – Information assurance fundamentals
4. Cryptography – Symmetric and Asymmetric –malware – Fire walls – Fraud Techniques

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2023-24
SEMESTER-I (For Arts Stream)
COURSE 2: PERSPECTIVES ON INDIAN SOCIETY
Theory Credits: 4 4 hrs/week

Unit – 1 – Man in Society
1. Human Nature and Real Life Engagement
2. Social Groups and Social Dynamics
3. Individualism and Collectivism – Ethical Concerns
4. Human Life – Social Influence and Social Impact

Unit – 2 – Freedom Struggle and Indian Heritage
1. Indian under British Rule
2. Raise of Nationalism (1857-1947)
3. Post-Independent India
4. Indian Heritage and Tourism

Unit – 3 – Indian Constitution
1. Philosophical Foundations of Indian Constitution
2. Elements of Indian Constitution
3. Study of Rights in Indian Constitution
4. Directive principles to State

Unit – 4 - Indian Economy
1. Contemporary Indian Economy – Sectoral Contribution of Income
2. Monetary and Fiscal Policies for Economic Development
3. Economic Reforms - Implementation in Public and Private Sectors
4. National and International Financial Resources

Unit – 5 - **Impact on Society & Analytics:**
1. Role of Computer, impact of Computers on human behavior, e-mail,
2. Social Networking- WhatsApp, Twitter, facebook, impact of Social Networks on human behavior.
3. Simulating, Modeling, and Planning, Managing Data, Graphing, Analyzing Quantitative Data,
4. Expert Systems and Artificial Intelligence Applications in the Social Sciences

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SEMESTER-II

COURSE 3: URDU ZABAN O ADAB KI TAREEKH

Theory Credits: 4 4 hrs/week

UNIT –I Urdu Zaban : Agaz O Irteqa, Mukhtalif Nazriyat

UNIT –II- Deccani Daur
1. Mohd. Quli Qutub Shah
2. Mulla Wajhi
3. Nusrati

UNIT – III Dabistan-e-Dehli
1. Meer
2. Sauda
3. Dard
4. Ghalib
5. Momin

UNIT – IV Dabistan-e-Lukhnau
1. Insha
2. Jur'at
3. Mushafi
4. Nasiq
5. Aatish

UNIT – V Fort William College Aur Uske Musannafeen
1. Meer Aman
2. Haidar Bakhs Haidari
3. Sher Ali Afsos

Reference Books
- Tareekh e Adab Urdu –Jameel Jalibi
- Muqaddama Tareekh E Zaban E Urdu- Masud Hussain Khan
- Panjab mein Urdu – Mohmood Shirani
- Dackhan mein Urdu – Naseeruddin Hashmi

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SEMESTER-II
COURSE 4: URDU ADAB KI TAHRIKAAT
Theory Credits: 4 4 hrs/week

Unit-1 Urdu mein Adabi Tahrikat ki Revayat

Unit-2 Sir Syed Tahrik

Unit-3 Romanvi Taharik

Unit -4 Taraqqi pasand Tahrik

Unit-5 Halqa-e Arbab-e Zauq

Reference Books Aligarh Tahreek ka pasmanzar – Khaleeq Ahmed Nizami

- Urdu Adab mein Romanvi Tahreek – Mohammed Hasan
- Urdu mein Taraqqi Pasand Adabi Tahreek- Khaleelur Rahman Azami
- Halqa-e Arbab-e Zauq – Younus Javed•

2023-24

Core papers

Special Urdu

Syllabus for II B.A. Part – II Urdu

SEMESTER - III
Second year Optional Urdu Paper - III

URDU POETRY
Prescribed book : Gowhare Adab by A.P.Urdu Academy

UNIT – I MASNAVI – A portion of Gulzar-e-Naseem
'Aana tajul mulook ka sehrae tilism se'

UNIT – II GHAZAL – The following Ghazals only:
1.'Bas ke dushwar hai har kaam' by Ghalib
2. 'Woh adae dilbari ho ke nawae' by Jigar
3. 'Jala ke mashale jan hum' by Majrooh

UNIT – III NAZM
1. 'Roohe arzi aadam ka isteqbal karti hai'
By Allama Iqbal
2. 'Sagar ke kinare' by Maqdoom

UNIT – IV Ghazalgo shora ki sawaneh
1.Ghalib 2.Jigar 3.Majrooh

UNIT – V Nazmgo shora ki sawaneh
1.Allama Iqbal 2. Maqdoom

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Core papers

Advance Urdu

Syllabus for II B.A. Part – II Urdu

SEMESTER - IV
Second year Optional Urdu Paper - IV

URDU POETRY
Prescribed book : Gowhare Adab by A.P.Urdu Academy

UNIT – I	**QASEEDA – Ta'aruf**
UNIT – II	**QASEEDA – Mohsin Kakori (Selected portion)** **'Simte kashi se chala janibe mathura badal'**
UNIT – III	**MARSIYA – Ta'aruf**
UNIT – IV	**MARSIYA – Meer Anees (Selected portion)** **'Namake khwane takallum hai fasahat meri'**
UNIT – V	**Biography of following poets:** **1.Mohsin Kakori 2. Meer Anees**

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2023-24

Core papers

Advance Urdu

Semester-IV Paper -V

UNIT –I

1-Urdu Zuban Ka Agaz-O-Irtakha:

1-1 MiktalifNazriyat-ShokatThanayi-

1-2 Mahamood Khan Shirani

UNIT– II.

2- DakniDouar-Ke-Qusiyat-Mahammad Quli Qutub Sha
2-1 Mulawajahi
2-2 Nusrathi

UNIT – III

3- DabistanaDilhi--Ke-Qusiyat-
3-1 Dard
3-2 Zaqak

UNIT – IV

4-DabistanaLaknow--Ke-Qusiyat-
4-1 Attish
4-2 Nasiq

UNIT –V

5- SirSayedTaharikKe-Qusiyat-
5-1 RumaniTaharik
5-2 TarakhiPasandTaharik

Prescribed book- TariqeAdabe Urdu by Noorulhasn Naqvi

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Core papers Advance

Urdu Semester-V

Paper-VI

Semester-Wise Revised Syllabus under CBCS, 2022-23Course Code: Four-Year B.A. (Hons)

Domain Subject:SPECIAL URDU

IV Year B. A. (Hons) – Semester – V

Course6A: اردو میں ذرائع ابالغ **Course**

UrdumeinZarayaIblagh

Mass Media in Urdu

No. of Hours: 75 (05 per Week) Credits: 04Max Marks: 100

(Skill Enhancement Course (Elective))

I. Learning Outcomes:

At the end of the course the student will be able to:

I	Understand the basics of communication
II	The major concepts/thoughts related to mass communication.
III	The understanding of the fundamentals of communication.
IV	The framework in which they operate and major thoughts/concepts related to mass communication
V	Students will be able to trace the history and development of print and Electronic Media s and will demonstrate an understanding of the origins, functions, and evolution of the Urdu Media.

Syllabus:

(Hours: Teaching: 60, Skills Training: 10, others including unit tests: 05. Total: 75)

Unit: 1	ماس میڈیا کی اقسام	
Unit: 2	ماس میڈیا کے اجزائے ترکیبی	
Unit: 3	ماس میڈیا کے اقسام	
Unit: 4	ماس میڈیا کی آزادی کے مثبت اور منفی اثرات	
Unit: 5	ہندوستانی معاشرے میں پرنٹ میڈیا اور الکٹرانک میڈیا کا رول اور ذمہ داریاں	
III. References:	معاون کتابیں	
اشفاق محمد خان	عوامی ذرائع ترسیل وابالغ	1
دیوندر اسر	عوامی ترسیل	2
محمد شاہد حسین	ابالغیات	3
مہدی حسن	جدید ابالغ	4

2023-24

Core papers

Advance Urdu

Semester-Wise Revised Syllabus under CBCS, 2022-23

Course Code: Four-Year B.A. (Hons)

Domain Subject: Advance URDU

IV Year B. A. (Hons) – Semester – V

Paper-VII

Course 7A: اردو صحافت **Course Urdu Sahafath**

(Print Media in Urdu)

No. of Hours: 75 (05 per Week) Credits: 04 Max Marks: 100

(Skill Enhancement Course (Elective))

I-Learning Outcomes:

At the end of the course the student will be able to:

I	Understand Process of Reporting and familiar with basic terminology of Reporting & Editing.
II	Students will be able to Subbing and Packaging different types of News.
III	Gathering different types of News related to Society.
IV	Student will be made prepare to entry level Print Media Journalist
V	The main outcomes of this paper to trained students as a beginner journalist.

II-Syllabus:

(Hours: Teaching: 60, Skills Training: 10, others including unit tests: 05. Total: 75)

Unit: 1	**صحافت کی تعریف ابتدا اور عہد بعہد ارتقا**	
Unit: 2	**صحافی کی ذمہ داریاں**	
Unit: 3	**خبر کی تشکیل کا فن**	
Unit: 4	**کالم نگاری**	
Unit: 5	**انٹرویو**	
III. References:	معاون کتابیں	
فضل الحق	اردو ماس میڈیا	1
انور دہلوی	دہلی میں اردو صحافت	2
محمد شاہد حسین	ابلاغیات	3
محمد عتیق صدیقی	ہندوستانی اخبار نویسی	4
مسکین علی حجازی	فن ادارت	5
شافع قدوائی	خبر نگاری	6
امداد صابری	تاریخ صحافت	7

2023-24

Political Science

Semester II

3. Fundamentals of Political Science

Unit – I: Introduction: 1. Definition Nature of Political Science 2. Scope and Importance of Political Science 3. Relations with allied disciplines: History and Economics 4. Relations with allied disciplines: Philosophy and Sociology

Unit – II: Approaches: 1. Approaches to the study of Political Science: 2. Traditional Approaches: Philosophical, Historical. 3. Modern Approaches: Behavioural and Post-Behaviouralism 4. Modern Approaches: System Approach and Structural - Functional

Unit – III: State 1. Definition of the State, Nature 2. Elements of the State 3. Theories of Origin of the State: Divine Origin 4. Theories of Origin of the State: Force and Evolutionary

Unit – IV: Theory of Social Contract 1. Social Contract Theory: Origin of the theory 2. Social Contract Theory: Thomas Hobbes 3. Social Contract Theory: John Locke 4. Social Contract Theory: Jean Jacques Rousseau

Unit – V: Modern State 1. Concepts of Modern State: Meaning, Origin 2. Nature of Modern State 3. Welfare State: Origin 4. Nature of Welfare State

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Political Science

4. Concepts & Ideologies of Political Science

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Unit – I:
Law & Liberty: 1 Law: Meaning, Definition, Nature 2 Law: Types of Law - Sources of Law 3 Liberty: Meaning, Definition, Nature 4 Liberty: Types of Liberty

Unit – II:
Equality & Power: 1 Equality: Meaning, Definition, Nature 2 Equality: Types of Equality 3 Power: Meaning, Definition, Nature 4 Authority and Legitimacy: Meaning, Definition, Nature

Unit – III:
Rights: 1. Rights: Meaning, Nature 2. Rights: Classification of Rights 3. Theories of Rights: Natural, Legal, Historical 4. Theories of Rights: Idealistic, Social & Welfare

Unit – IV:
Ideologies: 1. Liberalism 2. Individualism 3. Anarchism 4. Fascism

Unit – V:
Isms 1. Socialism 2. Marxism 3. Multiculturalism 4. Nationalism Unit-wise proposed activities & evaluation: Celebrations on International Human Rights Day

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2023-24

Core papers

Political Science

B.A. POLITICAL SCIENCE

SECOND YEAR

THIRD SEMESTER

(Under CBCS w.e.f 2020-21)

Course-3: INDIAN GOVERNMENT AND POLITICS

Learning Outcomes:

On successful completion of the course the students will be able to:

- Acquire knowledge about the historical background of Constitutional development in India, appreciate philosophical foundations and salient features of the Indian Constitution.
- Analyze the relationship between State and individual interms of Fundamental Rights and Directive Principles of State Policy.
- Understand the composition of and functioning of Union Government as well as State Government and finally
- Acquaint themselves with the judicial system of the country and its emerging trends such as judicial reforms.

UNIT-I :	SOCIAL AND IDEOLOGICAL BASE OF THE INDIAN CONSTITUTION
	1. Constitutional Development in India during British Rule-A Historical Perspective with reference to Government of India Acts, 1909,1919 and 1935.
	2. Constituent Assembly-Nature, Composition, Socio-Economic, Philosophical Dimensions and Salient Features of the Indian Constitution.

UNIT-II :	INDIVIDUAL AND STATE
	1. Fundamental Rights, Directive Principles of State Policy and Fundamental Duties-Differences between Fundamental Rights and

	Directive Principles of State Policy.
	2. The 'Doctrine of Basic Structure of the Constitution' with reference to Judicial Interpretations and Socio-Political Realities.

UNIT-III :	UNION EXECUTIVE
	1. President of India-Mode of Election, Powers and Functions.
	2. Parliament-Composition, Powers and Functions, Legislative Committees, Prime Minister and Council of Ministers-Powers and Functions, Role in Coalition Politics

UNIT-IV :	STATE EXECUTIVE
	1. Governor-Mode of Appointment, Powers and Functions.
	2. Legislature-Composition, Powers and Functions, Chief Minister and Council of Ministers-Powers and Functions

UNIT-V :	THE INDIAN JUDICIARY
	1. Supreme Court-Composition and Appointments, Powers and Functions or Jurisdiction of the Supreme Court, Judicial Review, Judicial Activism.
	2. High Court-Composition, Powers and Functions, Debates on the mode of appointment of Judges-National Judicial Appointments Commission and Judicial Reforms.

B.A. POLITICAL SCIENCE
SECOND YEAR
FOURTH SEMESTER
(Under CBCS w.e.f 2020-21)

Course-4 : INDIAN POLITICAL PROCESS

Learning Outcomes:

On successful completion of the course the students will be able to :

- Know and understand the federal system of the country and some of the vital contemporary emerging issues.
- Evaluate the electoral system of the country and to identify the areas of electoral reforms.
- Know the constitutional base and functioning of local governments with special emphasis on 73rd& 74th Constitutional Amendment Acts.
- Understand the dynamics of Indian politics, challenges faced and gain a sensitive comprehension to the contributing factors.
- Apply the knowledge and critically comprehend the functioning of some of the regulatory and governance institutions.
- Propose theoretical outline alternate models

UNIT-I :	FEDERAL PROCESSES
	1. Features of Indian Federal System- Centre-State Relations-Legislative, Administrative and Financial
	2. Emerging Trends in Centre-State Relations-Restructuring Centre-State Relations-Recommendations of Sarkaria Commission, M.M.Punchi Commission

UNIT-II :	ELECTORAL PROCESSES
	1. The Election Commission of India, Powers and Functions.
	2. Issues of Electoral Reforms, Voting Behaviour-Determinants and

	Problems of Defections.

UNIT-III :	GROSSROOT DEMOCRACY-DECENTRALISATION
	1. Panchayat Raj system-Local and Urban Governments-Structure, Powers and Functions.
	2. Democratic Decentralization-Rural Development and Poverty alleviation with reference to 73rd and 74th Constitutional Amendment Acts, Challenges and Prospects.

UNIT-IV :	SOCIAL DYNAMICS AND EMERGING CHALLENGES TO INDIAN POLITICAL SYSTEM
	1. Role of Caste, Religion, Language and Regionalism in India.
	2. Politics of Reservation, Criminalization of Politics and Internal threats to Security.

UNIT-V :	REGULATORY AND GOVERNANCE INSTITUTIONS
	1. NITI Ayog, Finance Commission, Comptroller and Auditor General of India.
	2. Central Vigilance Commission, Central Information Commission, Lokpal and Lokayukta.

2023-24

Core papers

Political Science

B.A. POLITICAL SCIENCE

SECOND YEAR

FOURTH SEMESTER

(Under CBCS w.e.f 2020-21)

Course 5:WESTERN POLITICAL THOUGHT

Learning Outcomes:

On successful completion of the course the students will be able to:

- Understand the fundamental contours classical, western political philosophy, basic features of medieval political thought and shift from medieval to modern era.
- Understand the Social Contract Theory and appreciate its implications on the perception of State in terms of its purposes and role.
- Acquaint with the Liberal and Marxist philosophy and analyze some trends in Western Political Thought.
- Critically analyse the evolution of western political thought

UNIT-I :	ANCIENT GREEK POLITICAL THOUGHT
	1. Plato-Rule of Philosopher Kings-Theory of Justice-Ideal State and Education
	2. Aristotle-Theory of State-Classification of Governments-Citizenship, Slavery and Theory of Revolutions.

UNIT-II :	MEDIEVAL AND MODERN POLITICAL THOUGHT
	1. St.Augustine-Theory of Two Cities.
	2. NiccoloMachiavelli-State and Statecraft.

UNIT-III :	CONTRACTUAL POLITICAL THOUGHT
	1. Thomas Hobbes- Social Contract and Absolute Sovereignty.
	2. John Locke- Human Nature, State of Nature, Social Contract, Natural Rights and Limited Government

	3. Jean Jacques Rousseau- Human Nature, State of Nature, Social Contract, General Will and Popular Sovereignty

UNIT-IV :	**UTILITARIAN POLITICAL THOUGHT**
	1. Jermy Bentham-Theory of Utility, Law and Reforms.
	2. J.S.Mill-Theory of Liberty and Representative Government.

UNIT-V :	**MARXIST POLITICAL THOUGHT**
	1. Karl Marx-Dialectical Materialism, Theory of Surplus Value and Class Struggle.
	2. Antonio Gramsci-Hegemony and Civil Society.

2023-24

Core papers

Political Science

SKR & SKR GOVT. COLLEGE FOR WOMEN (A), KADAPA

DEPARTMENT OF POLITICAL SCIENCE

B.A.POLITICAL SCIENCE- Semester –V, Paper-V; Syllabus

Course 6C: **OFFICE MANAGEMENT**

(Skill Enhancement Course (Elective), 4 credits)

I. Learning Outcomes:

Students at the successful completion of the course will be able to;

1. Understand fundamental knowledge of Office Management that can be applied to a career.
2. Have knowledge on office administration and identify job competencies.
3. Understand the importance of record management and allied sections.
4. Comprehend the administrative process in office
5. Identify the challenges in the background of ICT.
6. Enhance skills, strategies and techniques to compete with the global competencies in office management.

II. Syllabus:(Hours: Teaching: 60, Training: 10, Others incl. unit tests: 05)

Unit: 1

Introduction to Office, Office structure-Office Management: Meaning, Nature, Importance, Elements and Functions of Office Management-Basic Principles of office management.

Unit: 2

Office organization: Definition, Characteristics-Office Planning, Accommodation, Layout and Office Environment.

Unit: 3

Office Record Management-Objectives and Importance-Filing System: Steps in filing, Essentials for filing, Classification and arrangements of files, Modern filing methods using Information and Communication Technology and devices-Indexing: Essentials of a good indexing and Records retention and Micro filing.

Unit: 4

Office Communication: Meaning and mailing, Barriers to communication -Correspondence and Report Writing-Types- Periodical reports.

Unit: 5

Form Letters: Meaning, Principles, Factors in designing office forms-Supervisory Skills-Importance of Motivation and Leadership-Issues in Office Management-Recent trends: e-office, use of modern appliances and application of IT in office management.

2023-24

Core papers

Political Science

SKR & SKR GOVT.COLLEGE FOR WOMEN (A),KADAPA
DEPARTMENT OF POLITICAL SCIENCE
B.A.POLITICAL SCIENCE- Semester –V, Paper-VI;
Course 7C: **PERSONNEL ADMINISTRATION**
(Skill Enhancement Course (Elective), 4 credits)

I. Learning Outcomes:

Students at the successful completion of the course will be able to;

1. Understand Personnel Administration that can be applied to a career.
2. Acquire knowledge on recruitment, selection and training and identify job competencies.
3. Understand the importance and role of civil services in Indian Governance.
4. Provide an overview on issues in administration.
5. Enhance skills, strategies and techniques for redressal of grievances in administration

II. Syllabus:(Hours: Teaching: 60, Training: 10, Others incl. unit tests: 05)

Unit: 1

Personnel Administration: Concept, Nature, Scope and Significance-Hierarchy in Personnel Administration-Roles and Responsibilities of Personnel Administrative Officers- Bureaucracy: Meaning, Characteristics, Nature, Importance and its role in modern state.

Unit: 2

Recruitment: Meaning and Importance, Types of Recruitment, Methods of recruitment with regard to All India, Central and State Services-Union Public Service Commission and State Public Service Commissions-Constitutional provisions and Composition, Functions and Role.

Unit: 3

Training: Meaning, Objectives, Types and Significance-Training Institutions in India-Promotion-Promotion procedure-Career Planning, Evaluation and Development-Motivation and Morale-Performance Appraisal.

Unit: 4

Administrative Ethics-Integrity in administration-Code of Conduct-Common Lapses and Disciplinary Procedure-Employee and Employer Relations-Rights of Civil Servants.

Unit: 5

Problems in Personnel Administration-Employees participation in administration-Grievances-Institutional arrangements for settlement of disputes-Change in work place, Counseling and Time Management.

2023-24

Economics

3. MICROECONOMICS

Unit–1: Introduction to Economics • Economic Activities and Economic System; Definition, Scope and Importance of Economics • Fundamental problems of economics: Scarcity and Choice, Production Possibilities Curve • Meaning and Scope of Microeconomics; Differences between Micro and Macro Economics • Principles of Microeconomics: Equilibrium, Optimization, Welfare ; Methodology in Economics : Positive and Normative

Unit -2: Demand and Consumption • Demand: Meaning, Types and Factors; Law of Demand • Elasticity of Demand: Meaning, Price, Income and Cross Elasticities • Utility: Meaning, Types, Importance; Marginal Rate of Substitution (MRS), DMRS • Indifference Curves (IC): Concept, Properties; Budget Line; Consumer Equilibrium under IC

Unit -3: Production and Supply • Firm: Concept and Objectives; Production and Factors of Production; Concepts of Production, Cost and Revenue: Total, Average, Marginal • Production Function: Meaning and Types; Cobb- Douglas Production Function • Law of Variable Proportions; Laws of Returns to Scale • Supply: Meaning, Factors, Law of Supply, Elasticity of Supply 8

Unit-4: Markets • Market: Concept and Classification; Perfect Competition: Characteristics, Equilibrium of Firm and Industry • Monopoly: Characteristics, Equilibrium, Price Discrimination • Monopolistic Competition: Characteristics, Equilibrium, Selling Costs • Oligopoly: Characteristics, Types, Kinked Demand Curve Model

Unit - 5: Distribution • Distribution: Meaning, types and importance • Rent: Ricardian Theory of Rent, Marshallian Quasi Rent • Theories of Wage: Subsistence Theory, Modern Theory • Theories of Interest: Classical Theory, Loanable Funds Theory • Theories of Profit: Risk and Uncertainty Theory, Innovations Theory

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2023-24

Core papers

Economics

4. MATHEMATICAL METHODS FOR ECONOMICS

Unit 1: Sets & Functions • Role of Mathematical Methods in Economics • Sets: Types, Operations • Functions: Meaning, Types, Graphical Representation, Applications in Economics.

Unit 2: Differential Calculus • Limits of Functions; Continuity and Differentiability of a Function • Derivative of a Function; Rules of Differentiation • First and Second Derivatives and their Interpretations; Partial Derivatives • Applications of Derivatives in Economics

Unit 3: Optimization Problems and their Applications • Concept of Optimization in mathematics; Problems of Maxima and Minima • Unconstrained & Constrained Optimization • The Method of Lagrange Multipliers • Some Applications of Optimization in Economics

Unit 4: Integrations and Linear Programming • Concept of integration; Simple Rules of Integration • Application of Integrations in Economics • Linear Programming: Basic Concept, Formulation of Problem; Feasible, Basic and Optimal Solutions • Applications of Liner Programming in Economics.

Unit 5: Matrices and Determinants and Applications in Economics • Matrix: Concept, Types; Matrix Operations: Addition, Multiplication 10 • Determinants, Inverse of a Matrix • Solution to the System of Simultaneous Equations, Cramer's Rule • Some Applications of Matrix Theory in Economics

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2023-24

Core papers

Economics

SEMESTER – 3:: COURSE – 3

DEVELOPMENT ECONOMICS

Module - 1: Economic Growth and Development

Economic Development as a Branch of Study of Economics – Scope and Importance - Distinction between Economic Growth and Economic Development -Measures of Economic Development and their limitations - Economy and Environment : Concepts of sustainable development and inclusive growth

Module -2: Modern Economic Growth

Characteristics of Underdeveloped Countries - World Bank and IMF Classification of countries - Modern economic growth – Kuznets' Six Characteristics -Obstacles to economic development - Vicious Circle of Poverty and cumulative causation -Factors of economic growth: Economic and Non-economic - Capital Formation – Foreign and Domestic capital, Debt and Disinvestment.

Module-3: Theories of Development and Underdevelopment

Classical Theory: Adam Smith, Ricardo and Malthus -Marxian Theory - Schumpeter Theory -Rostow's Stages of Economic Growth -Harrod-Domar two sector model -Solow's Model and Robinson's Golden Age

Module – 4: Strategies of Economic Development

Strategies of Economic Development – Big Push -Balanced Growth -Unbalanced Growth - Mahalanobis Model - Agriculture vs Industry -Capital Intensive Technology vs Labour Intensive Technology -Role of Infrastructure in Economic Development

Module - 5: Institutions and Economic Development

Role of State in Economic Development -Role of Markets - Market Failure and Regulation

2023-24

Core papers

Economics

SEMESTER – 4 :: COURSE – 4

ECONOMIC DEVELOPMENT- INDIA AND ANDHRA PRADESH

Module – 1 Basic Features

Basic characteristics of Indian Economy as a developing economy – Economic development since independence - Objectives and achievements of planning – Planning Commission/NITIAyog and their approaches to economic development - India's Rank in Global Human Development Index .

Module 2 National Income and Demography

Trends in National income - Demographic trends - Poverty and Inequalities – Occupational Structure and Unemployment - Various Schemes of employment generation and eradication of poverty – Issues in Rural Development and Urban Development –Intra-state and Inter-state Labour Migration. Problems of Migrant Labour in unorganized sector.

Module – 3 Agricultural and Industrial Developments

Indian Agriculture – Agricultural Strategy and Agricultural Policy – Agrarian Crisis and land reforms – Agricultural credit – Minimum Support Prices -Malnutrition and Food Security - Indian Industry - Recent Industrial Policy – Make-in India – Start-up and Stand-up programmes – SEZs and Industrial Corridors - Economic Reforms and their impact - Economic initiatives by government of India during COVID - Atmanirbhar Bharat package.

Module –4Indian Public Finance

Centre, States financial relations - Indian Tax System and Recent changes – GST and its impact on Commerce and Industry –- Recommendations of 15th Finance Commission – Public Expenditure and Public Debt - Fiscal Policy and Budgetary Trends

Module- 5Andhra Pradesh Economy

Basic characteristics of Andhra Pradesh Economy – Impact of State bifurcation on AP Agriculture – New challenges to industry and commerce - New initiatives for the development of infrastructure – Power and Transport - Information Technology and e-governance – Urbanization and smart cities – Skill development and employment –Social welfare programmes.

2023-24

Core papers

Economics

COURSE– 5(Semester - IV)

STATISTICAL METHODS FOR ECONOMICS

Module – 1: Nature and Definition of Statistics

Introduction to Statistics – Definition, scope, importance and limitations of Statistics – Primary and Secondary data- Census and Sampling techniques and their merits and demerits

Module – 2:Diagrammatic Analysis

Collection of data - Schedule and questionnaire – Frequency distribution – Tabulation – diagram and graphic presentation of data – Histogram, Frequency Polygon, Cumulative Frequency Curves - Bar Diagrams and Pie Diagram

Module – 3:Measures of Central Tendency and Dispersion

Measures of Central Tendency and Dispersion - Types of averages- Arithmetic Mean, Geometric Mean, Harmonic Mean – Median – Mode – Dispersion - Range, Quartile Deviation, Mean Deviation, Standard Deviation- Coefficient of Variation.

Module – 4:Correlation and Regression

Correlation and Regression - Meaning, Definition and uses of Correlation- Types of Correlation- Karl Pearson's Correlation coefficient - Spearman's Rank Correlation- Regression Equations - utility of regression analysis – Demand forecasting.

Module – 5: Time Series and Index Numbers

Time Series and Index Numbers: Definition and components of Time Series – Measurement of Time Series – Moving Average and the Least Squares Method – Index Numbers - Concepts of Price and Quantity Relatives – Laspeyer's, Paasche's and Fisher's Ideal Index Numbers – Uses and Limitations of Index Numbers.

2023-24

Core papers

B. A. ECONOMICS

III Year B. A. Programme (UG) Courses – Under CBCS

Semester

Paper-VI: Syllabus

Rural Entrepreneurship

Unit -1:Entrepreneurship:Concept andTheories

ConceptandImportanceofEntrepreneurship-TheoriesofEntrepreneurship:Innovations,RiskBearing-QualitiesandFunctionsofanEntrepreneur–WomenEntrepreneurship.

Unit -2:RuralEntrepreneurship,BusinessPlanningandAgribusiness

Rural Entrepreneurial Ecosystem – Factors, Problems and Challenges of RuralEntrepreneur

Unit-3: NewRuralEntrepreneurshipOpportunities

New Entrepreneurship Opportunities in Farm sector: Organic Farm Products, Nutri-Cereals,Horticultural Products, Forest Produce, Medicinal Plant Products - New EntrepreneurshipOpportunitiesinRuralNon-farmsector:Poultry,Aquaculture,Sericulture,Honeybee,MushroomsCultivation,Handicrafts.

Unit -4:FinancingandMarketingforRuralEntrepreneurship

Financing the Rural Entrepreneurship: Procedures to obtain formal loans from banks andotherinstitutions-PreparationofDetailedProjectReportforLoan-NewavenuesofFinance:CrowdFundingandVentureCapital-MarketingofRuralProducts:MarketSurvey,DemandForecasting,MarketingStrategies,Branding,PlanningandPromotion,DigitalandSocialMedia Marketing.

Unit - 5: Institutional Support and Case Studies of Rural Entrepreneurship InstitutionalSupportfor RuralEntrepreneurship- SpecialRoleofNABARDinpromotingandsupportingtheRuralEntrepreneurship-GovernmentSchemesforpromotionofRura Entrepreneurship– Rules and Procedures to start a Rural Entrepreneurship Firm – Discussionoftwodifferent typesofCaseStudiesrelatedtoRuralEntrepreneurship with localrelevance.

SKR&SKRGOVT.COLLEGEFORWOMEN (A),KADAPA

DEPARTMENTOFECONOMICS

B.A. ECONOMICSSemester–V,Paper-VII; Syllabus

Farmer Producer Organizations(FPOs)

Unit1:ConceptofFPOandImportance

ConceptandimportanceofFPO– TypesofFPOs-OrganizationalstructureandFunctionsofFPO-EcosystemrequiredforFPO-RoleofFPOsinpresentIndianAgriculturalDevelopment –Factors,ProblemsandChallengesofFPOsinIndia.

Unit2:EstablishingFPOandCollaborations

Situation Analysis and Mobilizing Farmer Producers for FPO - Rules and Regulation relatedtoFPOs-ProcedurestostartFPO–Infrastructurerequired forFPO-CollaborationwithOtherOrganizations –Training and Capacity Building to Persons in FPO – Managing FinancialAccountsofFPO.

Unit3: EconomicActivitiesandBusinessPlanning ofFPO

Economic Activities undertaken by FPO: Input Purchase, Custom Hiring Machines - OutputBusiness:Procuring,Processing,Storage, Logistics,Marketing,Exportingetc.-ProductIdentification and Value Chain Analysis for FPO- Business Planning for FPO - ViableBusinessModelsofFPO:Multi-productandValueAdded.

Unit 4:FinancingandMarketing ofFPO

Financial Planning in FPO - Mobilization of Capital from Members, Promoters, Banks andother Funding Agencies-Marketing of FPO Products: Market Survey, Demand Forecasting,MarketingStrategies,Branding,PlanningandPromotion,DigitalandSocialMediaMarketing.

Unit5: InstitutionalSupport andCaseStudiesofFPOs

InstitutionalSupportandResourceSupportingAgenciesforFPOs-SpecialRolesofNABARDandSFAC–Government SchemesforpromotionofFPOs-DiscussionoftwoimportantCaseStudiesrelatedtoFPOswithdifferentproductorprocesstypesoflocalrelevance.

2023-24

B.A (Honours) in History

Semester- II 3. Science and Human Fast

Unit-I What is History-Is History a science?-Facts, Interpretations-Relation with other Social Sciences-Sources of Indian History: Archaeological and Literary Sources.

Unit-II Hunting Gathering to the Food Production Society: Palaeolithic, Mesolithic, Neolithic and Chalcolithic Phases in India- Evolution of tools, belief systems and art forms.

Unit-III First Urbanization in India: The Indus Valley Civilization-Definition of Civilization and Urbanization-Origin, Extent-Sites-Features of IVC-Trade and Commerce-Social and Cultural Life-Decline of the Civilization.

Unit-IV The Vedic Corpus: Vedic Literature-Indo-Aryans Theories-Society, Economy, Culture, religion and Polity during the Early Vedic Period-Society, Economy, Culture, religion and Polity during the Later Vedic Period-Origin of Varna System.

Unit-V Second Urbanization in India: Iron Age Cultures in the subcontinent-Impact of Iron technology-The emergence of City life- Urban Occupations, Crafts, Guilds-Trade and Commerce

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Semester-II
4.Age of Enlightenment and State Formation in India

Unit-I New Religious Philosophy- Ajivikas, Charvakas-Jainism and Buddhism

Unit-II State formation: Sixteen Mahajanapadas - Rise of Magadha - Nandas- Foreign Invasions - Darius I and Alexander.

Unit-III Mauryan Empire: Archaeological and Literary Sources-Chandra Gupta Maurya-Bindusara and Ashoka - Ashoka's Dhamma Policy

Unit-IV The Mauryan Administration-Society, Economy, Art and Architecture - Decline of Mauryan Empire-Sangam Literature

Unit-V Post Mauryan Period-Invasions from Central Asia-Indo Greeks-Sakas-Parthians and Khushans-Growth of Trade and Urban centres-Coins and Guilds-Gandhara and Mathura Art.

2023-24

Semester -III
History

Course 3:MODERNINDIAN HISTORY & CULTURE (1757-1947 A. D)

Learning Outcomes:

After successful completion of this course, the student will be able to:

- Unearth the true nature of the British rule and its disastrous impact on Indian economy and society
- Gauge the disillusionment of people against the Company's rule even during the early 19th century
- Assess the causes and effects of Reformation movements and also inspire the public to overthrow inequalities of the present day society
- Rise above petty parochial issues after understanding the sacrificial saga of freedom struggle
- Evaluate the undercurrent of communal politics that led to India's partition and identify the enemies of India's integrity and sovereignty
- Visualize where places are in relation to one another through map pointing

Syllabus:

Unit - 1 Conquest of Bengal by EIC – Battle of plassey-Policies of Expansion –Warren Hastings, Cornwallis - Subsidiary Alliance & Doctrine of Lapse – Causes & Results of 1857 Revolt – Lytton, Rippon, Curzon

III	Moderate Phase — Militant Phase: Vandemataram Movement - Home Rule Movement
Unit - IV	Freedom Struggle from 1920 to 1947: Gandhiji's Role in the National Movement – Revolutionary Movement – Subhas Chandra Bose
Unit - V	Muslim League & the Growth of Communalism – Partition of India – Advent of Freedom - Integration of Princely States into Indian Union – SardarVallabhai Patel

Course Code:

Domain Subject: History

Semester-wise Syllabus under CBCS

II Year B. A. – Semester – IV

Course 4: HISTORY & CULTURE OF ANDHRA (FROM 1512 TO 1956 AD)

Learning Outcomes:

After successful completion of this course, the student will be able to:

- Interpret social and political and cultural transformation from medieval to modern Andhra
- Relate key historical developments during medieval period occurring in coastal Andhra and Telangana regions and analyze socio - political and economic changes under QutbShahi rulers
- Understand gradual change, or change in certain aspects of society in Andhra, rather than rapid or fundamental changes
- Explain how the English East India Company became the most dominant power and outline the impact of colonial policies on different aspects in Andhra
- Outline the issues related to caste, women, widow remarriage, child marriage, social reforms and the laws and policies of colonial administration towards these issues
- Take pride in the non-violence struggle for Indian Independence and relate the importance of peace in everyday life
- Apply the knowledge of the regional history to understand the regional, linguistic and other cultural aspirations of the present day society
- Visualize where places are in relation to one another through map pointing

Syllabus:

Unit - 1 Andhra through 16th& 19th Centuries AD: Evolution of Composite Culture - The QutbShahis of Golkonda –Administration, Society

	&Economy – Literature & Architecture; Advent of European and settlements in Andhra - Occupation of Northern Circars and Ceeded Districts – Early revolts against the British
Unit - II	Andhra under British rule: Administration – Land Revenue Settlements – Society – Education - Religion – Impact of Industrial Revolution on Economy – Peasantry & Famines – Contribution of Sir Thomas Munroe & C. P. Brown – Impact of 1857 Revolt in Andhra
Unit - III	Social Reform & New Literary Movements: KandukuriVeeresalingam, RaghupathiVenkataRathnam Naidu, GuruzadaApparao, KomarrajuVenkataLaxmana Rao; New Literary Movements: RayaproluSubbarao, ViswanathaSathyanarayana, GurramJashua, BoyiBheemanna, Sri Sri
Unit - IV	Freedom Movement in Andhra (1885-1947): Vandemataram Movement– Home Rule Movement in Andhra - Non-Cooperation Movement - AlluriSeetarama Raju &Rampa Revolt (1922-24) - Civil Disobedience Movement – Quit India Movement
Unit - V	Movement for separate Andhra State (1953) and AP (1956): Causes – Andhra Maha Sabha –Conflict between Coastal Andhra &Rayalaseema – Sri Bagh Pact – work of various Committees – Martyrdom of PottiSriramulu – Formation of separate Andhra State (1953); Movement for formation of Andhra Pradesh (1956): VisalandhraMahasabha – Role of Communists – States Reorganization Committee – Gentlemen's

2023-24

Core papers

History

PROGRAMME: THREE-YEAR B.A.

(With History, Economics and Political Science Disciplines)

Course Code:

Domain Subject: History

Semester-wise Syllabus under CBCS

I/II Year B. A. – Semester 4

Course 5: HISTORY OF MODERN WORLD (From 15th Cent. AD to 1945 AD)

Learning Outcomes:

After successful completion of this course, the student will be able to:

- Demonstrate advanced factual knowledge of world histories, politics, and cultures
- Assess and appraise the developments in art, literature, and society during the Renaissance and utilize content knowledge of the Reformation and Counter Reformation to make predictions about the evolution of Christianity in Europe and abroad
- Evaluate the causes for the Glorious Revolution and American Revolution and identify the background for the evolution of human rights movement
- Understand the main events of the French Revolution and its significance in the shift in European culture from Enlightenment to Romanticism
- Think how Russia's traditional monarchy was replaced with the world's first Communist state.
- Know how the world wars affected people all over the world and the destruction they caused

Syllabus:

Unit - 1	Transformation from Medieval to Modern Era – Chief Characteristics; Glorious Revolution (1688) – Origin of Parliament Bill of Rights – Results
Unit - II	American Revolution (1776); French Revolution (1789) – Causes, Course and Results
Unit - III	Unification of Italy; Unification of Germany
Unit - IV	Communist Revolution in Russia; World War I: Causes – Results of the War – Paris Peace Conference; League of Nations
Unit - V	World War II: Causes, Fascism & Nazism – Results; The United Nations Organization: Structure, Functions and Challenges

2023-24

Core papers

History

Four-Year B.A. (Hons)
Domain Subject: **HISTORY**
IV Year B. A (Hons) –Semester-V

Max Marks: 100

Course 6B: **Tourism and Hospitality Services**
(Skill Enhancement Course (Elective), 4 Credits)

I. Learning Outcomes:

Students after successful completion of the course will be able to:

1. Understand hospitality as a career
2. Inculcate interpersonal skills
3. Develop the ability for multitasking and crisis management
4. Understands the spirit of teamwork
5. Acknowledge the importance of guest service and satisfaction

II. Syllabus: (Hours: Teaching: 60, Skills Training: 10, others including unit tests: 05. Total: 75)

Unit: 1

Tourism – Definition – Nature and Scope – History of Tourism–Types of Tourism – Domestic and International Tourism – Causes of rapid growth of tourism – National Institute of Tourism and Hospitality Management

Unit: 2

Relationship between history and tourism - Major tourist spots in AP – Gandikota, Nagarjunakonda, Salihundam, Konaseema

Unit: 3

Characteristics of Hospitality Industry - Inflexibility, Intangibility, Perish ability- Types of Hospitality jobs – Hotel Manager, Hotel Receptionist, Restaurant Manager, Catering Assistant, Executive Chef etc - Concepts of Atithi Devo Bhavah - Types of hotels in India

Unit: 4

Duties, responsibilities & skills of front office staff – duties, responsibilities and skills of housekeeping staff - guest stay process in a hotel - major processes and stages associated with it

Unit: 5

Different types of services offered in selected Hotels/Motels/Restaurants - Room Service, Catering Services -Different types of managerial issues - Service etiquettes

Course Code:

Four-Year B.A. (Hons)
Domain Subject: **HISTORY**
IV Year B. A.(Hons) - Semester – V
Max Marks: 100
Course 7B: **Tourism Guidance and Operating Skills**
(Skill Enhancement Course (Elective), 4 Credits)

II. Learning Outcomes:

Students after successful completion of the course will be able to:

1. Acquire tour guiding, operating and soft skills
2. Understand different situations under which one has to work
3. Cultivate cultural awareness and flexibility
4. Understand and apply team spirit
5. Plan and organize tour operations efficiently

II. Syllabus: (Hours: Teaching: 60, Skills Training: 10, others including unit tests: 05 Total: 75)

Unit: 1

Meaning of tour guide - types of tour guide: heritage guide, nature guide, adventure guide, business guide, special interest guide etc – duties and responsibilities of guides -various roles of tour guide.

Unit: 2

Guiding techniques: leadership skills, social skills, presentation skills, communication skills - Guide's personality skills: passion, empathy, enthusiasm, punctuality, humour etc - Personal hygiene and grooming – code of conduct.

Unit: 3

Guest Relationship Management- Handling emergency situations- Medical, Personal, Official, VISA/Passport, Death, Handling Guest with special needs/Different Abilities/ Different age groups.

Unit: 4

Conducting Tours: Pre-Tour Planning, Route Chart, Modes of Transportation, Security Measures, and Check list etc. - Conducting various types of tours- Relationship with Fellow Guides - Coordination with hospitality institutions.

Unit: 5

Travel Agency and Tour operations – Difference between Travel Agent and Tour operator – Functions of Tour Operator – Types of Tour Operations and of Tour Operators - A brief study of tour operating agencies like APTDC, Southern Travels etc.

2023-24

Core papers

B.COM (G) & B.com (Computer Application)
SEMESTER-I
COURSE 1: FUNDAMENTALS OF COMMERCE

Unit 1: Introduction: Definition of Commerce – Role of Commerce in Economic Development - Role Commerce in Societal Development. Imports and Exports, Balance of Payments. World Trade Organization.

Unit 2: Economic Theory: Macro Economics – Meaning, Definition, Measurements of National Income, Concepts of National Income. Micro Economics – Demand and Supply. Elasticity of Demand and Supply. Classification of Markets -Perfect Competition – Characteristics – Equilibrium Price, Marginal Utility. .

Unit 3: Accounting Principles: Meaning and Objectives Accounting, Accounting Cycle - Branches of Accounting - Financial Accounting, Cost Accounting, Management Accounting. Concepts and Conventions of Accounting – GAAP.

Unit 4: Taxation: Meaning of Tax, Taxation - Types of Tax- Income Tax, Corporate Taxation, GST, Customs & Exercise. Differences between Direct and Indirect Tax – Objectives of TaxConcerned authorities – Central Board of Direct Taxes (CBDT) and Central Board of Excise and Customs (CBIC).

Unit 5: Computer Essentials: Web Design - Word Press Basics, Developing a Simple Website. Digital Marketing - Social Media Marketing, Content Marketing, Search Engine Optimization (SEO), E-mail Marketing. Data Analytics- Prediction of customer behavior, customized suggestions.

Lab Exercise: Build a sample website to display product information.• Provide wide publicity for your product over social media and e-mail• Estimate the customer behavior and provide necessary suggestions regarding the products• of his interest.

B.COM (G) & B.com (Computer Application)

2023-24

SEMESTER-I

COURSE 2: BUSINESS ORGANIZATION

Theory Credits: 4 4 hrs/week

Learning Objectives: The course aims to acquire conceptual knowledge of business, formation various business organizations. To provide the knowledge on deciding plant location, plan layout and business combinations. Learning outcomes: After completing this course a student will have: Ability to understand the concept of Business Organization along with the basic laws and norms of Business Organization. The ability to understand the terminologies associated with the field of Business Organization along with their relevance and to identify the appropriate types and functioning of Business Organization for solving different problems. The application of Business Organization principles to solve business and industry related problems and to understand the concept of Sole Proprietorship, Partnership and Joint Stock Company etc.

Unit 1: Business: Concept, Meaning, Features, Stages of development of business and importance of business. Classification of Business Activities. Meaning, Characteristics, Importance and Objectives of Business Organization.. Difference between Industry & Commerce and Business & Profession, Modern Business and their Characteristics.

Unit 2: Promotion of Business: Considerations in Establishing New Business. Qualities of a Successful Businessman. Forms of Business Organization - Sole Proprietorship, Partnership, Joint Stock Companies & Co-operatives and their Characteristics, relative merits and demerits, Difference between Private and Public Company, Concept of One Person Company.

Unit 3: Plant Location and Layout: Meaning, Importance, Factors affecting Plant Location. Plant Layout - Meaning, Objectives, Importance, Types of Layout. Factors affecting Layout. Size of Business Unit - Criteria for Measuring the Size and Factors affecting the Size. Optimum Size and factors determining the Optimum Size.

Unit 4: Business Combination: Meaning, Characteristics, Objectives, Causes, Forms and Kinds of Business Combination. Rationalization: Meaning, Characteristics, Objectives, Principles, Merits and demerits, Difference between Rationalization and Nationalization.

Unit 5: Computer Essentials: Milestones of Computer Evolution – Computer, Block diagram, generations of computer . Internet Basics - Internet, history, Internet Service Providers, Types of Networks, IP, Domain Name Services, applications. Ethical and Social Implications - Network and security concepts- Information Assurance Fundamentals, Cryptography - Symmetric and Asymmetric, Malware, Firewalls, Fraud Techniques, privacy and data protection

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2023-24

SEMESTER-II
B.Com (CA)
COURSE 3: FINANCIAL ACCOUNTING

Theory Credits: 4 4 hrs/week

Unit-I: Introduction:- Need for Accounting - Definitions, objectives, functions, - Book keeping and accounting - Advantages and limitations - Accounting concepts and conventions - double entry book keeping - Journal - Posting to Ledger - Preparation of Subsidiary books including Cash book.

Unit-II: Final Accounts: - Final accounts - Preparation of Trading account, Profit & loss account and Balance Sheet using computers.

Unit-III: Depreciation: Meaning and Causes of Depreciation - Methods of Depreciation: Straight Line – Written Down Value –Annuity and Depletion Method (including Problems).

Unit-IV: Consignment Accounts: Consignment - Features - Proforma Invoice - Account Sales – Del-credere Commission - Accounting Treatment in the Books of Consigner and Consignee - Valuation of Closing Stock - Normal and Abnormal Losses (including Problems).

Unit-V: Joint Venture Accounts: Joint Venture - Features - Difference between Joint-Venture and Consignment – Accounting Procedure – Methods of Keeping Records–One Vendor Keeps the Accounts and Separate Set off Books Methods (including Problems).

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SEMESTER-II

COURSE 4: OFFICE AUTOMATION TOOLS

Practical | Credits: 1 | 2 hrs/week

LIST OF EXPERIMENTS

1) Design a visiting card for Managing Director of a company as per the following specification.
   - Sizeofvisitingcardis3½×2
   - Name of the company with big font
   - Phone number, Fax number and E-mail address with appropriate symbols.
   - Office and Residence address separated by a line

2) Create a table with following columns and display the result ins eparate cells for the following
   - Emp Name, Basic pay, DA, HRA, Total salary.
   - Sort all the employees in ascending order with the name as the key
   - Calculate the totals alary of the employee
   - Calculate the Grand total salary of the employee
   - Finding highest salary and
   - Find lowest salary

3) Prepare an advertisement to a company requiring software professional with the following
   - Attractive page border
   - Design the name of the company using WordArt
   - Use at least one clipart.
   - Give details of the company (use bullets etc)

Unit 2:

MS Word Advanced features: Difference between Wizard and Template - Customize the Quick Access Tool Bar – Macros: Purpose – Creating Macro – Using Macro – Storing Macro - ,Inserting pictures: From Computer, Online Pictures – Insert 3d Models - Insert Shapes – Insert Text Box – Insert Equation, Hyperlinks, Tables Insert tables Mail merging, Printing documents, Tables : Insert tables, Mathematical calculations on tables data. Insert Text Box etc.

Case Study:

1. Create a document to send a holiday intimation to all the parents at time about Dasara Vacation.
2. Create a document to create Time Table of you class using tables.

Unit 3:

Introduction to MS Excel & Its features: MS-Excel: Excel Features, Spreadsheets, workbooks, creating, saving & editinga workbook, Renaming sheet, cell entries (numbers, labels, and formulas), spell check ,find and replace, Adding and deleting rows and columns Filling series, fill with drag, data sort, Formatting worksheet, Functions and its parts, Some useful Functions in Excel (SUM,AVERAGE,COUNT, MAX,MIN, IF),

Case Study:

1. Create a worksheet with you class marks displaying total, average, top marks in the class and least marks in the class.

Unit 4:

Ms-Excel Advanced Features: Cell referencing (Relative, Absolute, Mixed), What-if analysis, Introduction to charts: types of charts, creation of charts, printing a chart, printing worksheet – Sort – Filters – View Menu

Case Study:

1. Prepare a chart with height and weights of you class mates in atleast 3 types of charts.
2. Demonstrate the use of Filter with the attendance data of your class.

Unit 5:

Ms-PowerPoint and its Applications: MS-Power Point: Features of Power Point, Uses, components of slide, templates and wizards, using template, choosing an auto layout ,using outlines, adding sub headings, editing text, formatting text, using master slide, adding slides, changing color scheme, changing background and shading, adding header and footer, adding cliparts and auto shapes. Various presentation, Working in slide sorter view(deleting, duplicating, rearranging slides),adding transition and animations to slide show, inserting music or sound on a slide, viewing slide show
,Printing slides.

Case Study:

1. Prepare a presentation with your achievements and experiences in College.

Text Books:

1. Computer Fundamentals–Pradeep.K.Sinha:BPBPublications.
2. Fundamentals of Computers -ReemaThareja, Oxford University Press India

Reference Books:

1. Fundamentals of Computer – V . Rajaraman, Printice Hell of India.
2. Introduction to Computers–Peter Norton McGraw-Hill.

SEMESTER-II
COURSE 4: OFFICE AUTOMATION TOOLS
Theory Credits: 3 3 hrs/week

Unit 1: Introduction to MS Office & MS Word: MS-Word: Features of MS-Word, MS-Word Window components, working with formatted text, Shortcut keys, Formatting documents: Selecting text, Copying &moving data, Formatting characters, changing cases, Paragraph formatting ,Indents, Drop Caps ,Using format painter, Page formatting, Header & footer, Bullets & numbering, Tabs, Forming tables. Finding & replacing text, go to(F5) command, proofing text (Spell-check, Auto correct),
Case Study: 1. Create a document to write a letter to the DM&HO of the district complaining about Hygienic conditions in your area. 2. Create a document to share your experience of your recent vacation with family.

Unit 2: MS Word Advanced features: Difference between Wizard and Template - Customize the Quick Access Tool Bar – Macros: Purpose – Creating Macro – Using Macro – Storing Macro - ,Inserting pictures: From Computer, Online Pictures – Insert 3d Models - Insert Shapes – Insert Text Box – Insert Equation, Hyperlinks, Tables Insert tables Mail merging, Printing documents, Tables : Insert tables, Mathematical calculations on tables data. Insert Text Box etc.
Case Study: 1. Create a document to send a holiday intimation to all the parents at time about Dasara Vacation. 2. Create a document to create Time Table of you class using tables.

Unit 3: Introduction to MS Excel & Its features: MS-Excel: Excel Features, Spreadsheets, workbooks, creating, saving & editinga workbook, Renaming sheet, cell entries (numbers, labels, and formulas), spell check ,find and replace, Adding and deleting rows and columns Filling series, fill with drag, data sort, Formatting worksheet, Functions and its parts, Some useful Functions in Excel (SUM,AVERAGE,COUNT, MAX,MIN, IF),
Case Study: 1. Create a worksheet with you class marks displaying total, average, top marks in the class and least marks in the class.

Unit 4: Ms-Excel Advanced Features: Cell referencing (Relative, Absolute, Mixed), What-if analysis, Introduction to charts: types of charts, creation of charts, printing a chart, printing worksheet – Sort – Filters – View Menu Case Study: 1. Prepare a chart with height and weights of you class mates in atleast 3 types of charts. 2. Demonstrate the use of Filter with the attendance data of your class.

Unit 5: Ms-PowerPoint and its Applications: MS-Power Point: Features of Power Point, Uses, components of slide, templates and wizards, using template, choosing an auto layout ,using outlines, adding sub headings, editing text, formatting text, using master slide, adding slides, changing color scheme, changing background and shading, adding header and footer, adding cliparts and auto shapes. Various presentation, Working in slide sorter view(deleting, duplicating, rearranging slides),adding transition and animations to slide show, inserting music or sound on a slide, viewing slide show ,Printing slides.

Case Study: 1. Prepare a presentation with your achievements and experiences in College.

Text Books: 1. Computer Fundamentals–Pradeep.K.Sinha:BPBPublications. 2. Fundamentals of Computers - ReemaThareja, Oxford University Press India

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2023-24
SEMESTER-II
COURSE 4: OFFICE AUTOMATION TOOLS
Practical Credits: 1 2 hrs/week

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SEMESTER-II

COURSE 4: OFFICE AUTOMATION TOOLS

Practical | Credits: 1 | 2 hrs/week

LIST OF EXPERIMENTS

1) Design a visiting card for Managing Director of a company as per the following specification.
   - Sizeofvisitingcardis3½×2
   - Name of the company with big font
   - Phone number, Fax number and E-mail address with appropriate symbols.
   - Office and Residence address separated by a line
2) Create a table with following columns and display the result ins eparate cells for the following
   - Emp Name, Basic pay, DA, HRA, Total salary.
   - Sort all the employees in ascending order with the name as the key
   - Calculate the totals alary of the employee
   - Calculate the Grand total salary of the employee
   - Finding highest salary and
   - Find lowest salary
3) Prepare an advertisement to a company requiring software professional with the following
   - Attractive page border
   - Design the name of the company using WordArt
   - Use at least one clipart.
   - Give details of the company (use bullets etc)

- Give details of the Vacancies in each category of employee's (Business manager, Software engineers, System administrators, Programmers, Data entry operators)

  Qualification required.

4) Create a letter having following specifications

- Name ofthecompanyonthetopofthepage2withbigfontandgoodstyle
- Phone no, Fax no and E-mail address with symbols.
- Main products manufactured by the company
- Slogans if any should be specify in bold at the bottom

5) Create two pages of curriculum vitae of a graduate with the following specifications

- Table to show qualifications with proper headings
- Appropriate left and right margins
- Format ½pageusingtwo-columnapproachabout yourself
- Name on each page at the top right side
- Page no.in the footer on the right side.

6) Write a macro format documents below

- Linespacing"2"(double)

- Paragraphindentof0.1
- Justification formatting style
- Arial font andBoldof14pt-size

7) Create a letter as the maindocumentandcreate10recordsforthe 10persons

usemailmergetocreateletterforselectedpersonsamong10.

8) Create an electronic spread sheet in which you enter the following decimal numbers and convert the mintooctal, Hexa decimal an d binary numbers and vice-versa.

DecimalNumbers:35,68,95,78,165,225,355,375,465

BinaryNumbers:101,1101,11101,11111,10001,11101111

9) Calculate the net pay of the employees following the conditions below.

	A	B	C	D	E	F	G	H	I
1	Employee	Employe e	Basic	DA	HRA	GPF	Gross	Income	Net
2									

DA:-56%ofthebasicpayifBasicpayisgreaterthan20000 orelse44%.

HRA:-15%oftheBasicpaysubjecttomaximumofRs.4000.
GPF: -10%ofthebasicpay.
INCOMETAX:-10%ofbasicifBasicpayisgreaterthan20000.
Find who is getting highest salary & who is get lowestsalary?

10) The ABC Company shows the sales of different product For5years.CreateBARGraph, 3D

and Pie chart for the following.

A	B	C	D	E	F
S.No.	Year	Pro1	Pro2	Pro3	Pro4
1	1989	1000	800	90	1000
2	1990	800	80	50	900
3	1991	1200	190	40	800
4	1992	400	200	30	1000
5	1993	1800	400	40	1200

11) Create a suitable examination data base and find the sum of the marks (total) of each student and respective, class secured by the student.

Pass: if marks in each subject>=35

Distinction :if average>=75

First class :if average>=60but<75

Second class: if average>=50butlessthan60

Third class: if average>=35butlessthan50 Fail:

if marks in any subject<35

12) Enter the following data into the sheet.

Name	Department	Salary
Anusha	Accounts	12000
Rani	Engineering	24000
Lakshmi	Accounts	9000
Purnima	Marketing	20000
Bindu	Accounts	4500
Tejaswi	Accounts	11000
Swetha	Engineering	15000
Saroja	Marketing	45000
Sunitha	Accounts	5600
Sandhya	Engineering	24000
Harika	Marketing	8000

- Extract records for department tin Accounts and Salary > 10000
- Sort the data by salary with the department using "sort commands".
- Calculate total salary for a ch department using Subtotals

13) Enter the following data in to the sheet..

	Raju	Rani	Mark	Rosy	Ismail	Reshma
English	76	89	43	51	76	87
2ndLang	55	85	78	61	47	33
Maths	65	82	34	58	52	65
Computers	45	91	56	72	49	56
Human Values	51	84	54	64	32	64

Apply the conditional formatting for marks

- 35 below Red
- 35 to 50 Blue
- 51 to 70 Green
- 71 to 100 Yellow

14) Create a presentation using templates.

15) Create a Custom layout or Slide Master for professional presentation.

16) Create a presentation with slide transitions and animation effects.

17) Create a table in PPT and apply graphical representation.

- Name ofthecompanyonthetopofthepage2withbigfontandgoodstyle
- Phone no, Fax no and E-mail address with symbols.
- Main products manufactured by the company
- Slogans if any should be specify in bold at the bottom

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SEMESTER-II

COURSE 4: OFFICE AUTOMATION TOOLS

Theory | Credits: 3 | 3 hrs/week

Course Objectives:

The objective of this paper is to help students to acquire knowledge on the environment of GUI in Ms-Word and its features. To introduce the fundamentals concepts of using Ms-Word and its features to make it more useful and provide hands on use of Word, Excel and PowerPoint.

Learning Outcomes:

The students will be able:

Understand concept of Word Processor and use its features. To use the advanced features of Ms-Word to make day to day usage easier. To work comfortably with Ms-Excel Environment. To create work sheets and user advanced feature of Excel. To create make presentations and inserting multimedia in them.

Unit 1:

Introduction to MS Office & MS Word: MS-Word: Features of MS-Word, MS-Word Window components, working with formatted text, Shortcut keys, Formatting documents: Selecting text, Copying &moving data, Formatting characters, changing cases, Paragraph formatting ,Indents, Drop Caps ,Using format painter, Page formatting, Header & footer, Bullets & numbering, Tabs, Forming tables. Finding & replacing text, go to(F5) command, proofing text (Spell-check, Auto correct),

Case Study:

1. Create a document to write a letter to the DM&HO of the district complaining about Hygienic conditions in your area.
2. Create a document to share your experience of your recent vacation with family.

Unit 2:

MS Word Advanced features: Difference between Wizard and Template - Customize the Quick Access Tool Bar – Macros: Purpose – Creating Macro – Using Macro – Storing Macro - ,Inserting pictures: From Computer, Online Pictures – Insert 3d Models - Insert Shapes – Insert Text Box – Insert Equation, Hyperlinks, Tables Insert tables Mail merging, Printing documents, Tables : Insert tables, Mathematical calculations on tables data. Insert Text Box etc.

Case Study:

1. Create a document to send a holiday intimation to all the parents at time about Dasara Vacation.
2. Create a document to create Time Table of you class using tables.

Unit 3:

Introduction to MS Excel & Its features: MS-Excel: Excel Features, Spreadsheets, workbooks, creating, saving & editinga workbook, Renaming sheet, cell entries (numbers, labels, and formulas), spell check ,find and replace, Adding and deleting rows and columns Filling series, fill with drag, data sort, Formatting worksheet, Functions and its parts, Some useful Functions in Excel (SUM,AVERAGE,COUNT, MAX,MIN, IF),

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1. Create a worksheet with you class marks displaying total, average, top marks in the class and least marks in the class.

Unit 4:

Ms-Excel Advanced Features: Cell referencing (Relative, Absolute, Mixed), What-if analysis, Introduction to charts: types of charts, creation of charts, printing a chart, printing worksheet – Sort – Filters – View Menu

Case Study:

1. Prepare a chart with height and weights of you class mates in atleast 3 types of charts.
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Unit 5:

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SEMESTER-II

COURSE 4: OFFICE AUTOMATION TOOLS

Practical | Credits: 1 | 2 hrs/week

LIST OF EXPERIMENTS

1) Design a visiting card for Managing Director of a company as per the following specification.
   - Sizeofvisitingcardis3½×2
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   - Phone number, Fax number and E-mail address with appropriate symbols.
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8) Create an electronic spread sheet in which you enter the following decimal numbers and convert the mintooctal, Hexa decimal an d binary numbers and vice-versa.

DecimalNumbers:35,68,95,78,165,225,355,375,465

BinaryNumbers:101,1101,11101,11111,10001,11101111

9) Calculate the net pay of the employees following the conditions below.

	A	B	C	D	E	F	G	H	I
1	Employee	Employe e	Basic	DA	HRA	GPF	Gross	Income	Net
2									

DA:-56%ofthebasicpayifBasicpayisgreaterthan20000 orelse44%.

HRA:-15%oftheBasicpaysubjecttomaximumofRs.4000.
GPF: -10%ofthebasicpay.
INCOMETAX:-10%ofbasicifBasicpayisgreaterthan20000.
Find who is getting highest salary & who is get lowestsalary?

10) The ABC Company shows the sales of different product For5years.CreateBARGraph, 3D

and Pie chart for the following.

A	B	C	D	E	F
S.No.	Year	Pro1	Pro2	Pro3	Pro4
1	1989	1000	800	90	1000
2	1990	800	80	50	900
3	1991	1200	190	40	800
4	1992	400	200	30	1000
5	1993	1800	400	40	1200

11) Create a suitable examination data base and find the sum of the marks (total) of each student and respective, class secured by the student.

Pass: if marks in each subject>=35

Distinction :if average>=75

First class :if average>=60but<75

Second class: if average>=50butlessthan60

Third class: if average>=35butlessthan50 Fail:

if marks in any subject<35

12) Enter the following data into the sheet.

Name	Department	Salary
Anusha	Accounts	12000
Rani	Engineering	24000
Lakshmi	Accounts	9000
Purnima	Marketing	20000
Bindu	Accounts	4500
Tejaswi	Accounts	11000
Swetha	Engineering	15000
Saroja	Marketing	45000
Sunitha	Accounts	5600
Sandhya	Engineering	24000
Harika	Marketing	8000

- Extract records for department tin Accounts and Salary > 10000
- Sort the data by salary with the department using "sort commands".
- Calculate total salary for a ch department using Subtotals

13) Enter the following data in to the sheet..

	Raju	Rani	Mark	Rosy	Ismail	Reshma
English	76	89	43	51	76	87
2ndLang	55	85	78	61	47	33
Maths	65	82	34	58	52	65
Computers	45	91	56	72	49	56
Human Values	51	84	54	64	32	64

Apply the conditional formatting for marks

- 35 below Red
- 35 to 50 Blue
- 51 to 70 Green
- 71 to 100 Yellow

14) Create a presentation using templates.

15) Create a Custom layout or Slide Master for professional presentation.

16) Create a presentation with slide transitions and animation effects.

17) Create a table in PPT and apply graphical representation.

- Name ofthecompanyonthetopofthepage2withbigfontandgoodstyle
- Phone no, Fax no and E-mail address with symbols.
- Main products manufactured by the company
- Slogans if any should be specify in bold at the bottom

2023-24

Core papers

Computer Application

DATABASEMANAGEMENTSYSTEMS

Semester	CourseCode	CourseTitle	Hours	Credits
III	C3	DATABASEMANAGEMENT SYSTEMS	60	3

CourseObjective:

1. To educate student regarding databases and how to manage databases.
2. To provide knowledge about creating relationships.
3. To provide knowledge about dependencies and relational constraints.
4. To enable student to write various types of queries for handling data.

CourseLearningOutcomes:
On completingthe subject, students will be able to:

1.Gain knowledgeof Database and DBMS.
2.UnderstandthefundamentalconceptsofDBMSwithspecialemphasisonrelational data model.
3.Demonstrateanunderstandingofnormalizationtheoryandapplysuchknowledgeto the normalization of adatabase
4.Model database usingERDiagrams and design database schemas based on the model.
5.Create asmall database usingSQL.

UNITI **12Hrs**

Introduction: Data and Information**, Characteristics of the Database Approach:** Self-Describing Nature of the a Database System, Insulation between Programs and Data, Data Abstraction, Support of Multiple Views of the data, Sharing of Data and multiuser Transaction Processing, Advantages of DBMS, **Data Models, Schemas and Instances:** Categories of Data Models, Schemas, Instances, and Database State**, DBMS Architecture and Data Independence:** The Three-Schema Architecture, Data Independence**,**

UNITII **12 Hrs**

Entity Relationship Model:
Introduction, Entity types, Entity sets, Attributes and Keys, Entities and Attributes, Entity Types, Entity Sets, Keys and Value Sets, Relationships, Relationship types, Roles, and Structural Constraints, Relationship Types, Sets and Instances, Relationship Degree, Attributes of Relationship Types, Weak Entity Types, ER Diagrams,

Enhanced Entity-Relationship:
Subclasses, super classes, and inheritance, Specialization and Generalization, Constraints and characteristics of Specialization and Generalization.

UNITIII **12 Hrs**

The relational data model, Relational Constraints:

Introduction, Relational Model Concepts, Domains, Attributes, Tuples and Relations, Characteristics of Relations, Relational Model Notation Relational Constraints and Relational

Database Schemas:

Domain Constraints, Key Constraints and Constraints on Null, Relational Databases and Relational Database Schemas, Entity Integrity, Referential Integrity and Foreign Keys

Functional Dependencies and normalization for Relational Databases:

Functional Dependencies, Definition of Functional Dependency, Inference Rules for Functional Dependencies, Equivalence of sets of Functional Dependencies, Minimal Sets of Functional Dependencies

Normal forms based on primary keys:

Introduction to Normalization, First Normal Form, Second Normal Form, Third Normal Form

UNITIV **12 Hrs**

The Relational Algebra:

Basic Relational Algebra Operation, The SELECT Operation, The PROJECT operation, Sequences of Operations and the, RENAME Operation, Set Theoretic Operations, The JOIN Operation, A Complete Set of Relational Algebra Operations, The DIVISION Operation

Additional Relational Operations:

Aggregate Functions

UNITV **12 Hrs**

SQL (STRUCTURED QUERY LANGUAGE)

Data Definition, Constraints and Schema changes in SQL, The CREATE TABLE Command and SQL Data Types and Constraints, The DROP SCHEMA and DROP TABLE Command, The ALTER TABLE Command, The SELECT-FROM-WHERE Structure of SQL Queries WHERE-Clause , Aggregate Functions and Grouping, Insert, Delete, and Update Statements in SQL, The INSERT Command, The DELETE Command

Prescribed Books:

1. "Fundamentals of Database Systems" by R.Elmasri and S.Navathe
2. "Introduction to Database Management System"AtulKahatePEARSON EDUCATION *ISBN*: 9789332505537
3. "Database System Concepts" by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill, 2010.

Reference Books:

1. "Database Management Systems" by Raghu Ramakrishnan, NcGrawhill,2002
2. "Prinicples of Database Systems" by J.D.Ullman
3. "An Introduction to Database Systems" by Bipin C Desai
4. "Fundamentals of Relational Database Management Systems" by S.Sumathi, S. Esakkirajan, Springer Publications

2023-24

Core papers

Computer Application

Object Oriented Programming using Java

Semester	CourseCode	CourseTitle	Hours	Credits
IV	C4	Object Oriented Programming using Java	60	3

CourseObjective:

To introduce the fundamental concepts of Object-Oriented programming and to design & implement object oriented programming concepts in Java.

CourseLearningOutcomes:

On completingthe subject, students will be able to:

1. Understand the concept and underlying principles of Object-Oriented Programming, Understand how object-oriented concepts are incorporated into the Java programming language.
2. Implement Object Oriented Programming Concepts (class, constructor, overloading, inheritance, overriding) in java.
3. Create and use interfaces in a Java.
4. Implement Multithreading, exception handling in Java.
5. Create and use packages and applets.

UNIT-1

13 hours

FUNDAMENTALS OF OBJECT – ORIENTED PROGRAMMING : Introduction, Object Oriented paradigm, Basic Concepts of OOP, Benefits of OOP, Applications of OOP, Java features.
OVERVIEW OF JAVA LANGUAGE: Simple Java program structure, Java tokens, Implementing a Java Program, Java Virtual Machine, Command line arguments.
CONSTANTS, VARIABLES & DATATYPES: Constants, Variables, Data Types, Declaration of Variables, Giving Value to Variables, Getting Value of Variables, Operators in Java.

UNIT-II

12 hours

DECISION MAKING & BRANCHING :
Decision making with if statement- Simple if statement, If - Else statement, Nesting of if- else statements, The else if ladder, The switch statement, The conditional operator.
LOOPING: The While statement, The do-while statement, The for statement.
CLASSES, OBJECTS & METHODS: Defining a class, Adding variables, Adding methods, Creating objects, Accessing class members, Constructors, Method overloading, Static members.

12 hours

INHERITANCE: Extending a class, Overriding methods, Final variables and methods, Final classes, Abstract methods and classes.

ARRAYS, STRINGS : Arrays, One-dimensional arrays, Two – dimensional arrays, Strings.

INTERFACES: Introduction to multiple inheritance, Defining interfaces, Extending interfaces, Implementing interfaces.

UNIT-IV

10 hours

MULTITHREADED PROGRAMMING: Creating Threads, Extending the Threads, Stopping and Blocking a Thread, Lifecycle of a Thread, Using Thread Methods.

MANAGING ERRORS AND EXCEPTIONS: Types of errors, Compile-time errors, Run-time errors, Exceptions, Exception handling, Multiple Catch Statements, Using finally statement.

UNIT – V

13 hours

APPLET PROGRAMMING: Local and remote applets, Applets and Applications, Building Applet code, Applet Life cycle:-Initialization state, Running state, Idle or stopped state, Dead state, Display state.

PACKAGES: Java API Packages, Creating Packages, Accessing a Package, Using a Package.

Text Books:

1. E.Balaguruswamy, Programming with JAVA, A primer, 3e, TATA McGraw-Hill Company.

Reference Books:

1. Core Java: An Integrated Approach, Authored by Dr. R. NageswaraRao&Kogent Learning SolutionsInc.
2. John R. Hubbard, Programming with Java, Second Edition, Schaum's outline Series, TATA McGraw-Hill Company.
3. Deitel&Deitel. Java TM: How to Program, PHI (2007)
4. Object Oriented Programming Through Java by P. Radha Krishna, Universities Press (2008)

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

2022-23

Core papers

Computer Application

WEB DESIGNING

Semester	CourseCode	CourseTitle	Hours	Credits
IV	C5	WEB DESIGNING	60	3

Course Objectives:

To introduce the fundamental concepts of HTML, PHP, MySQL and able to design the web pages using scripting languages.

Course Outcomes:

6. To learn about Basic tags in Html and CSS
7. To learn about the Building Blocks of php, functions.
8. To learn about Different types of Arrays.
9. To learn about working with Forms, Sessions, Cookies.
10. To learn about Interacting with MySQL using PHP.

Unit–I: IntroductiontoHTML: **10 hours**

Introduction to HTML, Basic html, Document bodytext, Hyperlinks, Addingmore formatting Lists, Tables,Images, Multimedia Objects, Frames,Forms.

Unit-II:Building blocks of PHP: **10 hours**

Variables, Data Types, Operators and Expressions, Constants. Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output. Working with Functions: Defining Functions, Calling functions, returning the values from User Defined Functions, Variable Scope, Saving State between Function calls with the Static statement, more about arguments.

Unit-III: Working with Arrays: **13 hours**

Arrays, Creating Arrays, some Array-Related Functions, Working with Objects: Creating Objects, Object Instance. Working with Strings, Dates and Time: Formatting Strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP

Unit-IV: Working with Forms: **14 hours**

Creating Forms, Accessing Form - Input with User defined Arrays, Combining HTML and PHP code on a single Page, Redirecting the user, Sending Mail on Form Submission, Working with File Uploads. Working with Cookies and User Sessions: Introducing Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables, passing session IDs in the Query String, Destroying Sessions and Unsettling Variables, Using Sessions in an Environment with Registered Users.

Unit-V: Interacting with MySQL using PHP: 13 hours

MySQLVersus MySQL Function, Connecting to MySQL with PHP, Working with MySQL Data. Creating Database Tables, Creating Menu, Creating Record Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism, Adding Sub-entities to a Record.

PrescribedBooks:

1. Chris Bates, Web Programming BuildingInternet Application, Second Edition, Wiley (2007)
2. HeadFirst Servlets and JSP 2nd Edition, Bryan Basham, KathySierra
3. Uttam Kumar Roy, WebTechnologies from Oxford UniversityPress
3. JulieC.Meloni,PHPMySQLandApache,SAMSTeachyourself,Pearson Education (2007).
4. XueBaiMichaelEkedahl,ThewebwarriorguidetoWebProgramming, Thomson (2006).

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))

Core papers

Computer Application

2023=24

S.K.R. & S.K.R. Govt. College for Women (Autonomous), Kadapa.
Reaccredited with 'B' Grade by NAAC
Y.S.R.Kadapa District – 516001, Andhra Pradesh

III BCOMCA/BA HECA & BA HUCA Computer Applications V Semester

Course 6C: E– Commerce Application Development Lab

Case study of E –commerce:

1. Home page design of web site
2. Validation using PHP
3. Implement Catalogue design
4. Implement Access control mechanism(eg: username and password)
5. Case study on business model of online E-Commerce store

2023-24

Core papers

Computer Application

BCOMCA/BA HECA & BA HUCA 5th Semester Computer Applications
Syllabus under CBCS

Course 7C : Real Time Governance System (RTGS)

Course Objectives:

This course aims to provide exposure to Real Time Governance System. It introduces the concepts of E- Governance, E-Governance Infrastructure, E-Governance in India, Latest Applications in Real Time Governance.

Course Learning Outcomes:

Upon successful completion of this course, students will have the knowledge and skills to

1. Understand the terms regarding Governance, E-Governance and RTGS
2. Learn about E-Governance Infrastructure
3. Understand the E-Governance implementation in several countries
4. Understand the E-Governance implementation in several Indian states
5. Understand the applications of RTG

UNIT – I

Introduction to E-Governance:

- Government, Governance and Good Governance
- What is E-Governance or Electronic Governance?
- E-Government and E-Governance: A conceptual Analysis
  - Objectives
  - Components
  - application domains
  - four phase model
  - implementing E-Governance
  - issues while implementing E-Governance

UNIT – II

E-Governance Infrastructure:

1. Data Systems infrastructure

- Executive Information Systems
- Management Information Systems
- Knowledge Management Systems
- Transaction Processing Systems

UNIT – I

Introduction to E-Governance:

- Government, Governance and Good Governance
- What is E-Governance or Electronic Governance?
- E-Government and E-Governance: A conceptual Analysis
  - Objectives
  - Components
  - application domains
  - four phase model
  - implementing E-Governance
  - issues while implementing E-Governance
  - Opportunities and challenges
- Types of E-Governance
- What is Real-Time Governance (RTG)
- Real Time Governance Society (RTGS)

UNIT – II

E-Governance Infrastructure:

1. Data Systems infrastructure
   - Executive Information Systems
   - Management Information Systems
   - Knowledge Management Systems
   - Transaction Processing Systems
2. Legal Infrastructural preparedness
   - IT Act 2000
   - Challenges to Indian law and cybercrime scenario in India
   - Amendments of the Indian IT Act
3. Institutional Infrastructural preparedness
   - Internet
   - intranet
   - extranet
4. Human Infrastructural preparedness
   - Top-level management
   - Middle-level management
   - Low-level management
5. Technological Infrastructural preparedness
   - Information and communications technology
   - Data Warehousing

UNIT – III

E-Governance: Country Experience:

- INDIA
- US
- UK
- AUSTRALIA
- DUBAI

UNIT –IV

E-Governance in India:

- Andhra Pradesh
- Karnataka
- Kerala
- Uttar Pradesh
- Madhya Pradesh
- West Bengal
- Gujarat

UNIT –V

Latest Applications in Real Time Governance:

- Agriculture
- Rural Development
- Health care
- Education
- Tourism
- Commerce and Trade

Prescribed Textbooks:

1. E-Governance: concepts and case studies| CSR Prabhu| Prentice-Hall|
2. E-Governance| Niranjan pani, Sanhari Mishra | Himalaya Publishing House

Website References:

1. http://www.egov4dev.org/success/case/
2. https://vikaspedia.in/e-governance/resources-for-vles
3. https://altametrics.com/en/information-systems/information-system-types.html
4. https://core.ap.gov.in/CMDashBoard/Index.aspx

Core papers

Special English

Semester-1I

AN INTRODUCTION TO ENGLISH LITERATURE (600-1500)Objectives& Outcomes:

UNIT-I

HistoryofEnglishLiterature-- OldEnglish,Middle English,Renaissance period

UNIT-II

Literary Genres--Poetry, Drama, Ballad, Epic, Alliteration, Elegy, Sonnet, Mystery/MiraclePlays,Morality Play

UNIT-III

Poetry---GeoffreyChaucer:*ControllingtheTongue*

EdmundSpencer:Sonnet81*(Fair is my love) from Amoretti*

UNIT-IV

Drama---ChristopherMarlowe:*Dr. Faustus*

UNIT-V

LiteraryCriticism---PhilipSydney: *An Apologyfor Poetry*

Reference:

Daiches, David. 1979. *A Critical History of English Literature*. Bombay: Allied Publishers.Grierson,H.J.C. 2014.*AHistoryof English Poetry*.CUP.
Daiches, David. 2014 ed. *History of English Literature.(*4 Volumes).CUP.Eagleton,Terry. 2007.*How toRead a Poem*.Oxford: Blackwell.
M.S.Naagarajan.2006.*EnglishLiteraryCriticism&Theory*.
Barry,Peter.2010.*BeginningTheory: AnIntroductiontoLiteraryTheoryandCulturalTheory*, ManchesterUniversityPress,Manchester.
MH Abrams.2015. *Glossaryof LiteraryTerms.*Cengagelearning
Stephen. *Renaissance Self-Fashioning. 1980. From More to Shakespeare.* Chicago: University ofChicagoPress.

Semester-II

3. AN INTRODUCTION TO ELIZABETHAN LITERATURE (1558-1603)Objectives&

Outcomes:

Aftergoingthrough thecoursethelearnerwouldbeableto

- LearnthefeaturesofElizabethanliterature.
- Reviewtheaspects ofliterary genres,formsand termsoftheperiod.
- Identifythecharacteristicsofpoetry,dramaandliterary criticism.
- Haveadetailedunderstanding of theliterary texts.

UNIT-I

History of Elizabethan Literature-- Literary Characteristics, Major Themes & WritersElizabethanTheatre

UNIT-II

Literary Genres---Simile, Metaphor, Allegory, Personification, Tragedy, Comedy, Tragi-Comedy,ChroniclePlay, ThreeUnities, Masque

UNIT-III

Poetry--- William Shakespeare: Sonnet 116 (*Let me not to the Marriage of True Minds*)
Alltheworld'sa stage(Poeticexcerpt from *As you LikeIt)*

UNIT-IV

Drama---WilliamShakespeare: *Hamlet*

UNIT-V

LiteraryCriticism---Aristotle: *Poetics*(ElementsofTragedy)

Reference:

M.S.Naagarajan.2006.*EnglishLiteraryCriticism&Theory*.

Barry,Peter.2010.*BeginningTheory: AnIntroductiontoLiteraryTheoryandCulturalTheory*, ManchesterUniversityPress,Manchester.

MH Abrams.2015. *Glossaryof LiteraryTerms.*Cengagelearning

Chambers,E.K.1923,*TheElizabethanStage.*4Volumes,Oxford,ClarendonPress.

Activities:

Tolistout majorplays ofShakespeare.

To prepare the biographies of the authors prescribed for the study.Topreparechartsofauthorswith differentliterarygenres.

Groupdiscussiononcharacteristicsoftheliterary period.Seminar presentations on the literary texts prescribed.

Enactingnotablescenes/actsoftheElizabethandrama

2023-24

Core papers

Special English

Paper III - An Introduction to English Language and Literature III

I Unit

1. History of English Literature
2. Restoration and Augustan Periods (17th and 18th Centuries)

II Unit

Literary Forms and Terms

1. Satire
2. Mock-epic
3. Heroic couplet
4. Epistle
5. Heroic tragedy
6. Comedy of manners
7. Genteel Comedy
8. Sentimental Comedy
9. Periodical Essay

III Unit

Poetry

Alexander Pope: Extracts from the Rape of the Lock, Canto-1

IV Unit

Prose

John Ruskin: Sesame and Lillie

Paper IV - An Introduction to English Language and Literature IV

I Unit

1. History of English Literature
2. Restoration and Victorian Periods

II Unit

Literary Forms and Terms

1. Biography
2. Autobiography
3. Melodrama
4. Historical Novel
5. Sentimental Novel
6. Gothic novel, Regional novel
7. Flat character, Round character
8. Protagonist
9. Antagonist

III Unit

Poetry 1

John Keats: Ode to a Nightingale

IV Unit

Prose

Francis Bacon: 1. Of Youth

2. Of Age
3. Of Love

V Unit

Poetry 2

Robert Browning: The Grammarian's Funeral

Paper V – An Outline of 20th Century Literature

Unit 1

1. History of English Literature
2. Literature in English in 20th Century

Unit 2

Literary Forms and Terms

1. Free Verse
2. Problem Play
3. Well-made play
4. Absurd Drama
5. Kitchen-sink drama
6. Stream of Consciousness Novel
7. Bildungsroman
8. Point of view
9. Setting

Unit 3 - Poetry

Philip Larkin: Church Going

Unit 4 - Prose

George Orwell: Politics and English Language

Unit 5 - Drama

Shakespeare: King Lear

...ernment of Andhra Pradesh)
REVISED UG SYLLABUS UNDER CBCS
(Implemented from the Academic Year - 2020-2021)
Programme: FOUR YEAR B.A (Hons)
Domain Subject: **SPECIAL ENGLISH**
Skill Enhancement Courses (SEC) for Semester-V from 2022-23
Pair-3: Course **6-C**

WRITING FOR THE MEDIA

No. of Hours: 75 (05 per Week) Credits: 04 Max. Marks: 100

OUTCOMES:

At the end of the course the student will be able to:

- Write with confidence
- Use Correct Grammar, Punctuation and Appropriate Style
- Differentiate between various types of media writing
- Gather and synthesize information from authentic sources
- Use digital resources for media writing

SYLLABUS

Unit-I

1. Good Writing Skills
   (Vocabulary, Basic Grammar, Expansion and Optimization)
2. Resources for Writing (Dictionary, Thesaurus and Encyclopaedia)

Unit-II

1. Proofreading, Punctuation and Style
2. Types of Media Writing
   (Information, Description, Persuasion and Editorial Writing & Feature Writing)

Unit-III

1. Writing for Specialized Areas: Sports, Culture, Entertainment, Cuisine etc.
2. Collecting News and Identifying Sources

Unit-IV

1. Media Writing and Translation
2. Media Writing and Social Responsibility

Unit-V

1. The Role of Technology in Media Writing (Blogging, Podcasts, Social Media and Collaboration in Writing)
2. Digital Resources for Writing (Online Dictionaries, Inbuilt and Online Spell-Checkers, Grammar-Checkers and Google Resources)

Programme: FOUR YEAR B.A (Hons)

Domain Subject: **SPECIAL ENGLISH**

Skill Enhancement Courses (SEC) for Semester-V from 2022-23

Pair-3: Course **7-C**

Creative Writing and Literary Appreciation

No. of Hours: 75 (05 per Week) Credits: 04 Max. Marks: 100

OUTCOMES:

At the end of the course the student will be able to:

vi. Understand and define the art of Creative Writing

vii. Identify different literary genres

viii. Review the published works of others

ix. Deliver presentations on the literary works

x. Demonstrate the creative writing skills

SYLLABUS

Unit-I

1. Understanding Creative Writing
2. Characteristics of Good Writing

Unit-II

1. Understanding Fiction : Novel and Short Story

   (Plot, Character, Theme and Narrative Technique: David Copperfield –by Charles Dickens;

   Visual Description, Point of View and Setting: 'The Fall of the House of User' –by Edgar AllenPoe)

2. Understanding Prose

   (Language and Style: Francis Bacon's 'Of Studies';

   Persuasiveness, Readability and Argument: 'The Power of Prayer' –by APJ AbdulKalam)

Unit-III

1. Understanding Poetry

   (**Figurative Language:** 'Endless Time' –by Rabindranath Tagore;

   Imagery and Metre: 'Elegy Written in a Country Churchyard' -by Thomas Gray;

   Tone: 'The Lovers of the Poor' -by Gwendolyn Brooks)

2. Mechanics of Poetry

Unit-IV

1. Writing a Memoir
2. Writing Reviews

Unit-V

1. Writing a Short Story
2. Writing Different Types of Essays

Resources for Further Reading:

1. Stephen King. On Writing: A Memoir of the Craft. Scribner, 2010.
2. Alice LaPlante. The Making of a Story: A Norton Guide to Writing Fiction and Non-Fiction.W.W.Norton, New York.2009
3. Tara Mokhtari. The Bloomsbury Introduction to Creative Writing. Bloomsbury Academic, London, 2015.
4. Philip Seargeant& Bill Greenwell. From Language to Creative Writing: An Introduction. Bloomsbury Academic, London, 2013.
5. Tips for Creative Writing: https://www.lexico.com/grammar/top-tips-for-creative-writing
6. Creative Writing: Simple Definition and Tips: https://grammar.yourdictionary.com/word-definitions/definition-of-creative-writing.html
7. Weekly Writing Prompts: https://blog.reedsy.com/creative-writing-prompts/
8. Decolonising Creative Writing: https://scroll.in/article/999215/decolonising-creative-writing-its-about-not-conforming-to-techniques-of-the-western-canon

B.Com (CA)
2023-34

Course 3C: Programming with C & C++

(Five units with each unit having 12 hours of class work)

Semester	CourseCode	CourseTitle	Hours	Credits
III	3C	Programming with C & C++	60	3

Course 3C: Programming with C & C++

Unit	Details
I	**Introduction and Control Structures:** History of 'C' - Structure of C program – C character set, Tokens, Constants, Variables, Keywords, Identifiers – C data types - C operators - Standard I/O in C - Applying if and Switch Statements
II	**Loops And Arrays:** Use of While, Do While and For Loops - Use of Break and Continue Statements - Array Notation and Representation - Manipulating Array Elements - Using Multi Dimensional Arrays
III	**Strings and Functions:** Declaration and Initialization of String Variables - String Handling Functions -Defining Functions - Function Call - Call By Value, Call By Reference – Recursion
IV	**Classes and Objects** Introduction to OOP and its basic features - C++ program structure - Classes and objects - Friend Functions-Constructor – Types of constructors – Destructors.
V	**Inheritance:** Inheritance - Types of Inheritance -Types of derivation- Public – Private - Protected Hierarchical Inheritance - Multilevel Inheritance – Multiple Inheritance - Hybrid Inheritance

Core papers

Computer Application

Semester-IV Paper 4E

Object Oriented Programming using Java

Semester	CourseCode	CourseTitle	Hours	Credits
IV	C4	Object Oriented Programming using Java	60	3

CourseObjective:

To introduce the fundamental concepts of Object-Oriented programming and to design & implement object oriented programming concepts in Java.

CourseLearningOutcomes:

On completingthe subject, students will be able to:

1. Understand the concept and underlying principles of Object-Oriented Programming, Understand how object-oriented concepts are incorporated into the Java programming language.
2. Implement Object Oriented Programming Concepts (class, constructor, overloading, inheritance, overriding) in java.
3. Create and use interfaces in a Java.
4. Implement Multithreading, exception handling in Java.
5. Create and use packages and applets.

UNIT-1

13 hours

FUNDAMENTALS OF OBJECT – ORIENTED PROGRAMMING : Introduction, Object Oriented paradigm, Basic Concepts of OOP, Benefits of OOP, Applications of OOP, Java features.
OVERVIEW OF JAVA LANGUAGE: Simple Java program structure, Java tokens, Implementing a Java Program, Java Virtual Machine, Command line arguments.
CONSTANTS, VARIABLES & DATATYPES: Constants, Variables, Data Types, Declaration of Variables, Giving Value to Variables, Getting Value of Variables, Operators in Java.

UNIT-II

12 hours

DECISION MAKING & BRANCHING :
Decision making with if statement- Simple if statement, If - Else statement, Nesting of if- else statements, The else if ladder, The switch statement, The conditional operator.
LOOPING: The While statement, The do-while statement, The for statement.
CLASSES, OBJECTS & METHODS: Defining a class, Adding variables, Adding methods, Creating objects, Accessing class members, Constructors, Method overloading, Static members.

Semester	CourseCode	CourseTitle	Hours	Credits
IV	4F	Database Management System	60	3

Course 4F: Database Management System

Unit	Details
I	**Overview of Database Management System** Introduction, Data and Information, Database, Database Management System, Objectives of DBMS, Evolution of Database Management System, Classification of Database Management System.
II	**File-Based System** File Based System. Drawbacks of File-Based System, DBMS Approach, Advantage of DBMS, Data Models, Components of Database System, Database Architecture, DBMS Vendors and their products.
III	**Entity-Relationship Model:** Introduction, The Building Blocks of an Entity-Relationship, Classification of Entity Set, Attribute Classification, Relationship Degree, Relationship Classification, Generalization and Specialization, Aggregation and Composition, CODD's Rules, Relational Data Model, Concept of Relational Integrity.
IV	**Structured Query Language** Introduction, History of SQL Standards, Commands in SQL, Data types in SQL, Data Definition Language (DDL),Selection Operation Projection Operation, Aggregate Functions, Data Manipulation Language, Table Modification, Table Truncation, Imposition of Constraints, Set Operations.
V	**PL/SQL:** Introduction, Structure of PL/SQL,PL/SQL Language Elements, Data Types, Control Structure, Steps to Create a PL/SQL Program, Iterative Control Cursors, Steps to Create a Cursor, Procedure, Functions, Packages, Exceptions Handling, Database Triggers, Types of triggers.

III BCOMCA/BA HECA & BA HUCA Computer Applications V Semester

Course 6C: E– Commerce Application Development Lab

Case study of E –commerce:

1. Home page design of web site
2. Validation using PHP
3. Implement Catalogue design
4. Implement Access control mechanism(eg: username and password)
5. Case study on business model of online E-Commerce store

BCOMCA/BA HECA & BA HUCA 5th Semester Computer Applications
Syllabus under CBCS

Course 7C : Real Time Governance System (RTGS)

Course Objectives:

This course aims to provide exposure to Real Time Governance System. It introduces the concepts of E- Governance, E-Governance Infrastructure, E-Governance in India, Latest Applications in Real Time Governance.

Course Learning Outcomes:

Upon successful completion of this course, students will have the knowledge and skills to

1. Understand the terms regarding Governance, E-Governance and RTGS
2. Learn about E-Governance Infrastructure
3. Understand the E-Governance implementation in several countries
4. Understand the E-Governance implementation in several Indian states
5. Understand the applications of RTG

UNIT – I

Introduction to E-Governance:

- Government, Governance and Good Governance
- What is E-Governance or Electronic Governance?
- E-Government and E-Governance: A conceptual Analysis
  - Objectives
  - Components
  - application domains
  - four phase model
  - implementing E-Governance
  - issues while implementing E-Governance
  - Opportunities and challenges
- Types of E-Governance
- What is Real-Time Governance (RTG)
- Real Time Governance Society (RTGS)

UNIT – II

E-Governance Infrastructure:

1. Data Systems infrastructure
   - ❖ Executive Information Systems
   - ❖ Management Information Systems
   - ❖ Knowledge Management Systems
   - ❖ Transaction Processing Systems
2. Legal Infrastructural preparedness
   - ❖ IT Act 2000
   - ❖ Challenges to Indian law and cybercrime scenario in India
   - ❖ Amendments of the Indian IT Act
3. Institutional Infrastructural preparedness
   - ❖ Internet
   - ❖ intranet
   - ❖ extranet
4. Human Infrastructural preparedness
   - ❖ Top-level management
   - ❖ Middle-level management
   - ❖ Low-level management
5. Technological Infrastructural preparedness
   - ❖ Information and communications technology
   - ❖ Data Warehousing

UNIT – III

E-Governance: Country Experience:

- INDIA
- US
- UK
- AUSTRALIA
- DUBAI

UNIT –IV

E-Governance in India:

- Andhra Pradesh
- Karnataka
- Kerala
- Uttar Pradesh
- Madhya Pradesh
- West Bengal
- Gujarat

UNIT –V

Latest Applications in Real Time Governance:

- Agriculture
- Rural Development
- Health care
- Education
- Tourism
- Commerce and Trade

Prescribed Textbooks:

1. E-Governance: concepts and case studies| CSR Prabhu| Prentice-Hall|
2. E-Governance| Niranjan pani, Sanhari Mishra | Himalaya Publishing House

Website References:

1. http://www.egov4dev.org/success/case/
2. https://vikaspedia.in/e-governance/resources-for-vles
3. https://altametrics.com/en/information-systems/information-system-types.html
4. https://core.ap.gov.in/CMDashBoard/Index.aspx

E-COMMERCE

Unit-I

Electronic Commerce Environment and Opportunities: Background, The Electronic Commerce Environment, Electronic Market place Technologies. **Mode of Electronic Commerce:** Electronic Data Interchange, Migration to Open EDI, Electronic Commerce with WWW/Internet, Commerce Net Advocacy, Web Commerce going forward.

Unit-II

Approaches to Safe Electronic Commerce: Secure Transport Protocols, Secure Transactions, Secure Electronic Payment Protocol (SEPP), Secure Electronic transaction (SET), Certificates for authentication Security on Web Servers and Enterprise Networks.

Unit-III

Electronic Cash and Electronic Payment Schemes: Internet Monetary Payment & Security Requirements, Payment and Purchase Order Process, On-line Electronic cash. **Internet / Intranet Security Issues and Solution:** The need for Computer Security, Specific Intruder Approaches, Security Strategies, Security Tools, Encryption, Enterprise Networking and Access to the Internet, Antivirus Programs, Security Teams.

Unit-IV

Master Card / Visa secure Electronic Transaction: Introduction, Business Requirements, Concepts, Payments Processing. **E-Mail and Secure E-Mail technologies for Electronic Commerce:** Introduction The Means of Distribution, A Model for Message Handling, E-Mail Handling, Multipurpose Internet Mail Extensions, Message Object Security Services, Comparisons of Security Methods, MIME and Related Facilities for EDI over the Internet.

Unit-V

Internet Resources for Commerce Introduction: Introduction, Technologies for Web Servers, Internet Tools Relevant to Commerce, Internet Applications for Commerce, Internet Charges, Internet Access and Architecture.

Unit-III: Trial Balance and Rectification of Errors:

Preparation of Trial balance - Errors – Meaning – Types of Errors – Rectification of Errors – Suspense Account (including Problems)

Unit-IV: Bank Reconciliation Statement:

Need for Bank Reconciliation - Reasons for Difference between Cash Book and Pass Book Balances- Preparation of Bank Reconciliation Statement - Problems on both Favourable and Unfavourable Balance (including Problems).

Unit -V: Final Accounts:

Preparation of Final Accounts: Trading account – Profit and Loss account – Balance Sheet – Final Accounts with Adjustments (including Problems).

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B.Com(Commerce/Genral)

SEMESTER-II

COURSE 3: FINANCIAL ACCOUNTING

Theory Credits: 4 4 hrs/week

Learning Objectives

The course aims to help learners to acquire conceptual knowledge of financial accounting, to impart skills for recording various kinds of business transactions and to prepare financial statements.

Learning Outcomes:

At the end of the course, the student will able to identify transactions and events that need to be recorded in the books of accounts. Equip with the knowledge of accounting process and preparation of final accounts of sole trader. Develop the skill of recording financial transactions and preparation of reports in accordance with GAAP. Know the difference between Joint Ventures and Consignment. Critically examine the balance sheets of a sole trader for different accounting periods. Design new accounting formulas & principles for business organizations.

Unit-I: Introduction:- Need for Accounting - Definitions, objectives, functions, - Book keeping and accounting - Advantages and limitations - Accounting concepts and conventions - double entry book keeping - Journal - Posting to Ledger - Preparation of Subsidiary books including Cash book.

Unit-II: **Final Accounts: -** Final accounts - Preparation of Trading account, Profit & loss account and Balance Sheet using computers.

Unit-III: Depreciation: Meaning and Causes of Depreciation - Methods of Depreciation: Straight Line – Written Down Value –Annuity and Depletion Method (including Problems).

Unit-IV: Consignment Accounts: Consignment - Features - Proforma Invoice - Account Sales – Del-credere Commission - Accounting Treatment in the Books of Consigner and Consignee - Valuation of Closing Stock - Normal and Abnormal Losses (including Problems).

Unit-V: Joint Venture Accounts: Joint Venture - Features - Difference between Joint-Venture and Consignment – Accounting Procedure – Methods of Keeping Records–One Vendor Keeps the Accounts and Separate Set off Books Methods (including Problems).

Activities:

- Assignment on Sudsier Books.
- Group Activates on Problem solving in Depreciation Methods.

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B.Com(Commerce/Genral)

SEMESTER-II

COURSE 4: BUSINESS MANAGEMENT

Theory Credits: 4 4 hrs/week

Learning Objectives

The course aims to develop an understanding of principles, functions and challenges of management and contemporary issues in management.

Learning Outcomes:

At the end of the course, the student will able to;

Understand the concept of Business Management along with the basic laws and norms. Able to understand the terminologies associated with the field of Business Management and control along with their relevance. and to identify the appropriate method and techniques of Business Management for solving different problems. They apply basic Business Management principles to solve business and industry related problems and to understand the concept of Planning, Organizing, Direction, Motivation and Control etc.

Unit 1: Management: Definition & Meaning of Management - Henry Fayol Principals of Management and F.W.Taylor's Scientific Management - Functions of Management - Levels of Management..

Unit 2: Planning: Planning – Nature, importance, Process of Planning and Types of Planning. Decision making – Process and Types

Unit 3: Organizing: Organizing - Nature & Importance, Principles of Organizing. Delegation & Decentralization – Departmentation – Span of Management. Organizational structure – line, line & staff and functional.

Unit 4: Directing: Functions of Directing - Motivation – Theories of motivation (Maslow Need and Hierarchy theory) and Motivation techniques. Leadership – Styles of Leadership and Types.

Unit 5: Controlling; Nature, importance and Problems – effective coordination. Basic Control Process and Control techniques.

Activities:

- Student Seminars, Debates
- Quiz Programmes
- Assignments
- Co-operative learning
- Visit a firm (Individual and Group)
- Group Discussions on problems relating to topics covered by syllabus

Unit–III: Economic Policies: Economic Reforms and New Economic Policy – New Industrial Policy – Competition Law – Fiscal Policy – Objectives and Limitations – Monetary Policy and RBI

Unit – IV:Social, Political and Legal Environment: Concept of Social Responsibility of Business towards Stakeholders - Demonetisation, GST and their Impact - Political Stability - Legal Changes.

Unit–V:Global Environment : Globalization – Meaning – Role of WTO – WTO Functions - IBRD– Trade Blocks, BRICS, SAARC, ASEAN in Globalisation

2022-23

Core papers

Commerce

PROGRAMME: THREE-YEAR B COM

(General and Computer Applications)

Course Code:

Domain Subject: Commerce

Semester-wise Syllabus under CBCS

(w.e.f. 2020-21 Admitted Batch)

I Year B Com (Gen & CA)– Semester – II

Course 2A: Financial Accounting

Learning Outcomes:

At theend of the coursethe student will able to;

- Understand the concept of consignment and learn the accounting treatment of the various aspects of consignment.
- Analyze the accounting process and preparation of accounts in consignment and joint venture.
- Distinguish Joint Venture and Partnership and to learn the methods of maintaining records under Joint Venture.
- Determine the useful life and value of the depreciable assets and maintenance of Reserves in business entities.
- Design an accounting system for different models of businesses at his own using the principles of existing accounting system.

Syllabus

Unit-I:Depreciation: Meaning and Causes of Depreciation - Methods of Depreciation: Straight Line – Written Down Value –Annuity and Depletion Method (including Problems).

Unit-II:Provisions and Reserves: Meaning – Provision vs. Reserve – Preparation of Bad Debts Account – Provision for Bad and Doubtful Debts – Provision for Discount on Debtors – Provision for Discount on Creditors - Repairs and Renewals Reserve A/c (including Problems).

Unit-III: Bills of Exchange: Meaning of Bill – Features of Bill – Parties in the Bill – Discounting of Bill – Renewal of Bill – Entries in the Books of Drawer and Drawee (including Problems).

Unit-IV: Consignment Accounts: Consignment - Features - Proforma Invoice - Account Sales – Del-credere Commission - Accounting Treatment in the Books of Consigner and Consignee - Valuation of Closing Stock - Normal and Abnormal Losses (including Problems).

Unit-V: Joint Venture Accounts: JointVenture - Features - Difference between Joint-Venture and Consignment – Accounting Procedure – Methods of Keeping Records–One Vendor Keeps the Accounts and Separate Set off Books Methods (including Problems).

2022-23

Core papers

Commerce

PROGRAMME: THREE-YEAR B COM

(General and Computer Applications)

Course Code:

Domain Subject: Commerce

Semester-wise Syllabus under CBCS

(w.e.f. 2020-21 Admitted Batch)

I Year B Com (Gen & CA)– Semester – II

Course 2B: Business Economics

Learning Outcomes:

At the end of the course, the student will able to;

- Describe the nature of economics in dealing with the issues of scarcity of resources.
- Analyze supply and demand analysis and its impact on consumer behaviour.
- Evaluate the factors,such as production and costs affecting firmsbehaviour.
- Recognize market failure and the role of government in dealing with those failures.
- Use economic analysis to evaluate controversial issues and policies.
- Apply economic models for managerial problems, identify their relationships, and formulate the decision making tools to be applied for business.

Syllabus

Unit-I: Introduction: Meaning and Definitions of Business Economics - Nature and Scope of Business Economics -Micro and Macro Economics and their Interface.

Unit-II: Demand Analysis: Meaning and Definition of Demand – Determinants to Demand –Demand Function -Law of Demand – Demand Curve – Exceptions to Law of Demand - Elasticity of Demand – Measurements of Price Elasticity of Demand

Unit – III: Production, Cost and Revenue Analysis: Concept of Production Function – Law of Variable Proportion -Law of Returns to Scale - Classification of Costs -Break Even Analysis - Advantages

Unit-IV: Market Structure: Concept of Market – Classification of Markets -Perfect Competition – Characteristics – Equilibrium Price -Monopoly – Characteristics – Equilibrium Under Monopoly.

Unit-V: National Income: Meaning – Definition – Measurements of National Income - Concepts of National Income -Components of National Income-Problems in Measuring National Income

Unit-IV: Banker and Customer:

Meaning and Definition of Banker and Customer – Types of Customers – General Relationship and Special Relationship between Banker and Customer - KYC Norms.

Unit-V: Collecting Banker and Paying Banker:

Concepts - Duties & Responsibilities of Collecting Banker – Holder for Value – Holder in Due Course – Statutory Protection to Collecting Banker - Responsibilities of Paying Banker - Payment Gateways.

Unit-III: Types of Banks:

Indigenous Banking - Cooperative Banks, Regional Rural Banks, SIDBI, NABARD - EXIM bank

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Core papers

Commerce

PROGRAMME: THREE-YEAR B COM

(General and Computer Applications)

Course Code:

Domain Subject: Commerce

Semester-wise Syllabus under CBCS

(w.e.f. 2020-21 Admitted Batch)

II Year B Com (Gen &CA)– Semester – III

Course 3A:Advanced Accounting

Learning Outcomes:

At the end of the course, the student will able to;

- Understand theconcept of Non-profit organisations and its accounting process
- Comprehend the concept of single-entry system and preparation of statement of affairs
- Familiarize with the legal formalities at the time of dissolution of the firm
- Prepare financial statements for partnership firm on dissolution of the firm.
- Employ critical thinking skills to understand the difference between the dissolution of the firm and dissolution of partnership

Syllabus

Unit-I:**Accounting for Non Profit Organisations**: Non Profit Entities- Meaning - Features of Non-Profit Entities –Provisions as per Sec 8 - Accounting Process- Preparation of Accounting Records - Receipts and Payments Account- Income and Expenditure Account - Preparation of Balance Sheet (including problems).

Unit-II: Single Entry System: Features – Differences between Single Entry and Double Entry – Disadvantages of Single Entry- Ascertainment of Profit and Preparation of Statement of Affairs (including Problems).

Unit-III:Hire Purchase System: Features –Difference between Hire Purchase and Instalment Purchase Systems - Accounting Treatment in the Books of Hire Purchaser and Hire Vendor - Default and Repossession (including Problems).

Unit-IV: Partnership Accounts-I: Meaning – Partnership Deed - Fixed and Fluctuating Capitals-Accounting Treatment of Goodwill - Admission and Retirement of a Partner(including problems).

Unit-V: Partnership Accounts-II: Dissolution of a Partnership Firm – Application of Garner v/s Murray Rule in India – Insolvency of one or more Partners (including problems).

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Core papers

Commerce

PROGRAMME: THREE-YEAR B COM

(General and Computer Applications)

Course Code:

Domain Subject: Commerce

Semester-wise Syllabus under CBCS

(w.e.f. 2020-21 Admitted Batch)

II Year B Com (Gen & CA)– Semester – III

Course 3B: Business Statistics

Learning Outcomes:

At the end of the course, the student will able to;

- Understand the importance of Statistics in real life
- Formulate complete, concise, and correct mathematical proofs.
- Frame problems using multiple mathematical and statistical tools, measuring relationships by using standard techniques.
- Build and assess data-based models.
- Learn and apply the statistical tools in day life.
- Create quantitative models to solve real world problems in appropriate contexts.

Syllabus:

Unit 1: Introduction to Statistics: Definition – Importance, Characteristics and Limitations of Statistics -Classification and Tabulation – Frequency Distribution Table -Diagrams and Graphic Presentation of Data (including problems)

Unit 2: Measures of Central Tendency: Types of Averages – Qualities of Good Average - Mean, Median, Mode, and Median based Averages-Geometric Mean – Harmonic Mean(including problems)

Unit 3: Measures of Dispersion: Meaning and Properties of Dispersion – Absolute and Relative Measures - Types of Dispersion-Range - Quartile Deviation (Semi – Inter Quartile Range) -Mean Deviation - Standard Deviation - Coefficient of Variation. (including problems)

Unit 4: Skewness and Kurtosis: Measures of Skewness: Absolute and Relative Measures- Co-efficient of Skewness: Karl Pearson's, Bowley's and Kelly's - Kurtosis: Meso kurtosis, Platy kurtosis and Leptokurtosis (including problems)

Unit 5: Measures of Relation: Meaning and use of Correlation – Types of Correlation - Karlpearson's Correlation Coefficient - Probable Error-Spearman's Rank-Correlation (including problems)

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Core papers

Commerce

PROGRAMME: THREE-YEAR B COM

(General and Computer Applications)

Course Code:

Domain Subject: Commerce

Semester-wise Syllabus under CBCS

(w.e.f. 2020-21 Admitted Batch)

II Year B Com (Gen)– Semester – III

Course 3C:Marketing

Learning Outcomes:

At the end of the course, the student will able to;

- Develop an idea about marketing and marketing environment.
- Understand the consumer behaviourand market segmentation process.
- Comprehendthe product life cycle and product line decisions.
- Know the process of packaging and labeling to attract the customers.
- Formulate new marketing strategies for a specific new product.
- Develop new product line and sales promotion techniques for a given product.
- Design and develop new advertisements to given products.

Syllabus:

Unit-I: **Introduction:** Concepts of Marketing: Need, Wants and Demand - Marketing Concepts – Marketing Mix - 4 P's of Marketing – Marketing Environment.

Unit-II: **Consumer Behaviour and Market Segmentation:** Buying Decision Process – Stages – Buying Behaviour – Market Segmentation –Bases of Segmentation - Selecting Segments – Advantages of Segmentation.

Unit-III: Product Management: Product Classification – Levels of Product - Product Life Cycle - New Products, Product Mix and Product Line Decisions - Design, Branding, Packaging and Labelling.

Unit-IV: Pricing Decision: Factors Influencing Price – Determination of Price - Pricing Strategies: Skimming and Penetration Pricing.

Unit-V: Promotion and Distribution: Promotion Mix - Advertising - Sales promotion - Publicity – Public Relations - Personal Selling and Direct Marketing - Distribution Channels – Online Marketing

PROGRAMME: THREE-YEAR B COM

(General and Computer Applications)

Course Code:

Domain Subject: Commerce

Semester-wise Syllabus under CBCS

(w.e.f. 2020-21 Admitted Batch)

II Year B Com (Gen & CA)– Semester – IV

Course 4A:Corporate Accounting

Learning Outcomes:

At the end of the course, the student will able to;

- Understand the Accounting treatment of Share Capital and aware of process of book building.
- Demonstratetheprocedure for issue of bonus shares and buyback of shares.
- Comprehend the important provisions of Companies Act, 2013 and prepare final accounts of a company with Adjustments.
- Participate in the preparation of consolidated accounts for a corporate group.
- Understand analysis of complex issues, formulation ofwell-reasoned arguments and reachingbetter conclusions.
- Communicate accounting policy choiceswith reference to relevant laws and accounting standards.

SYLLABUS:

Unit-I:

Accounting for Share Capital: Kinds of Shares – Types of Preference Shares – Issue of Shares at Par, Discount and Premium - Forfeiture and Reissue of Shares (including problems).

Unit-II:

Issue and Redemption of Debentures and Issue of Bonus Shares: Accounting Treatment for Debentures Issued and Repayable at Par, Discount and Premium -Issue of Bonus Shares - Buyback of Shares - (including problems).

Unit-III:

Valuation of Goodwill: Need and Methods - Average Profit Method, Super Profits Method – Capitalization Method and Annuity Method (Including problems).

Unit –IV:

Valuation Shares: Need for Valuation - Methods of Valuation - Net Assets Method, Yield Basis Method, Fair Value Method (including problems).

UNIT – V:

Company Final Accounts: Provisions of the Companies Act, 2013 - Preparation of Final Accounts – Adjustments Relating to Preparation of Final Accounts – Profit and Loss Account and Balance Sheet – (including problems with simple adjustments).

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Core papers

PROGRAMME: THREE-YEAR B COM

(General and Computer Applications)

Course Code:

Domain Subject: Commerce

Semester-wise Syllabus under CBCS

(w.e.f. 2020-21 Admitted Batch)

II Year B Com (Gen & CA)– Semester – IV

Course 4B:Cost and Management Accounting

Learning Outcomes:

At the end of the course, the student will able to;

- Understand various costing methods and management techniques.
- Apply Cost and Management accounting methods for both manufacturing and service industry.
- Prepare cost sheet, quotations, and tenders to organization for different works.
- Analyze cost-volume-profit techniques to determine optimal managerial decisions.
- Compare and contrast the financial statements of firms and interpret the results.
- Prepare analysis of various special decisions, using relevant management techniques.

SYLLABUS:

UNIT-I: Introduction:

Cost Accounting: Definition – Features – Objectives – Functions – Scope – Advantages and Limitations - Management Accounting: Features – Objectives – Functions – Elements of Cost - Preparation of Cost Sheet (including problems)

UNIT-II: Material and Labour Cost:

Techniques of Inventory Control – Valuation of Material Issues: FIFO - LIFO - Simple and Weighted Average Methods

Labour: Direct and Indirect Labour Cost – Methods of Payment of Wages- Incentive Schemes -Time Rate Method, Piece Rate Method, Halsey, Rowan Methods and Taylor Methodsonly(including problems)

UNIT-III: Job Costing and Batch Costing:

Definition and Features of Job Costing – Economic Batch Quantity (EBQ) – Preparation of Job Cost Sheet – Problems on Job Cost Sheet and Batch Costing(including problems)

UNIT-IV: Financial Statement Analysis and Interpretation:

Financial Statements - Features, Limitations. Need, Meaning, Objectives, and Process of Financial Statement Analysis- Comparative Analysis – Common Size Analysis and Trend Analysis (including problems)

UNIT-V: Marginal Costing:

Meaning and Features of Marginal Costing – Contribution –Profit Volume Ratio- Break Even Point – Margin of Safety – Estimation of Profit and Estimation of Sales(including problems)

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Core papers

PROGRAMME: THREE-YEAR B COM

(General and Computer Applications)

Course Code:

Domain Subject: Commerce

Semester-wise Syllabus under CBCS

(w.e.f. 2020-21 Admitted Batch)

II Year B Com (Gen& CA)– Semester – IV

Course 4C:Income Tax

Learning Outcomes:

At the end of the course, the student will able to;

- Acquire the complete knowledge of the tax evasion, tax avoidance and tax planning.
- Understand the provisions and compute income tax for various sources.
- Grasp amendments made from time to time in Finance Act.
- Compute total income and define tax complicacies and structure.
- Prepare and File IT returns of individual at his own.

Syllabus:

Unit-I: Introduction: Income Tax Act-1961 - Basic Concepts: Income, Person, Assessee - Assessment Year, Previous Year, Rates of Tax, Agricultural Income,ResidentialStatusof Individual -Incidence of Tax – IncomesExempt from Tax (theory only).

Unit-II: Income from Salaries: Basis of Charge, Tax Treatment of Different Types of Salaries Allowances, Perquisites, Profits in Lieu of Salary, Deductions from Salary Income, Computation of Salary Income (including problems).

Unit-Ill: Income from House Property and Profits and Gains from Business: Annual Value, Let-out/Self Occupied/Deemed to be Let-out house -Deductions from Annual Value - Computation of Income from House Property

Definition of Business and Profession – Procedure for Computation of Income from Business – Revenue and Capital Nature of Incomes and Expenses – Allowable Expenses – Expenses Expressly Disallowed – Computation (including problems).

Unit-IV: Income from Capital Gains - Income from Other Sources: Meaning of Capital Asset – Types – Procedure for Computation of Long-term and Short-term Capital Gains/Losses

Meaning of Other Sources - General Incomes – Specific Incomes – Computation (including problems).

Unit-V: Computation of Total Income of an Individual: Deductions under Section 80 - Computation of Total Income (Simple problems).

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Core papers

PROGRAMME: THREE-YEAR B COM

(General and Computer Applications)

Course Code:

Domain Subject: Commerce

Semester-wise Syllabus under CBCS

(w.e.f. 2020-21 Admitted Batch)

II Year B Com (Gen & CA)– Semester – IV

Course 4D:Business Law

Learning Outcomes:

At the end of the course, the student will able to;

- Understand the legal environment of business and laws of business.
- Highlight the security aspects in the present cyber-crime scenario.
- Apply basic legal knowledge to business transactions.
- Understand the various provisions of Company Law.
- Engage critical thinking to predict outcomes and recommend appropriate action on issues relating to business associations and legal issues.
- Integrate concept of business law with foreign trade.

Syllabus:

Unit-I: Contract:

Meaning and Definition of Contract - Essential Elements of Valid Contract -Valid, Void and Voidable Contracts - Indian Contract Act, 1872

Unit-II: Offer, Acceptance and Consideration:

Definition of Valid Offer, Acceptance and Consideration - Essential Elements of a Valid Offer, Acceptance and Consideration.

Unit-III: Capacity of the Parties and Contingent Contract:

Rules Regarding to Minors Contracts - Rules Relating to Contingent Contracts - Different Modes of Discharge of Contracts - Rules Relating to Remedies to Breach of Contract.

Unit-IV: Sale of Goods Act 1930 and Consumer Protection Act 2019:

Contract of Sale - Sale and Agreement to Sell - Implied Conditions and Warranties - Rights of Unpaid Vendor- Definition of Consumer - Person - Goods - Service - Consumer Dispute - Consumer Protection Councils - Consumer Dispute Redressal Mechanism

Unit-V: Cyber Law:

Overview and Need for Cyber Law - Contract Procedures - Digital Signature – Safety Mechanisms.

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Core papers

PROGRAMME: THREE-YEAR B COM
(General and Computer Applications)

Course Code:

Domain Subject: Commerce
Semester-wise Syllabus under CBCS
(w.e.f. 2020-21 Admitted Batch)

II Year B Com (Gen& CA)– Semester – IV
Course 4E:Auditing

Learning Outcomes:
At the end of the course, the student will able to;

- Understanding the meaning and necessity of audit in modern era
- Comprehend the role of auditor in avoiding the corporate frauds
- Identify the steps involved in performing audit process
- Determine the appropriate audit report for a given audit situation
- Apply auditing practices to different types of business entities
- Plan an audit by considering concepts of evidence, risk and materiality

SYLLABUS:

Unit-I: Introduction: Meaning – Objectives – Importance of Auditing – Characteristics - Book Keeping vs Auditing - Accounting vs Auditing – Role of Auditor in Checking Corporate Frauds.

Unit-II: Types of Audit: Based on Ownership,Time and Objective - Independent, Financial, Internal, Cost,Tax, Government, Secretarial Audits

Unit-III: Planning of Audit: Steps to be taken at the Commencement of a New Audit – Audit Programme - Audit Note Book– Audit Working Papers - Audit Evidence - Internal Check, Internal Audit and Internal Control.

Unit-IV: Vouching and Investigation: Definition and Importance of Vouching – Objectives of Vouching -Vouching of Cash and Trading Transactions – Investigation - Auditing vs. Investigation

Unit-V: Company Audit and Auditors Report: Auditor's Qualifications – Appointment andReappointment – Rights, Duties, Liabilities and Disqualifications - Audit Report: Contents –Preparation - Relevant Provisions of Companies Act, 2013.

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Core papers

PROGRAMME: THREE-YEAR B COM

(General and Computer Applications)

Course Code:

Domain Subject: Commerce

Semester-wise Syllabus under CBCS

(w.e.f. 2020-21 Admitted Batch)

II Year B Com (Gen)– Semester – IV

Course 4F:Goods and Service Taxes

Learning Outcomes:

At the end of the course, the student will able to;

- Understand the basic principles underlying the Indirect Taxation Statutes.
- Examine the method of tax credit. Input and Output Tax credit and Cross Utilisation of Input Tax Credit.
- Identify and analyze the procedural aspects under different applicable statutes related to GST.
- Compute the assessable value of transactions related to goods and services for levy and determination of duty liability.
- Develop various GST Returns and reports for business transactions in Tally.

Syllabus:

Unit I: Introduction: Overview of GST - Concepts –Taxes Subsumed under GST – Components of GST- GST Council- Advantages of GST-GST Registration.

Unit II: GST Principles –Vijay Kelkar Sha Committee Recommendations - Comprehensive Structure of GST Model in India: Single, Dual GST – GST Rates - Taxes Exempted from GST- Taxes and Duties outside the purview of GST- Taxation of Services

Unit-III: Tax Invoice- Bill of Supply-Transactions Covered under GST-Composition Scheme- Reverse Charge Mechanism- Composite Supply -Mixed Supply.

Unit-IV: Time of Supply of Goods & Services: Value of Supply - Input Tax Credit - Distribution of Credit -Matching of Input Tax Credit - Availability of Credit in Special Circumstances- Cross utilization of ITC between the Central GST and the State GST.

Unit-V:GST Returns: Regular Monthly Filing Returns-Composition Quarterly Filing Returns-GSTR-1, GSTR-2, GSTR 2A, GSTR-3, GSTR 3B -Annual Returns GSTR-9, GSTR 9A, GSTR 9B& GSTR 9C - Records to be Maintained under GST

2023-24

Core papers

Course- 16- B. ADVERTISING AND MEDIA PLANNING
(Skill Enhancement Course (Elective), 4 Credits)

I: Learning Outcomes:
At the successful completion of the course students are able to:
- Understand the role of advertising in business environment
- Understand the legal and ethical issues in advertising
- Acquire skills in creating and developing advertisements
- Understand up-to-date advances in the current media industry.
- Acquire the necessary skills for planning an advertising media campaign.

II: SYLLABUS: Total 75hrs (Teaching 60, Training10, Others 05 including IE etc.)

UNIT-I: Introduction, Nature and Scope Advertising- Nature and Scope- Functions - Impact on Social, Ethical and Economical Aspects - Its Significance – Advertising as a Marketing Tool and Process for Promotion of Business Development - Criticism on advertising

UNIT-II: Strategies of Advertisements
Types of Advertising Agencies and their Strategies in Creating Advertisements - Objectives - Approach - Campaigning Process - Role of Advertising Standard Council of India (ASCI) - DAGMAR approach

UNIT-III: Process of Advertisement
Creativeness and Communication of Advertising –Creative Thinking – Process – Appeals – Copy Writing - Issues in Creation of Copy Testing –Slogan Elements of Design and Principles of Design

UNIT-IV: Media Planning
Advertising Media - Role of Media - Types of Media - Print Media - Electronic Media and other Media - Advantages and Disadvantages – Media Planning - Selection of Media

UNIT-V: Analysis of Market Media
Media Strategy – Market Analysis -Media Choices - Influencing Factors - Target, Nature, Timing, Frequency, Languages and Geographical Issues - Case Studies

III: References:
1. Bhatia. K.Tej - Advertising and Marketing in Rural India - Mc Millan India
2. Ghosal Subhash - Making of Advertising - Mc Millan India
3. Jeth Waney Jaishri& Jain Shruti - Advertising Management - Oxford university Press
4. Advertising Media Planning, Seventh Edition Paperback – by Roger Baron (Author), Jack Sissors (Author)
5. Media Planning and Buying in 21st Century – Ronald DGeskey
6. Media Planning and Buying: Principles and Practice in the Indian Context – Arpita Menon
7. Publications of Indian Institute of Mass Communications
8. Advertising and Salesmanship. P. Saravanavel, Margham Publications
9. Publications of ASCI
10. Web resources suggested by the Teacher concerned and the College Librarian including reading material

2023-24

Core papers

Course:17- B. SALES PROMOTION AND PRACTICE
(Skill Enhancement Course (Elective), 4 Credits)

I: Learning Outcomes:
By the end of the course students are able to:
1. Analyse various sales promotion activities
2. Get exposed to new trends in sales Promotion
3. Understand the concepts of creativity in sales promotion
4. Enhance skills to motivate the salesperson to reach their targets
5. Develop the skills of designing of sales promotion events

II: SYLLABUS: Total 75hrs (Teaching 60, Training10, Others 05 including IE etc.)

UNIT-I: Introduction to Sales Promotion: Nature and Scope of Sales Promotion- Influencing Factors - Sales Promotion and Control - Strengths and Limitations of Sales Promotion – Sales Organization - Setting-up of Sales Organization - Types of Sales Organization.

UNIT-II: Sales Promotion and Product Life Cycle: Types of Sales Promotion - Consumer Oriented - Trade Oriented - Sales Oriented - Various Aspects -Sales Promotion methods in different Product Life Cycle – Cross Promotion - Sales Executive Functions- Theories of Personal Selling - Surrogate Selling.

UNIT-III: Strategies and Promotion Campaign: Tools of Sales Promotion - Displays, Demonstration, Fashion Shows, Conventions - Conferences, Competitions –Steps in designing of Sales Promotion Campaign – Involvement of Salesmen and Dealers – Promotional Strategies - Ethical and Legal issues in Sales Promotion.

Unit-IV: Salesmanship and Sales Operations: Types of Salesman - Prospecting - Pre-approach and Approach - Selling Sequence - Sales budget, Sales territories, Sales Quota's - Point of Sale – Sales Contests - Coupons and Discounts - Free Offers - Showrooms and Exhibitions - Sales Manager Qualities and functions.

Unit-V: Sales force Management and Designing: Recruitment and Selection - Training - Induction - Motivation of sales personnel - Compensation and Evaluation of Sales Personnel - Designing of Events for Enhancing Sales Promotion

III: References:
1. Don.E. Schultz - Sales Promotion Essentials- Mc Graw hill India
2. S.H.H Kazmi & Satish K Batra, Advertising and Sales Promotion- Excel Books
3. Jeth Waney Jaishri& Jain Shruti - Advertising Management - Oxford university Press
4. Dr.ShailaBootwala Dr.M.D. Lawrence and Sanjay R.Mali -Advertising and Sales Promotion- NiraliPrakashan
5. Successful Sales Promotion – Pran Choudhury
6. Advertising and Sales Promotion Paperback – S. H. H. Kazmi & Satish Batra
7. Publications of ASCI
8. Kazmi & Batra, ADVERTISING & SALES PROMOTION, Excel Books, 2008
9. Web resources suggested by the Teacher concerned and the College Librarian including reading material

2022-23

Core papers

Course19 A: COST CONTROL TECHNIQUES

(Skill Enhancement Course (Elective) 4 credits)

I. Learning Outcomes

Up on completion of the course the student will be able to

1. Differentiate cost control, cost reduction concepts and identify effective techniques.
2. Allocate overheads on the basis of Activity Based Costing.
3. Evaluate techniques of cost audit and rules for cost record.
4. Appraise the application of marginal costing techniques to evaluate performances, fix selling price, make or buy decisions.

II. Syllabus: (Total 75hrs (Teaching 60, Training10, Others 05 including IE etc.)

Unit 1: Introduction-Nature and Scope

Introduction: Meaning of Cost Control – Cost Control Techniques – Requisites of effective Cost Control System – Cost Reduction – meaning – essentials for an effective cost Reduction Program – Scope of cost reduction - Difference between Cost Control and Cost Reduction –Meaning of cost audit – Types of Cost Audit – Auditing techniques.

Unit 2: Activity Based Costing

Concept of ABC – Characteristics of ABC – Categories of ABC – Allocation of Overheads under ABC – Cost Reduction under ABC – advantages of implementing ABC –Application on overhead allocation on the basis of ABC-

Unit 3: Cost Volume Profit Analysis (CVP Analysis)

Applications of Marginal Costing – profit planning – Evaluation of Performance-fixing selling price – Key Factor –Make or Buy decision – Accept or Reject - closing down or suspending activities –

Unit 4: Standard Costing and Variance Analysis

Concept of Standard Cost and Standard Costing – Advantages and limitations – analysis of variances-importance of Variance Analysis - computation and application of variances relating to material and labour.

Unit 5: Application of Modern Techniques

Kaizen Costing – Introduction – objectives – scope –Principles – 5 S (Sort, Set in Order, Shine, Standardize, and Sustain) in Kaizen Costing– Advantages and Disadvantages of Kaizen Costing. Learning Curve Analysis-concept and Application.

III. References

1. Cost and Management Accounting by SP Jain and KL Narang.
2. Cost Accounting by M.C. Shukla, T. S. Grewal & Dr M. P. Gupta, S. Chand and Company Private Limited, New Delhi

Course 20C: E COMMERCE
(Skill Enhancement Course) (Elective 4 Credits)

I. Learning Outcomes:

By the completion of the course, the students are able to
1. Understand the mechanism of ecommerce
2. Equip specialization in website designing for e commerce
3. Enhance their skills in operational services of e commerce
4. Involve in activities of e commerce
5. Able to create awareness among the public one commerce activities

II. Syllabus Total 75hrs (Teaching 60, Training10 and others 05 including IE etc)

UNIT 1: Introduction, Nature and Scope
Introduction- Definition –importance- Nature and scope of e commerce-Advantages and limitations-Types of ecommerce – B2B,B2C,C2B,C2C,B2A,C2A- Framework e commerce

UNIT 2:- Environmental and Technical support Aspects
Technical Components- Internet and its component structure-Internet Vs Intranet, Vs Extranet and their differences-Website design- its structure-designing, developing and deploying the system-

UNIT 3. –Security and Legal Aspects
Security environment –its preliminaries and precautions-protecting Web server with Firewalls-Importance of Digital Signature –its components – Cyber Law-Relevant Provisions of IT Act 2000.

UNIT 4. - Operational Services of e Commerce
E retailing –features- E Services-Banking, Insurance, Travel, Auctions, Learning, Publication and Entertainment-Payment of utilities (Gas, Current Bill, Petrol Products)- On Line Shopping (Amazon, Flip kart, Snap deal etc.)

UNIT 5.–E Payment System
Types of e payment system- its features-Digital payments (Debit Card/Credit Cards, Internet Banking, Mobile wallets- Digital Apps (unified Payment Services-Phone Pay, Google Pay, BHIM Etc.) Unstructured Supplementary Services Data (Bank Prepaid Card, Mobile banking)-

III. References:
1. Bharat Bhaskar , Electronic Commerce Framework, Technology and Application. McGraw Hill Education
2. Bajaj,D.Nag,E Commerce, Tata McGraw Hill Publication
3. Whitely David , E-Commerce, McGraw Hill
4. TN Chhabra ,E Commerce, Dhanapat Rai & Co
5. Dave Chaffey, E Business and E Commerce Management, Pearson Publication
6. Dr.Pratikkumar Prajapati, Dr.M.Patel, E Commerce , Redshine Publication
7. *Web resources suggested by the Teacher concerned and the College Librarian including reading material*

IV Co-Curricular Activities (teacher participation: total 15 hours):
A. Mandatory

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Y.S.R. Kadapa District – 516001, Andhra Pradesh, India.

Affiliated to Yogi Vemana University

2022-23

Core papers

Course 21 C: E FILING
(Skill Enhancement Course (Elective) 4credits)

Learning Outcomes:
By the completion of the course, the students are able to
- Understand and apply basic knowledge of Indian Tax System
- Equip specialization in taxation system
- Enhance their skills in presenting returns
- Involve in activities of Charted Accountants for filing returns
- file returns of Income Tax and GST

II. Syllabus: Total 75hrs (Teaching 60, Tmining10, Others 05 including IE etc.)

UNIT 1: Introduction, Nature and Scope
Introduction- Definition –importance and scope of returns--Types of Assesses –under Income Tax and Goods and Service Tax-Sources of income-

UNIT 2:- Returns filing under Income Tax
Types of Returns- Mode of filing-Manual-Electronic Bureau of Internal Revenue Form (eBIR) Electronic Filing and Electronic and Payment System (eFPS)-for Individuals-ITR1,ITR2,ITR3,ITR4,For Firms and CompaniesITR5,ITR6,ITR7.

UNIT 3: –Penalties and Prosecution under Income Tax
Nonpayment, failure to comply,-Concealment-, Book Audit, Loans-International transactions, TDS

UNIT 4:-.Returns filing under Goods Service Tax
GSTR1. GSTR1, GSTR2, GSTR2A, GSTR3B, GSTR4, GSTR5, GSTR6

UNIT 5.–Penalties and Prosecution under GST
Differences between fees and penalty-Types of penalties under section 122 to 138

III. References:

1. Varun Panwar ,Jyothi Mahajan Introduction to efiling returns MKM Publishers
2. Hemachandjain and H.N.Tiwari Computer Application in Business Taxman's Publication
3. SusheelaMadan Computer Application in Business MKM Publishers
4. www.incometaxindiafiling.gov.in
5. www.taxguru.in 6. www.bharatlaws.com
7. www.cbic-gst.gov.in 8.. www.taxmann.com

V Co-Curricular Activities (teacher participation: total 15 hours):

A. Mandatory
1. For Teachers: Training of students by the teacher (using actual field material) in classroom and field for not less than 10 hours on the skills of Local tax consultants and the problems raised at the time of e filing, Identifying the assesses and their experience in e filing activities, Analysis of various returns filed through manual and e filing and their difficulties and advantages, Listing out assesses who paid penalties and identify the various reasons
2. For Students: Filing of tax returns through the tax experts and concerned websites, Students shall be submitted a project report on filing of returns.
3. Max marks for Fieldwork/Project work Report: 05.

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2023-24

Core papers

B.A/B.Sc., STATISTICS (WM) CBCS REVISED SYLLABUS 2020-21
Semester – III (CBCS With Maths Combination Common to BA/BSc)
Paper - III: Statistical Inference

UNIT-I

Concepts: Population, Sample, Parameter, statistic, Sampling distribution, Standard error. convergence in probability and convergence in distribution, law of large numbers, central limit theorem (statements only). Student's t- distribution, F – Distribution, χ^2- Distribution: Definitions, properties and their applications.

UNIT-II

Theory of estimation: Estimation of a parameter, criteria of a good estimator – unbiasedness, consistency, efficiency, &sufficiency and. Statement of Neyman's factorization theorem. Estimation of parameters by the method of moments and maximum likelihood (M.L), properties of MLE's. Binomial, Poisson &Normal Population parameters estimate by MLE method. Confidence Intervals.

UNIT-III

Testing of Hypothesis: Concepts of statistical hypotheses, null and alternative hypothesis, critical region, two types of errors, level of significance and power of a test. One and two tailed tests. Neyman-Pearson's lemma. Examples in case of Binomial, Poisson, Exponential and Normal distributions.

UNIT – IV

Large sample Tests: large sample test for single mean and difference of two means, confidence intervals for mean(s). Large sample test for single proportion, difference of proportions. standard deviation(s) and correlation coefficient(s).

Small Sample tests: t-test for single mean, difference of means and paired t-test. χ2-test for goodness of fit and independence of attributes. F-test for equality of variances.

UNIT – V

Non-parametric tests- their advantages and disadvantages, comparison with parametric tests. Measurement scale- nominal, ordinal, interval and ratio. One sample runs test, sign test and Wilcoxon-signed rank tests (single and paired samples). Two independent sample tests: Median test, Wilcoxon – Mann-Whitney U test, Wald Wolfowitz's runs test.

2022-23

Core papers

B.A/B.Sc., STATISTICS (WM) CBCS REVISED SYLLABUS 2020-21
Semester – IV (CBCS With Maths Combination Common to BA/BSc)

Paper IV: Sampling Techniques and Designs of Experiments

UNIT I

Simple Random Sampling (with and without replacement): Notations and terminology, various probabilities of selection. Random numbers tables and its uses. Methods of selecting simple random sample, lottery method, method based on random numbers. Estimates of population total, mean and their variances and standard errors, determination of sample size, simple random sampling of attributes.

UNIT II

Stratified random sampling: Stratified random sampling, Advantages and Disadvantages of Stratified Random sampling, Estimation of population mean, and its variance. Stratified random sampling with proportional and optimum allocations. Comparison between proportional and optimum allocations with SRSWOR.

Systematic sampling: Systematic sampling definition when N = nk and merits and demerits of systematic sampling - estimate of mean and its variance. Comparison of systematic sampling with Stratified and SRSWOR.

UNIT III

Analysis of variance : Analysis of variance(ANOVA) –Definition and assumptions. One-way with equal and unequal classification, Two way classification.

Design of Experiments: Definition, Principles of design of experiments, CRD: Layout, advantages and disadvantage and Statistical analysis of Completely Randomized Design (C.R.D).

UNIT IV

Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) with their layouts and Analysis, Missing plot technique in RBD and LSD. Efficiency RBD over CRD, Efficiency of LSD over RBD and CRD.

UNIT V

Factorial experiments – Main effects and interaction effects of 2^2 and 2^3 factorial experiments and their Statistical analysis. Yates procedure to find factorial effect totals.

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2023-24

Core papers

B.A/B.Sc., STATISTICS (WM) CBCS REVISED SYLLABUS 2020-21
Semester – II to IV (CBCS With Maths Combination Common to BA/BSc)

Paper V: Applied Statistics

UNIT I

Time Series: Time Series and its components with illustrations, additive, multiplicative models. Trend: Estimation of trend by free hand curve method, method of semi averages. Determination of trend by least squares (Linear trend, parabolic trend only), moving averages method.

UNIT II

Seasonal Component: Determination of seasonal indices by simple averages method, ratio to moving average, Ratio to trend and Link relative methods, Deseasonalization.

UNIT III

Growth curves: Modified exponential curve, Logistic curve and Grompertz curve, fitting of growth curves by the method of three selected points and partial sums. Detrending. Effect of elimination of trend on other components of the time series

UNIT IV

Index numbers: Concept, construction, problems involved in the construction of index numbers, uses and limitations. Simple and weighted index numbers. Laspayer's, Paasche's and Fisher's index numbers, Criterion of a good index number, Fisher's ideal index numbers. Cost of living index number and wholesale price index number.

UNIT V

Vital Statistics: Introduction, definition and uses of vital statistics, sources of vital statistics.

Measures of different Mortality and Fertility rates, Measurement of population growth. Life tables: construction and uses of life tables.

Text Books:

1. Fundamentals of applied statistics : VK Kapoor and SC Gupta.
2. BA/BSc III year paper - III Statistics - applied statistics - Telugu academy by prof.K.Srinivasa Rao, Dr D.Giri. Dr A.Anand, Dr V.Papaiah Sastry.

Reference Books:

3. Anuvarthita Sankyaka Sastram - Telugu Academy.
4. Mukopadhyay, P (2011). Applied Statistics, 2nd ed. Revised reprint, Books and Allied Pvt. Ltd.
5. Brockwell, P.J. and Devis, R.A. (2003). Introduction to Time Series Analysis. Springer.

2023-24

Core papers

Semester – V (CBCS with Maths Combination Common to B.Sc)

Course Code:.

Domain Subject: **Statistics**

COURSE 6A: OPERATIONS RESEARCH - I

(Skill Enhancement Course(Elective), 05 Credits

Max. Marks: Theory :100 + Practicals: 50

Objective: The Objective of the paper is to introduce the basic concepts of Operational Research and linear programming to the students.

Learning Outcomes:

After learning this course, the student will be able

1. To know the scope of Operations Research
2. To link the OR techniques with business environment and life sciences
3. To convert real life problems into mathematical models
4. To find a solution to the problem in different cases
5. To inculcate logical thinking to find a solution to the problem

UNIT-I

Introduction of OR – Origin and development of OR – Nature and features of OR –Scientific Method in OR – Modeling in OR – Advantages and limitations of Models-General Solution methods of OR models – Applications of Operation Research. Linear programming problem (LPP) -Mathematical formulation of the problem - illustrations on Mathematical formulation of Linear programming of problem. Graphical solution of linear programming problems. Some exceptional cases - Alternative solutions, Unbounded solutions, non-existing feasible solutions by Graphical method.

UNIT-II

General linear programming Problem(GLP) – Definition and Matrix form of GLP problem, Slack variable, Surplus variable, unrestricted Variable, Standard form of LPP and Canonical form of LPP. Definitions of Solution, Basic Solution, Degenerate Solution, Basic feasible Solution and Optimum Basic Feasible Solution. Introduction to Simplex method and Computational procedure of simplex algorithm. Solving LPP by Simplex method (Maximization case and Minimization case)

UNIT-III

Artificial variable technique - Big-M method and Two-phase simplex method, Degeneracy in LPP and method to resolve degeneracy. Alternative solution, Unbounded solution, Non existing feasible solution and Solution of simultaneous equations by Simplex method.

UNIT-IV

Duality in Linear Programming –Concept of duality -Definition of Primal and Dual Problems, General rules for converting any primal into its Dual, Economic interpretation of duality, Relation between the solution of Primal and Dual problem(statements only). Using duality to solve primal problems. Dual Simplex Method.

UNIT-V

Post Optimal Analysis- Changes in cost Vector **C**, Changes in the Requirement Vector **b** and changes in the Coefficient Matrix **A**. Structural Changes in a LPP.

Reference Books:

1. S.D. Sharma, Operations Research, Kedar Nath Ram Nath & Co, Meerut.
2. Kanti Swarup, P.K.Gupta, Manmohn, Operations Research, Sultan Chand and sons, New Delhi.
3. J.K. Sharma, Operations Research and Application, Mc.Millan and Company, New Delhi.
4. GassS.I: Linear Programming. Mc Graw Hill.
5. HadlyG : Linear programming. Addison-Wesley.
6. Taha H.M: Operations Research: An Introduction : Mac Millan.

Practical/Lab to be performed on a computer using OR/Statistical packages

1. To solve Linear Programming Problem using Graphical Method with
   (i) Unbounded solution
   (ii) Infeasible solution
   (iii) Alternative or multiple solutions.
2. Solution of LPP with simplex method.
3. Problem solving using Charne's M - method.
4. Problem solving using Two Phase method.
5. Illustration of following special cases in LPP using Simplex method
   (i) Unrestricted variables
   (ii) Unbounded solution
   (iii) Infeasible solution
   (iv) Alternative or multiple solutions.
6. Problems based on Principle of Duality.
7. Problems based on Dual simplex method.
8. Problems based on Post Optimal Analysis

2022-23

Core papers

Semester-V Paper VII

B.Sc., STATISTICS (WM) CBCS REVISED SYLLABUS 2022-23
Semester – V (CBCS with Maths Combination Common to B.Sc)

Course Code:

Three-year B.A./B.Sc.
Domain Subject: **Statistics**
COURSE 7A: OPERATIONS RESEARCH - II
(Skill Enhancement Course (Elective), 05 Credits
Max. Marks: Theory: 100 + Practicals: 50

Objective: To enrich the knowledge of students with advanced techniques of linear programming problems along with real life applications.

Learning Outcomes:

After learning this course, the student will be able

1. To solve the problems in logistics
2. To find a solution for the problems having space constraints
3. To minimize the total elapsed time in an industry by efficient allocation of jobs to the suitable persons.
4. To find a solution for an adequate usage of human resources
5. To find the most plausible solutions in industries and agriculture when a random environment exists.

UNIT -I

Transportation Problem- Introduction, Mathematical formulation of Transportation problem. Definition of Initial Basic feasible solution of Transportation problem- North-West corner rule, Lowest cost entry method, Vogel's approximation method. Method of finding optimal solution-MODI method(U-V method). Degeneracy in transportation problem, Resolution of degeneracy, Unbalanced transportation problem. Maximization TP. Transshipment Problem.

UNIT-II

Assignment Problem -Introduction, Mathematical formulation of Assignment problem, Reduction theorem (statement only), Hungarian Method for solving Assignment problem, Unbalanced Assignment problem. The Traveling salesman problem, Formulation of Traveling salesman problem as an Assignment problem and Solution procedure.

UNIT-III

Sequencing problem: Introduction and assumptions of sequencing problem, Sequencing of n jobs and one machine problem. Johnson's algorithm for n jobs and two machines problem-problems with n-jobs on two machines, Gantt chart, algorithm for n jobs on three machines problem- problems with n- jobs on three machines, algorithm for n jobs on m machines problem, problems with n-jobs on m-machines. Graphical method for two jobs on m–machines.

2023-24

Core papers

B.Sc MICROBIOLOGY (CBCS) REVISED SYLLABUS – 2020

MBT – III: MEDICAL MICROBIOLOGY AND IMMUNOLOGY

TOTAL HOURS: 48 **CREDITS: 4**

UNIT- I: **No. of hours: 8**

Normal flora of human body. Host pathogen interactions: infection, invasion, pathogen, pathogenicity, virulence and opportunistic infection. General account on nosocomial infection. General principles of diagnostic microbiology- collection, transport and processing of clinical samples. General methods of laboratory diagnosis - cultural, biochemical, serological and molecular methods.

UNIT- II: **No. of hours: 10**

General account on microbial diseases -causative agent, pathogenesis, epidemiology, diagnosis, prevention and control.

Bacterial diseases - Tuberculosis and Typhoid

Fungal diseases – Candidiasis, Aspergillosis, Yeast

Protozoal diseases – Malaria, Filaria & Diseases spread by House Fly.

Viral Diseases - Hepatitis- A & C and AIDS.

UNIT- III: **No. of hours: 10**

Description and pathology of diseases caused by Aspergillus, Penicillium. Description and pathology of diseases caused by hemoflagellates; *Leishmania donavani, L.tropica, Trypanosoma gambiense.* Principles of chemotherapy, Antibacterial drugs – Penicillin, Antifungaldrugs – Nystatin, Antiviralagents – Robovirin, Drug resistance in bacteria.

UNIT- IV: **No. of hours: 10**

Types of immunity - innate and acquired; active and passive; humoral and cell-mediated immunity.

Primary and secondary organs of immune system - Thymus, Bursa fabricus, bone marrow, spleen and lymph nodes.

Cells of immune system – structure and functions of B and T lymphocytes, null cells, monocytes, macrophages,neutrophils, basophils and eosinophils.

UNIT – V: **No. of hours: 10**

Antigens - types, chemical nature, antigenic determinants, haptens. Factors affecting antigenicity.

Antibodies - basic structure, types, properties and functions of immunoglobulins.

Types of antigen-antibody reactions - Agglutinations, Precipitation, Neutralization, complement fixation, blood groups.

Labeled antibody based techniques - ELISA, RIA and Immuno fluroscence. Polyclonal and monoclonal antibodies - production and applications.

Concept of Hypersensitivity and Autoimmunity. Hybridoma technology.

2023-24

Core papers

B.Sc MICROBIOLOGY (CBCS) REVISED SYLLABUS - 2020

MBT – IV INDUSTRIAL MICROBIOLOGY

UNIT – I **No. of hours: 7**

Microorganisms of industrial importance –History,introduction and general charecters of yeasts (*Saccharomyces cerevisiae*), moulds (*Aspergillus niger*) bacteria (*E.coli*), actinomycetes (*Streptomyces griseus*). Industrially important Primary and secondary microbial metabolites. Screening techniques. Techniques involved in strain improvement.

UNIT – II **No.of hours: 10**

Fermentation and fermenter: concept and discovery of fermentation. Fermenter: its parts and function. Types of fermenter – batch, continuous and fed batch.

Types of fermentation processes – solid state, liquid state, batch, fed-batch, continuous.

Basic concepts of Design of fermenter.

Ingredients of Fermentation media.

Downstream processing - filtration, centrifugation, cell disruption, solvent extraction.

UNIT – III **No.of hours: 8**

Microorganisms involved in Pharma and therapeutic enzymes. Enzymes used in detergents, textiles and leather industries. Production of amylases and Proteases. Production of therapeutic enzymes. Role of microorganisms in bioleaching and textile industry.

UNIT – IV **No.of hours: 7**

Industrial microorganisms: cell growth, microbial growth kinetics, factors affecting growth, basic nutrition, principles of production media, components of media, chemical composition of media.

Bioreactors: basic structure of bioreactor, types of bioreactors, kinetics and methodology of batch and continuous bioreactors. Sterilization of bioreactors: fibrous filter sterilization. Aeration and agitation: agitation in shake flask and tube rollers.

UNIT – V **No.of hour: 7**

Microbial production and applicatons of Industrail products: Citric acid, Ethanol, Penicillin, Glutamic acid, and vitamin B12, Single cell proteins,Production of bacterial and viral vaccines.

2023-24

Core papers

B.Sc MICROBIOLOGY (CBCS) REVISED SYLLABUS - 2020

MBT – V: MOLECULAR BIOLOGY AND MICROBIAL GENETICS

TOTAL HOURS: 48 **CREDITS: 4**

UNIT- I **No. of hours: 8**

DNA and RNA as genetic material. Structure and organization of prokaryotic DNA. Watson and Crick model of DNA. Extra chromosomal genetic elements - Plasmids and transposons. Replication of DNA - Semi conservative mechanism, Enzymes involved in replication.

UNIT- II **No. of hours: 10**

Mutations - spontaneous and induced, base pair changes, frame shifts, deletions, inversions, tandem duplications, insertions.

Mutagens - Physical and Chemical mutagens.

Outlines of DNA damage and repair mechanisms.

UNIT- III **No. of hours: 10**

Modern concept of gene Cistron, Recon and Muton. One gene one enzyme and one gene one polypeptide hypotheses.

Types of RNA and their functions,poly and mono cistronic m-RNA.

Genetic code –genetic code, the decoding system,codon- anticodon interaction.

Structure of ribosomes.

Bacterial recombination – Bacterial transformation, Bacterial conjugation, Transduction– Generalized and specialized transductions.

UNIT- IV **No. of hours: 10**

Transcription: Introduction- Basic features of RNA synthesis, *E.coli* RNA polymerase, Classes of RNA molecules, processing of tRNA and rRNA and m-RNA. Transcription in Eukaryotes, Eukaryotic rRNA genes, formation of eukaryotic tRNA molecules, RNA Polymerases of eukaryotes. **Translation:** Outline of Translation. Protein Synthesis, Complex Translation units, Inhibitors and Modifiers of protein synthesis, Protein Synthesis in Eukaryotes.

UNIT- V **No. of hours: 8**

Gene regulation- structural, constitutive, regulatory, clustered genes and the control of gene expression. Regulation of gene expression in bacteria - operon concepts - Negative and positive control of the Lac Operon, trp operon.

Semester-wise Revised Syllabus under CBCS, 2020-21
Semester-V (Electives)
(Skill Enhancement Course -Credits: 05)

COURSE 6A: FOOD AND DAIRY MICROBIOLOGY

I THEORY
CREDITS: 3
TOTAL HOURS: 50

A. Learning outcomes

LO1: Understanding the key concepts in food and dairy microbiology
LO2: Emphasizing the role of intrinsic and extrinsic factors on growth and survival of microorganisms in food and dairy industries
LO3: Enumerating the various methods of isolation, detection and identification of microorganisms employed in food and dairy industries
LO4: Identifying the types and nature of food spoilage caused by microorganisms
LO5: Developing principles and methods for the microbiological examination and preservation of foods
LO6: Perception of food safety regulations and the rationale use of standard methods and procedures for the microbial analysis of food and dairy products.

B. SYLLABUS

UNIT – 1 **No. of Hours:10**

Microbiology of foods: Basic principles of food microbiology with influencing factors. Source of contamination of foods. Identification of food contaminants – Bacteria, Viruses, Fungi and Protozoa. Food sanitation and control.

UNIT – II **No. of Hours:10**

Microbial spoilage of food: Spoilage of canned foods, cereals, fruits, vegetables, bread, eggs, meat and fish. Food intoxication -Staphylococcal poisoning, botulism, Food infection -Salmonellosis, Shigellosis, Mycotoxins - Aflatoxins in stored food and grains.

UNIT – III **No. of Hours:10**

Principles of food preservation -Methods of food preservation- Physical methods-high temperature, canning, freezing, dehydration, and radiation. chemical methods- salt, sugar, organic acids, SO_2, nitrite and nitrates, ethylene oxide. Food processing- Thermal processing, Chemical processing (Sugar, Salt, Smoke, acid and chemicals). Packaging materials.

UNIT - IV **No. of Hours:10**

Fermented Foods: Dairy starter cultures, fermented dairy products: yogurt and cheese (Types and Production), other fermented foods: acidophilus milk, kumiss, kefir, dahi, dosa, sauerkraut, soy sauce and tampeh, Microorganisms as food – single cell protein. Mushrooms: Types and cultivation. Probiotics: Health benefits, types of microorganisms used, probiotic foods available in market.

UNIT – V **No. of Hours: 10**

Dairy Microbiology (Skill-based unit): Physical and chemical properties of milk, Microorganisms in milk, Sources of microbial contamination of milk - milch animal, utensils and equipment, water, milking environment. Methods of preservation of milk and milk products: Pasteurization, sterilization, dehydration. Fermentation in milk: Souring, lactic acid fermentation and proteolysis.

2023-24

Core papers

S.K.R & S.K.R GOVT. DEGREE COLLEGE FOR WOMEN (A)
KADAPA
Re accredited by NAAC at B Grade
DEPARTMENT OF MICROBIOLOGY- (BOS - 2022-2023)

COURSE 7A: ENVIRONMENTAL AND AGRICULTURE MICROBIOLOGY

I THEORY
CREDITS: 3
TOTAL HOURS: 50

A.LEARNING OUTCOMES

LO1: Providing basic understanding of microbial diversity in the environment
LO2: Perception of Energy transfer efficiencies between tropic levels
LO3:Enumerating the role of microbes in waste management and bioremediation.
LO4: Emphasizing the role of microbes in maintaining soil profile and fertility
LO5: Insights into the role of microorganisms as biofertilizers and biopesticides
LO6: Enumerating the various classes of microbes affecting agricultural yields.

B. SYLLABUS

UNIT – I **No. of Hours:10**

Ecology- Basic concepts of Ecology and Environment, Ecosystem – Concept, components, food chains, food webs and trophic levels. Energy transfer efficiencies between trophic levels. Microflora of fresh water and marine habitats. Aero microflora and dispersal of microbes. Host-Microbe interactions: Mutualism, synergism, commensalism, competition, amensalism, parasitism, predation. Microbes and biogeochemical cycles - nitrogen and carbon.

UNIT – II **No. of Hours:10**

Outlines of Waste management: Sources and types of solid waste, Methods of solid waste disposal (composting and sanitary landfill). Liquid waste management: Composition and strength of sewage treatment. Microorganisms and pollution: methyl mercury, acid rain water, carbon monoxide. Microbial Bioremediation of common pesticides, organic (hydrocarbons, oil spills) and inorganic (metals) matter. Biofouling.

UNIT – III **No. of Hours:10**

Soil Microbiology- Soil structure, soil profile, Physio-chemical conditions, Microbial composition, sampling techniques, Role of Microorganisms in organic matter decomposition (cellulose, Hemicellulose, Lignin's). Rhizosphere and Phyllosphere microflora. Management of soil biota for maintaining soil fertility. Conversion of waste lands into fertile lands. Management of soil nutrients. Microbes in composting.

UNIT – IV **No. of Hours:10**

Microorganisms in Agriculture: Biofertilizers - definition, types (bacterial - Rhizobium, Azotobacter; phosphate solubilizers (PSB) - examples of Bacterial sps., BGA, Azolla; kind of association, mode of application, merits and demerits. Biopesticides - introduction, types (Bacterial - Bacillus thuringiensis, Viral - NPV, fungal - Trichoderma), mode of action. Mycorrhiza-Importance of mycorrhizal inoculums, types of mycorrhizae associated plants, Production and field applications of Ectomycorrhizae and VAM.

UNIT – V **No. of Hours: 10**

Plant pathology: Contributions of G. Rangaswamy, Beijerinck, Winogradsky and Winogradsky's coloumn. Study of microbes as plant pathogens: Fungi - *Puccinia graminis,* Bacteria - *Xanthomonas oryzae,* Mycoplasma - sandal spike, Viruses - TMV (Tobacco Mosaic Virus). Advantages, Social and environmental aspects of transgenic plants (Bt crops, golden rice).

Unit-V: Nucleic acids and porphyrins 12 hours

Types of RNA and DNA. Structure of purines and pyrimidines, nucleosides, nucleotides. Stability and formation of phosphodiester linkages. Effect of acids, alkali and nucleases on DNA and RNA. Structure of Nucleic acids- Watson-Crick DNA double helix structure, denaturation and renaturation kinetics of nucleic acids-, *T*m-values and their significance, cot curves and their significance.

Structure of porphyrins:Identification of Porphyrins, Protoporphyrin, porphobilinogen properties, Structure of metalloporphyrins–Heme, cytochromes and chlorophylls.

I Semester Practicals: Qualitative Analysis

1. Preparation of buffers (acidic, neutral and alkaline) and determination ofpH.
2. Qualitative identification of carbohydrates- glucose, fructose, ribose/xylose,maltose,sucrose, lactose, starch/glycogen.
3. Qualitative identification ofamino acids-histidine,tyrosine,tryptophan,cysteine, arginine.
4. Qualitative identification of lipids- solubility, saponification, acrolein test, Salkowski test, Lieberman-Burchardtest.
5. Preparation of Osazones and their identification.
6. Absorption maxima of colored substances-p-Nitrophenol, Methyl orange.
7. Absorption spectra of protein-BSA, nucleic acids-Calf thymus DNA.

staining- Gram positive and Gram negative bacteria, motility and sporulation, Sterilization techniques-Physical methods, chemical methods, radiation methods, ultrasonic and. Antibiotic resistance.

Practical BCP- 201 :

Biochemical Techniques

List of Experiments:

1. Isolation of RNA and DNA from tissue/culture.
2. Qualitative Identification of DNA, RNA and Nitrogen Bases
3. Isolation of egg albumin from egg white.
4. Isolation of cholesterol from egg yolk.
5. Isolation of starch from potatoes.
6. Isolation of casein from milk.
7. Separation of amino acids by paper chromatography.
8. Determination of exchange capacity of resin by titrimetry.
9. Separation of serum proteins by paper electrophoresis.

Recommended books:

1. Principles and Techniques of practical Biochemistry. Eds. Williams and Wilson.
2. Techniques in Molecular biology Ed. Walker & Gastra, Croom Helm, 1983.
3. Principles of instrumental analysis, 2nd Ed, Holt-Sanders, 1980.
4. An introduction to spectroscopy for Biochemistry. Ed. Brown S.N., Academic press

2023-24

Core papers

Major Domain Subject: BIO-CHEMISTRY

Semester-III

Course: Enzymology, Bioenergetics and Intermediary Metabolism

Code: BCH-III

60 HRS
(5 periods/week)

Unit-I: Enzymology **12 hours**

Introduction to Biocatalysis, differences between chemical and biological catalysis. Nomenclature and classification of enzymes. Definition of holo-enzyme, apo-enzyme, coenzyme, cofactor. Active site, Enzyme specificity. Principles of energy of activation, transition state. Interaction between enzyme and substrate-lock and key, induced fit models. Fundamentals of enzyme assay, enzyme units. Outlines of mechanism of enzyme action, factors affecting enzyme activity. Commercial application of enzymes.

Unit- II: Bioenergetics and Biological oxidation **12 hours**

Bioenergetics: Thermodynamic principles – Chemical equilibria; free energy, enthalpy (H), entropy (S). Free energy change in biological transformations in living systems; High energy compounds. Energy, change, oxidation-reduction reactions.

Organization of electron carriers and enzymes in mitochondria. Classes of electron-transferring enzymes, inhibiters of electron transport. Oxidative phosphorylation. Uncouplers and inhibitors of oxidative phosphorylation. Mechanism of oxidative phosphorylation.

Unit-III: Carbohydrate Metabolism. **12 hours**

Concept of anabolism and catabolism. Glycolytic pathway, energy yield. Fate of pyruvate-formation of lactate and ethanol, Citric acid cycle, regulation, energy yield, amphipathic role. Anaplerotic reactions. Glycogenolysis and glycogenesis. Pentose phosphate pathway. Gluconeogenesis. Photosytnthesis- Light and Dark reactions, Calvin cycle, C_4 Pathway. Disorders of carbohydrate metabolism- Diabetes Mellitus.

Unit-IV: Lipid Metabolism **12 hours**

Catabolism of fatty acids (β- oxidation) with even and odd number of carbon atoms, Ketogenesis, *DE NOVO* synthesis of fatty acids, elongation of fatty acids in mitochondria and microsomes, Biosynthesis and degradation of triacylglycerol and lecithin. Biosynthesis of cholesterol. Disorders of lipid metabolism.

Unit-V: Metabolism of Amino acids **12 hours**

General reactions of amino acid metabolism- transamination, decarboxylation and deamination, Urea cycle and regulation, Catabolism of carbon skeleton of amino acids- glycogenic and ketogenic amino acids. Metabolism of glycine, serine, aspartic acid, methionine, phenylalanine and leucine. Biosynthesis of creatine. Inborn errors of aromatic and branched chain amino acid metabolism.

2023-24

Core papers

Major Domain Subject: BIO-CHEMISTRY

SEMESTER-IV

Course: Physiology, Nutritional and Clinical Biochemistry

Code: BCH-1V

60 HRS

(5 periods/week)

Unit-I: Digestion and Blood **12hours**

Digestion and absorption of carbohydrates, lipids and proteins. Role of enzymes and gastrointestinal hormones in digestion. Composition of blood, Blood groups, coagulation of blood and disorders of blood coagulation (haemophilia). Hemoglobin and transport of gases in blood (oxygen and CO_2). Types of anemias, haemoglobinopathies-sickle cell anemia.

Unit-II: Nervous system and excretory system **12hours**

Introduction to nervous system, general organization of nervous system, Neurons-structure, types, properties and functions; Neurotransmitters, Cerebrospinal fluid-composition and functions, Reflex-types and properties.

Introduction to excretory system. Organization of kidney, Structure and functions of nephron, Urine formation, Role of kidneys in maintaining acid-base and electrolyte balance in the body.

Unit III: Endocrinology **12 hour**

Endocrinology- organization of endocrine system. Classification of hormones. Outlines of chemistry, physiological role and disorders of hormones of thyroid, parathyroid, pituitary and hypothalamus. Introduction of gastrointestinal hormones. Mechanism of hormonal action- signal transduction pathways for glucocorticoids and insulin. Adrenalin, estrogen and progesterone.

Unit- IV: Nutritional Biochemistry **12hours**

Balanced diet. Calorific values of foods and their determination by bomb calorimeter. BMR and factors affecting it. Specific dynamic action of foods. Energy requirements and recommended dietary allowance (RDA) for children, adults, pregnant and lactating women. Sources of complete and incomplete proteins. Biological value of proteins. Malnutrition- Kwashiorkar, Marasmus and PEM.

Vitamins- sources, structure, biochemical roles, deficiency disorders of water- and fat-soluble vitamins. Introduction to nutraceutical and functional foods. Bulk and trace elements-Ca, Mg, Fe, I, Cu, Mo, Zn, Se and F.

Unit- V: Clinical Biochemistry **12hours**

Plasma proteins in health and disease. Liver diseases-jaundice. Liver function tests-conjugated and total bilurubin in serum, albumin: globulin ratio, Serum enzymes in liver diseases-SGOT, SGPT, GGT,CPK, Acid and alkaline phosphatases. Serum lipids and lipoproteins. Normal and abnormal constituents of urine. Renal function tests-Blood urea, creatinine, GFR, creatinine clearance. GTT and gastric and pancreatic function test

Practical – BCH-401: Nutritional and Clinical Biochemistry **45 HRS**

(3 periods/week)

List of Experiments:

1. Estimation of calcium by titrimetry
2. Estimation of iron by Wong's method.
3. Estimation of vitamin C by 2, 6 -dichlorophenol indophenol method.
4. Determination of iodine value of an oil.

2023-24

Core papers

Major Domain Subject: BIO-CHEMISTRY

Semester - IV

Course: Microbiology, Immunology and Molecular biology
Code: BCH-V

6 HRS

(5 periods/week)

Unit-I: Microbiology 12 hours

Introduction to microbiology and microbial diversity. Classification of microorganisms-prokaryotic and eukaryotic microorganisms. Bacterial structure, growth curve and kinetics of growth. Introduction to viruses-plant and animal viruses, structure, life cycle, Food and dairy microbiology.

Unit-II: Nitrogen Fixation 12 hours

Nitrogen cycle, Non-biological and biological nitrogen fixation, photosynthetic and non-photosynthetic systems, Nitrogenase system. Utilization of nitrate ion, Ammonia incorporation into organic compounds. Synthesis of glutamine and regulatory mechanism of glutamine synthase.

Unit-III: Applied Biochemistry

12 hours

Fermentation Technology: Batch, continuous culture techniques, principle types of fermentors. Pasteur effect. Industrial production of chemicals- alcohol, acids (citric acid), solvents (acetone), antibiotics (penicillin), Enzyme Technology: Immobilization of enzymes and cells, industrial applications, enzymes in Bioremediation.

Unit- IV : Immunology 12 hours

Organs and cells of immune system. Innate and acquired immunity, Cell mediated and humoral immunity (T-cells and B-cells). Classification of immunoglobulins, structure of IgG. Epitopes / antigenic determinants. Concept of haptens. Adjuvants. Monoclonal antibodies. Antigen-antibody reactions- agglutination, immunoprecipitation, immunodiffusion. Blood group antigens. Immunodiagnostics- ELISA. Vaccines and their

classification. Traditional vaccines-live and attenuated. Modern vaccines- recombinant and peptide vaccines. Outlines of hypersensitivity reactions.

Unit- IV: Molecular biology **12 hours**

Types of RNA and DNA, DNA replication-leading and lagging strands, okazaki fragments, inhibitors of DNA replication. Genetic code, Protein synthesis-transcription, translation, inhibitors of protein synthesis. Outlines of cloning technology, vectors, restriction enzymes, PCR, applications of cloning in agriculture, industry and medical fields.

Practical – BCP-501: Microbiology and immunology **45 HRS**

(3 periods/week)

List of Practical Experiments

10. Biosafety and good laboratory practices (GLP) of Microbiology.
11. Sterilization of microbial media by autoclave.
12. Isolation of pure cultures: (i) Streak plate method. (ii) Serial dilution method.
13. Demonstration of alcohol fermentation.
14. Antibiotic sensitivity by paper disc method.
15. Effect of nitrogen sources on growth of E. coli
16. Immunodiffusion by Ouchterlony method.
17. Blood group analysis.
18. Isolation of DNA from plant tissues.
19. Spotters.

2023-24

Core papers

Biochemistry

III B.Sc. -SEMESTER-V
SYLLABUS- 2022-2023

Paper-VIA: 6A -SEC Clinical Biochemistry

Total no of Hours: 30 Credits -2

UNIT – I **No. of Hours: 6**

Introduction:

Organization of Clinical laboratory. Introduction to instrumentation and automation in Clinical biochemistry laboratories, safety regulations and first aid. General comments on specimen collection, Type of specimen for biochemical analyses. Precision, accuracy, quality control, precautions and limitations.

Exercises

Collection of blood, separation of plasma, serum and their storage.

UNIT – II **No. of Hours: 6**

Basics of Hepatic and Renal physiology:

Evaluations of biochemical changes in liver and kidney diseases, Liver function tests (LFTs), Renal function tests (RFTs), GFR. Diagnostic biochemical profile.

Exercises

Estimation of bilirubin (direct and indirect method) serum transaminases (AST, ALT) and serum alkaline phosphatases (ALP).Quantitative determination of serum urea and creatine. Use of urine strips / dip strip method for urine analyses.

UNIT – III **No. of Hours: 6**

Glucose metabolism

Digestion, absorption and assimilation of carbohydrates. Enzymes and hormones (Insulin, Glucagon) in regulation of blood glucose levels. Clinical significance of variations in blood glucose levels, disorders - Diabetes mellitus.

Exercises

Estimation of blood glucose by glucose oxidase - peroxidase method, GTT (Glucose Tolerance Test).

UNIT – IV **No of Hours: 6**

Lipid profile: Lipids, fats, Triglycerides, cholesterol, fatty acids, PUFAS. Digestion and absorption of lipids. Composition and functions of lipoproteins. Clinical significance of elevated lipoproteins.

Exercises

Estimation of triglycerides, cholesterol, LDL, VLDL and HDL cholesterol.

UNIT – V **No of Hours: 6**

Cardiovascular diseases: Basic cardiovascular physiology, biochemical symptoms associated with cardiovascular diseases and their evaluation. Involvement of enzymes in diagnostics of heart diseases including Aspartate transaminase.

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2023-24

Core papers

Biochemist

III B.Sc- SEM-V Biochemistry Model question paper-2022-2023

Paper- 7A- SEC Hematological and Immunological Techniques

Total Hours of Teaching 60 Hours – 4 Hours / Week

Time: 3hrs **EXTERNAL SEMESTER END EXAMS** **Max.Marks:75**

UNIT - I **No. of Hours: 6**

1. Introduction

Organization of Clinical Immunology laboratory. Introduction and maintenance of clinical Immunology laboratory; hazards in clinical laboratory; units; 'normal range', reference values. Factors affecting reference values quality control in laboratory – use of external and internal standards; use of WHO standards.

Exercises

Collection of blood and separation of Serum and their storage. Haemagglutination tests for identification of human blood groups.

UNIT - II **No. of Hours: 6**

Composition of blood and Lymph

Plasma and cells-RBC, WBC, platelets, blood clotting, plasma proteins, separation and applications of plasma. Lymph. Lymphocytes.

Exercises

R.B.C. count, Total and differential count in human peripheral blood, Separation of mononuclear cells from human peripheral blood, Enumeration of T & B-cells from human peripheral blood.

UNIT - III **No. of Hours: 6**

Advanced diagnostic methods

Identification of viral, bacterial and other diseases - ELISA, Western blot, RT-PCR-Tissue Histopathology, fixing, staining (H&E).

Exercises

Erythrocyte Sedimentation Rate (ESR), Packed Cell Volume (PCV), Estimation of Hemoglobin (Hb), Mean Cell Hemoglobin and Mean Cell RBC volume.

UNIT - IV **No of Hours: 6**

Auto immunity

Introduction, Auto recognition, classes of auto immuno diseases. (Hashimoto disease, thyrotoxicosis, Systemic lupus erythematosus, autoimmune hemolytic anaemia, Rheumatoid arthritis).

Exercises

Tests for Rheumatoid arthritis, Systemic lupus erythematosus, CRP. Widal test, VDRL test.

UNIT – V **No of Hours: 6**

Immunoglobulins (Igs)

Types of Igs, nature and structure of Igs –Light chain, heavy chain and functions. Adjuvants, Antibody production, enzymatic cleavage of Igs, Haptens.

2023-24

Core papers

B.Sc., Biotechnology: Choice based credit system

B.Sc., -III- Semester W.E.F. 2020-21

BT-301: Immunology and rDNA technology

Course Objectives: To acquaint students with concepts of immunology and recombinant DNA technology. This course is aimed to give an understanding of the basics of immunology dealing cells and organs of the immune system, types of immune responses, antigen-antibody interactions, vaccines and tools, techniques and strategies and applications of genetic engineering.

Unit- I –Concepts, Cells and Organs of the Immune System

Terminology, antigen, hapten, antibody (structure and types), antigenicity, immunogenicity. Types of immunity- Innate and adaptive immunity. Hematopoiesis, organs, tissues, cells and mediators of the immune system (primary and secondary lymphoid organs, lymphocytes and cytokines). Introduction to complement components, MHC. Basic concepts of humoral and cell-mediated immune response.

Unit-II-Vaccinology and Clinical Immunology

Live, killed, attenuated, subunit and recombinant vaccines. Role and properties of adjuvants. Hybridoma technology, monoclonal antibodies and their application in immunodiagnosis, polyclonal antibodiesAntigen and antibody interactions - precipitation, agglutination, immune diffusion and ELISA. Introduction to hypersensitivity and autoimmunity.

Unit-III –Introduction, Tools and Techniques of rDNA Technology

Introduction to rDNA technology, steps involved in cloning, tools of genetic engineering (Genes, Cloning vectors - plasmids and cosmids, Enzymes – restriction endonucleases and DNA Ligase, Hosts – bacteria and yeast). Principles and application of PCR. Southern, Northern and Western Blotting. Introduction to DNA sequencing (Sanger Sequencing).

Unit-IV-Cloning Strategies and Application of rDNA Technology

cDNA library, construction, methods of transformation, recombinant selection and screening methods. Applications of rDNA technology in agriculture (transgenic plants) and medicine (disease diagnosis).

Unit-V-Bioinformatics

Databases (PubMed, NCBI, EMBL and ExPASy), nucleotide and protein BLAST analysis, CLustal W and phylogenetic tree construction. Introduction to omics (proteomics, genomics and transcriptomics).

List of Practicals:-

1. Determination of Blood Groups
2. Pregnancy test
3. Widal test
4. Ocuteroloney immunodiffusion
5. Radial immune diffusion
6. Production of antibodies (theory exercise)
7. Lymphoid organs (theory exercise)
8. Isolation of plasmid DNA (alkaline lysis method)
9. Analysis of plasmid DNA by Agarose gel electrophoresis
10. Southern blotting (theory exercise)
11. PCR Amplification (theory exercise)

Textbooks forImmunology and rDNA technology

1. Kuby immunology, Judy Owen, Jenni Punt, Sharon Stranford., 7th edition (2012), Freeman and Co., NY
2. Textbook of basic and clinical immunology, 1st edition (2013), Sudha Gangal and Shubhangi Sontakke, University Press, India
3. Immunology, 7th edition (2006), David Male, Jonathan Brostoff, David Roth, Ivan Roitt, Mosby, USA.

2023-24

Core papers

B.Sc., Biotechnology: Choice based credit system

B.Sc., -IV Semester W.E.F. 2020-21

BT-401 (i) Plant and Animal Biotechnology

Course Objectives

The objectives of this course are to introduce students to the principles, practices and application of animal biotechnology, plant tissue culture, plant and animal genomics, genetic transformation.

Unit – I

Plant tissue culture techniques & secondary metabolites production

Plant tissue culture: totipotency, media preparation – nutrients and plant hormones; sterilization techniques; establishment of cultures – callus culture, cell suspension culture, applications of tissue culture-micro propagation; Somatic embryogenesis; synthetic seed production; protoplast culture and somatic hybridization - applications. Cryopreservation, Plant secondary metabolites- concept and their importance

Unit – II

Transgenesis and Molecular markers

Plant transformation technology-- Agrobacterium mediated Gene transfer (Ti plasmid), hairy root features of Ri plasmid, Transgenic plants as bioreactors. Herbicide resistance – glyphosphate, Insect resistance- Bt cotton, Molecular markers - RAPD, RFLP and DNA fingerprinting-principles and applications.

Unit – III

Animal tissue culture techniques

Animal cell culture: cell culture media and reagents; culture of mammalian cells, tissues and organs; primary culture, secondary culture, cell lines, stem cell cultures; Tests: cell viability and cytotoxicity, Cryopreservation. Transfection methods (calcium phosphate precipitation, electroporation, Microinjection) and applications.

Unit – IV

Transgenic animals & Gene Therapy

Production of vaccines, diagnostics, hormones and other recombinant DNA products in medicine (insulin, somatostatin, vaccines), IVF, Concept of Gene therapy, Concept of transgenic animals – Merits and demerits -Ethical issues in animal biotechnology

Unit V

Bioethics, Biosafety and IPR

Bioethics in cloning and stem cell research, human and animal experimentation, animal rights/welfare (CPCSEA guidelines). Bio safety-introduction to biological safety cabinets; primary containment for biohazards; biosafety levels; GLP,GMP, Introduction to IP-Types of IP: patents, trademarks & copyright

Student Learning Outcomes

Students should be able to gain fundamental knowledge in animal and plant biotechnology and their applications.

PLANT AND ANIMAL BIOTECHNOLOGY-PRACTICALS

- plant culture media and composition of MS media
- Raising of aseptic seedlings
- Induction of callus from different explants
- Plant propagation through Tissue culture (shoot tip and Nodal culture)

2023-24

Core papers

B.Sc., Biotechnology: Choice based credit system

B.Sc., -IV Semester W.E.F. 2020-21

BT-401 (ii) Environmental & Industrial Biotechnology

Learning Objective

This course aims to introduce fundamentals of Environmental Biotechnology. The course will also give an insight in introducing major groups of microorganisms and their industrial applications

Unit – I

Pollution Types and Control

Environmental Biotechnology-Environmental Pollution : Types of pollution, air pollution & its control through Biotechnology, Biofilters, Bioscrubbers, Biotrickling filter.Water pollution and its management: Measurement of water, pollution, sources of water pollution. Microbiology of waste water treatment, aerobic processes, activated sludge, oxidation ponds, trickling filters, and rotating biological contactors. Anaerobic processes: Anaerobic digesters, upward flow anaerobic sludge blanket reactors.

UNIT-II

Bioremediation

Biodegradation and Bioremediation – Concepts & principles of Bioremediation ,Bioremediation of Hydrocarbons and its applications Degradation of pesticides and other toxic chemicals by microorganism. Role of genetically Engineered microbes, Concept of Phytoremediation, , environmental safety guidelines.

UNIT III

Biofuels

Bio fuels-biogas, microbial groups involved in biogas production & interactions, factors affecting biogas production, Biofertilizers, Vermiculture. Introduction to nanotechnology and its apllications

Unit IV

Basic principles of Microbial technology

Industrially important microbes, its screening, selection and identification. Maintenance and preservation of industrially important microbial cultures. Strain Improvement, Basic concepts of fermentation; Design of fermenter and applications

Unit V

Commercial Production of Microbial products

Microbial technology products and applications; Microbial production of Organic acids (Lactic acid, citric acid), Amino acids (Glutamic acid, Aspartic acid and Lysine). Fermentation by microbes for food additives: dairy products (Cheese, Yogurt), beverages (Beer, Wine) and antibiotics (Streptomycin, Pencillin)

Student Learning Outcomes Students should be able to gain fundamental knowledge in animal and plant biotechnology and their applications.

ENVIRONMENTAL AND INDUSTRIAL BIOTECHNOLOGY -PRACTICALS

- Detection of coliforms for determination of the purity of potable water.
- Determination of total dissolved solids of water
- Determination of Hardness and alkalinity of water sample.
- Determination of dissolved oxygen concentration of water sample
- Determination of biological oxygen demand of sewage sample
- Determination of chemical oxygen demand (COD) of sewage sample.
- Isolation of industrially important microorganisms from soil.
- Isolation of amylase producing organisms from soil.
- Production of alcohol or wine using different substrates.
- Estimation of citric acid by titrimetry.

2023-24

Core papers

Semester-wise Revised Syllabus under CBCS,2020-21

Four Year B.Sc.

Domain subject: Biotechnology IV year B.Sc., - Semester-V

Course 6B Organic Farming

(Skill enhancement course (Elective), 05 credits)

Maximum Marks Theory: 100 + practical: 50

Learningoutcomes

Students after successful completion of the course will be able to

Understand the soil profile and nutrients insoil

Appreciate the importance of organic manure and biofertilizers

Produce vermi compost, farmyard manure from biowaste

Acquire skill on isolation and maintenance of biofertilizers

Syllabus: *(Total 90 hrs. (including Teaching, Lab, Field Training and unit testsetc.)*

UNIT -1-Soil: (10h)

Definition, soil formation, composition and characteristics. Types of soils. Distribution of soil groups in India. Acidic, Alkaline and heavy metal contaminated soil. Methods of reclamation. Effects of chemical dependant farming on yield and soil health.

UNIT-2 -Plant Nutrition (10h)

Macro and micro nutrients, functions of nutrients in plant growth and development. Nutrient uptake and utilization by plant. Types of fertilizers. Organic, inorganic and bio fertilizers. Chemical fertilizer. Advantages & disadvantages of their use. Importance of organic and bio fertilizers.

UNIT -3 -Organic Farming (10h)

Definition, concept, benefits. Integrated farming system (combination of organic and inorganic). Mixed farming system. Concept of different cropping systems in relation to organic farming, Inter cropping, crop rotation. Organic farming process. Organic fertilizers, crop nutrients and effective microorganisms in Organic farming.

UNIT- 4 -Organiccompost (10h)

Definition, types of compost, farm yard compost, green leaf compost, animal husbandry,animal housing, animal feeding, animal health, breeding goals.

Vermi compost: Introduction, vermi composting material, species of earthworms, small scale, large scale composting process. Vermi castings, harvesting, processing and drying. Nutrient content of vermi compost. Field application methods.

UNIT –5-Biofertilizers (10h)

Introduction, status and scope. Structure and characteristic features of bacterial bio fertilizers- *Azospirillum*, *Azotobacter*, *Bacillus*, *Pseudomonas*, *Rhizobium* and *Frankia*. Cynobacterial biofertilizers- *Anabaena*, *Nostoc*, *Hapalosiphon*and fungal biofertilizers- AM mycorrhiza and ectomycorrhiza. Mechanism of nitrogen fixation and phosphorus solubilizatio

2023-24

Core papers

Semester-wise Revised Syllabus under CBCS, 2020-21

Four Year B.Sc.

Domain subject: Biotechnology IV year B.Sc. -Semester-V

Course 7B: Bio fertilizers and Bio pesticidesproduction

(Skill enhancement course (Elective), 05 credits)

Maximum Marks Theory: 100 + practical:50

I. Learningoutcomes:

On successful completion of the practical course, student shall be able to

1. Understand the importance of bio fertilizers for sustainableagriculture.
2. Appreciate the role of VAM in Psolubilisation
3. Define bio pesticide and itsnature
4. Produce bio fertilizers and bio pesticides on largescale
5. Able to prepare inoculums for fieldapplication

Syllabus: (Total 90 hrs (including Teaching, Lab, Field Training and unit testsetc.)

UNIT -1-Biofertilizers **(10h)**

Introduction, history, concept, scope of bio fertilizers in India. Classification, microorganisms used as bio fertilizers. Bacterial, fungal and algal bio fertilizers. Symbiotic and a symbiotic microorganisms. Mechanism of nodulation and nitrogen fixation.

UNIT – 2- Mycorrhizalbiofertilizers (10h) Importance, types, characteristic features of ecto and endo mycorrhiza. Mechanism of phosphorus solubilisation. Uptake of phosphates by the roots. Consortium based inoculums andsignificance.

UNIT-3 -Bio pesticides **(10h)**

Definition, concept, history, scope and importance of bio pesticides.

Classification - botanicals, bacterial, fungal and viral based bio pesticides. Mechanism of action of Bacillus thuringiensis and Trichoderma viridae as bio control agents.

UNIT -4 - Massproductiontechniques **(10h)**

Media, types, preparation. Methods of isolation, streak plate, spread plate and pour plate techniques, purification and identification of microorganisms used as bio fertilizers and bio pesticides. Mass production and packing techniques.

UNIT- 5 - Field applicationmethods **(10h)**

Preparation of carrier-based inoculum. Sphagnum, peat, vermiculite as inoculums carriers. Dosage standardization. Seed treatment, foliar application, root dressing and soil application techniques. Storage and maintenance of inoculum.

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2023-24

I-Semester

Course:1 **INTRODUCTIONTOCLASSICALBIOLOGY**

Hours/Week:5 **Credits:4**

Unit1:Introductiontosystematics,taxonomyandecology.

1.1. Systematics–Definitionandconcept,Taxonomy–Definitionandhierarchy.

1.2. Nomenclature– ICBNandICZN,Binomialandtrinomialnomenclature.

1.3. Ecology–Conceptofecosystem,Biodiversityandconservation.

1.4. Pollutionandclimatechange.

Unit2:EssentialsofBotany.

2.1. Theclassificationofplant kingdom.

2.2. Plant physiological processes (Photosynthesis, Respiration, Transpiration, phytohormones).

2.3. Structureofflower–Microandmacrosporogenesis,pollination,fertilizationand structure of mono and dicot embryos.

2.4Mushroomcultivation, floriculture and landscaping.

Unit3:EssentialsofZoology

3.1.TheclassificationofKingdom AnimaliaandChordata.

3.2 AnimalPhysiology–BasicsofOrganSystems&theirfunctions,Hormonesand Disorders

3.3 DevelopmentalBiology–Basicprocessofdevelopment(Gametogenesis,Fertilization, Cleavage and Organogenesis)

3.4 EconomicZoology–Sericulture,Apiculture,Aquaculture

Unit4:Cellbiology,GeneticsandEvolution

4.1. Celltheory,Ultrastructureofprokaryoticandeukaryoticcell,cellcycle.

4.2. Chromosomesandheredity –Structureofchromosomes,conceptof gene.

4.3. CentralDogma ofMolecularBiology.

4.4. Originoflife

Unit5:Essentialsofchemistry

1.1. Definitionandscopeofchemistry,applicationsofchemistryindailylife.

1.2. Branchesofchemistry

1.3. Chemicalbonds–ionic,covalent,noncovalent–VanderWaals,hydrophobic, hydrogen bonds.

1.4. Greenchemistry

References

1. SharmaO.P.,1993.Planttaxonomy.2nd Edition.McGrawHillpublishers.
2. PandeyB.P.,2001.ThetextbookofbotanyAngiosperms.4th edition.S.Chand publishers, New Delhi, India.
3. JordanE.L.,VermaP.S.,2018.ChordateZoology.S.Chandpublishers,NewDelhi,India.
4. Rastogi,S.C.,2019.Essentialsofanimalphysiology.4th Edition.NewAgeInternational Publishers.
5. VermaP.S.,AgarwalV.K.,2006.Cellbiology,genetics,MolecularBiology,Evolution and Ecology. S. Chand publishers, New Delhi, India.
6. SatyanarayanaU.,Chakrapani,U.,2013.Biochemistry.4th Edition.Elsevierpublishers.
7. JainJ.L.,SunjayJain,NitinJain,2000.FundamentalsofBiochemistry.S.Chand publishers, New Delhi, India.
8. KarenTimberlake,WilliamTimberlake,2019.Basicchemistry.5th Edition.Pearson publishers.
9. SubrataSenGupta,2014.Organicchemistry.1st Edition.Oxfordpublishers.

ACTIVITIES:

1. Makeadisplay chartoflifecycleof nonfloweringplants.
2. Makeadisplay chartoflifecycleof floweringplants.
3. Studyofstomata

4. Activitytoprovethatchlorophyllisessentialforphotosynthesis
5. Studyofpollengrains.
6. Observationofpollengermination.
7. Ikebana.
8. Differentiatebetweenedibleandpoisonousmushrooms.
9. Visitanearbymushroomcultivationunitandknowtheeconomicsofmushroom cultivation.
10. DrawtheUltrastructure ofProkaryoticandEukaryoticCell
11. VisittoZoologyLabandobservedifferenttypesofpreservationofspecimens
12. Hands-onexperienceofvariousequipment–Microscopes,Centrifuge,pHMeter,

Electronic Weighing Balance, Laminar Air Flow

13. VisittoZoo/Sericulture/Apiculture/Aquacultureunit
14. Listoutdifferenthormonal,geneticandphysiologicaldisordersfromthesociety

I-Semester

2023-24

Botany

Course:2 INTRODUCTIONTOAPPLIEDBIOLOGY

Hours/Week:5 Credits:4

Unit1:EssentialsofMicrobiologyandImmunology

1.1. HistoryandMajorMilestonesofMicrobiology;ContributionsofEdwardJenner,Louis Pasteur, Robert Koch and Joseph Lister.

1.2. GroupsofMicroorganisms–StructureandcharacteristicsofBacteria,Fungi,Archaeaand Virus.

1.3. Applicationsofmicroorganismsin –Food,Agriculture,Environment,andIndustry.

1.4. Immunesystem–Immunity,typesofimmunity,cellsandorgansofimmunesystem.

Unit2:EssentialsofBiochemistry

2.1. BiomoleculesI–Carbohydrates,Lipids.

2.2. BiomoleculesII–Aminoacids&Proteins.

2.3. BiomoleculesIII–Nucleicacids-DNAandRNA.

2.4. BasicsofMetabolism–Anabolismandcatabolism.

Unit3:EssentialsofBiotechnology

3.1. History,scope,andsignificanceofbiotechnology.ApplicationsofbiotechnologyinPlant, Animal, Industrial and Pharmaceutical sciences.

3.2. EnvironmentalBiotechnology–BioremediationandBiofuels,Biofertilizersand Biopesticides.

3.3. Geneticengineering–Genemanipulationusingrestrictionenzymesand cloning

3.4. vectors;Physical,chemical,andbiologicalmethodsofgenetransfer.

3.5. Transgenicplants–Stresstolerantplants(bioticstress–BTcotton,abioticstress–salt tolerance). Transgenic animals – Animal and diseasemodels.

Unit4:AnalyticalToolsandtechniquesinbiology–Applications

4.1. Applicationsinforensics–PCRandDNAfingerprinting

4.2. Immunologicaltechniques– ImmunoblottingandELISA.

4.3. Monoclonalantibodies–Applicationsindiagnosisandtherapy.

4.4. EugenicsandGenetherapy

Unit5:BiostatisticsandBioinformatics

1.1. Datacollectionandsampling.Measuresofcentraltendency –Mean,Median,Mode.

1.2. Measuresofdispersion–range,standarddeviationandvariance.Probabilityandtestsof significance.

1.3. Introduction,Genomics,Proteomics,typesofBiologicaldata,biologicaldatabases-NCBI, EBI, Gen Bank; Protein 3D structures, Sequence alignment

1.4. AccessingNucleicAcidandProteindatabases,NCBIGenomeWorkbench

3. Reproduction- Asexual (Binary fission and endospores) and bacterial recombination (Conjugation, Transformation,Transduction).
4. Economic importance of Bacteria with reference to their role in Agriculture and industry (fermentation and medicine).
5. A general account on symptoms of plant diseases caused by Bacteria; Citrus canker.

Unit – 3: Fungi & Lichens **12 Hrs.**

1. General characteristics of fungi and Ainsworth classification (upto classes).
2. Structure, reproductionand life history of(a)*Rhizopus*(Zygomycota)and (b)*Puccinia* (Basidiomycota).
3. Economic uses of fungi in food industry, pharmacy and agriculture.
4. A general account on symptoms of plant diseases caused by Fungi; Blast of Rice.
5. Lichens- structure and reproduction; ecological and economic importance.

Unit – 4: Algae **12 Hrs.**

1. General characteristics of Algae (pigments, flagella and reserve food material);Fritsch classification (upto classes).
2. Thallus organization in Algae.
3. Occurrence, structure, reproduction and life cycle of (a) *Spirogyra* (Chlorophyceae) and (b) *Polysiphonia* (Rhodophyceae).
4. Economic importance of Algae.

Unit – 5:Bryophytes **12 Hrs.**

1. General characteristics of Bryophytes; classification upto classes.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life cycle of (a) *Marchantia* (Hepaticopsida) and (b) *Funaria*(Bryopsida).
3. General account on evolution of sporophytes in Bryophyta.

Unit – 2:Gymnosperms **14 Hrs.**

1. General characteristics of Gymnosperms; Sporneclassification uptoclasses.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of (a) *Cycas*(Cycadopsida) and (b) *Gnetum* (Gnetopsida).
3. Outlines of geological time scale.
4. A brief account on *Cycadeoidea.*

Unit – 3:Basic aspects of Taxonomy **13Hrs.**

1. Aim and scope of taxonomy; Species concept: Taxonomic hierarchy, species, genus and family.
2. Plant nomenclature: Binomial system, ICBN- rules for nomenclature.
3. Herbarium and its techniques,BSI herbarium and Kew herbarium; concept of digital herbaria.
4. Types of classification; Bentham and Hooker system of classification,
5. Systematic description and economic importance of the following families: (a) Annonaceae (b) Curcurbitaceae

Unit – 4: Systematic Taxonomy **13 Hrs.**

1. Systematic description and economic importance of the following families:
   (a) Asteraceae (b) Asclepiadaceae (c)Amaranthaceae(d) Euphorbiaceae
   (e) Arecaceae (f) Poaceae
2. Outlines of Angiosperm Phylogeny Group (APG IV).

Unit – 5:Phytogeography **08 Hrs.**

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)
2. Endemism – types and causes.
3. Phytogeographic regions of World.
4. Phytogeographic regions of India.
5. Vegetation types in Andhra Pradesh.

2023-24

Core papers

III **Semester /Botany CoreCourse - 3**

Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity

(Total hours of teaching – 60 @ 04 Hrs./Week)

Theory:

Learning outcomes:

On successful completion of this course, thestudents will be able to;

- Understand on the organization of tissuesand tissue systems in plants.
- Illustrate and interpret various aspects of embryology.
- Discuss the basic concepts of plant ecology, andevaluate the effects of environmental and biotic factors on plant communities.
- Appraise various qualitative and quantitative parameters to study the population and community ecology.
- Correlate theimportance of biodiversity and consequences due to its loss.
- Enlistthe endemic/endangered flora and fauna from two biodiversity hot spots in India and assess strategies for their conservation.

Unit – 1: Anatomy of Angiosperms **12 Hrs.**

1. Organization of apical meristems: Tunica-carpus theory and Histogen theory.
2. Tissue systems–Epidermal, ground and vascular.
3. Anomalous secondary growth in *Boerhaavia* and *Dracaena.*
4. Study of timbers of economic importance - Teak, Red sanders and Rosewood.

Unit – 2: Embryology of Angiosperms **12 Hrs.**

1. Structure of anther, anther wall, types of tapetum. Microsporogenesis and development of male gametophyte.
2. Structure of ovule, megasporogenesis; monosporic (*Polygonum*), bisporic (*Allium*) and tetrasporic (*Peperomia*) types of embryo sacs.
3. Outlines of pollination, pollen – pistil interaction and fertilization.
4. Endosperm - Types and biological importance - Free nuclear, cellular,helobialand ruminate.
5. Development of Dicot (*Capsella bursa-pastoris*) embryo.

Unit – 3: Basics of Ecology **12 Hrs.**

1. Ecology: definition, branches and significance of ecology.
2. Ecosystem: Concept and components, energy flow, food chain, food web, ecologicalpyramids.
4. Plants and environment: Climatic (light and temperature), edaphic and biotic factors.
5. Ecological succession:Hydrosere and Xerosere.

Unit – 4:Population, Community and Production Ecology **12 Hrs.**

1. Population ecology: Natality, mortality, growth curves, ecotypes, ecads
2. Community ecology: Frequency, density, cover, life forms, biological spectrum
3. Concepts of productivity: GPP, NPP and Community Respiration
4. Secondary production, P/R ratio.

Unit – 5:Basics of Biodiversity **12 Hrs.**

1. Biodiversity: Basic concepts, Convention on Biodiversity - Earth Summit.
2. Value of Biodiversity; types and levels of biodiversity and Threats to biodiversity

3. Biodiversity Hot spots in India.Biodiversity in North Eastern Himalayas and Western Ghats.

4. Principles of conservation: IUCN threat-categories, RED data book
5. Role of NBPGR and NBA in the conservation of Biodiversity.

2022-23

Core papers

IV Semester/ BotanyCore Course – 4

Plant Physiology and Metabolism

(Total hours of teaching – 60 @ 04 Hrs./Week)

Theory:

Learning outcomes:

On successful completion of this course,the students will be able to;

- Comprehendthe importance of water in plant life and mechanisms for transport of water and solutes in plants.
- Evaluate the role of minerals in plant nutrition and their deficiency symptoms.
- Interpret the role of enzymes in plant metabolism.
- Critically understand the light reactions and carbon assimilation processes responsible for synthesis of foodin plants.
- Analyze the biochemical reactions in relation to Nitrogen and lipid metabolisms.
- Evaluate the physiological factors that regulategrowth and development in plants.
- Examine the role of light on flowering and explain physiology of plants under stress conditions.

Unit – 1: Plant-Water relations **10 Hrs.**

1. Importance of water to plant life, physical properties of water, diffusion, imbibition, osmosis. Water potential, osmotic potential, pressure potential.
2. Absorption and lateral transport of water; Ascent of sap
3. Transpiration: stomata structure and mechanism of stomatal movements (K^+ ion flux).
4. Mechanism of phloem transport; source-sink relationships.

Unit – 2: Mineral nutrition, Enzymes and Respiration 14 Hrs.

1. Essential macro and micro mineral nutrients and their role in plants; symptoms of mineral deficiency
2. Absorption of mineral ions; passive and active processes.
3. Characteristics, nomenclature and classification of Enzymes. Mechanism of enzyme action, enzyme kinetics.
4. Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, mechanism of oxidative phosphorylation, Pentose Phosphate Pathway (HMP shunt).

Unit – 3: Photosynthesis and Photorespiration 12 Hrs.

1. Photosynthesis: Photosynthetic pigments, absorption and action spectra; Red drop and Emerson enhancement effect
2. Concept of two photosystems; mechanism of photosynthetic electron transport and evolution of oxygen; photophosphorylation
3. Carbon assimilation pathways (C3,C4 and CAM);
4. Photorespiration - C2 pathway

Unit – 4: Nitrogen and lipid metabolism 12 Hrs.

1. Nitrogen metabolism: Biological nitrogen fixation – asymbiotic and symbiotic nitrogen fixing organisms. Nitrogenase enzyme system.
2. Lipid metabolism: Classification of Plant lipids, saturated and unsaturated fatty acids.
3. Anabolism of triglycerides, β-oxidation of fatty acids, Glyoxylate cycle.

Unit – 5: Plant growth - development and stress physiology 12 Hrs.

1. Growth and Development: Definition, phases and kinetics of growth.
2. Physiological effects of Plant Growth Regulators (PGRs) - auxins, gibberellins, cytokinins, ABA, ethylene and brassinosteroids.
3. Physiology of flowering:Photoperiodism, role of phytochrome in flowering.
4. Seed germination and senescence; physiological changes.

2023-24

Core papers

IV Semester / BotanyCoreCourse –5

Cell Biology, Genetics and Plant Breeding

(Total hours of teaching – 60 @ 04 Hrs./Week)

Theory:

Learning outcomes:

On successful completion of this course,the students will be able to:

- Distinguish prokaryotic and eukaryotic cells and design the model of a cell.
- Explain the organization of a eukaryotic chromosomeand the structure of genetic material.
- Demonstrate techniques to observe the cell and its componentsunder a microscope.
- Discuss the basics of Mendelian genetics, its variations and interpret inheritance of traits in living beings.
- Elucidate the role of extra-chromosomal genetic material for inheritance of characters.
- Evaluate the structure, function and regulation of genetic material.
- Understand the application of principles and modern techniques inplant breeding.
- Explain the procedures of selection and hybridization for improvement of crops.

Unit – 1: The Cell **12 Hrs.**

1. Cell theory; prokaryotic vs eukaryotic cell;animal vs plant cell; a brief account on ultra-structure of a plant cell.
2. Ultra-structure of cell wall.
3. Ultra-structure of plasma membrane and various theories on its organization.
4. Polymorphic cell organelles (Plastids); ultrastructure of chloroplast. Plastid DNA.

Unit – 2: Chromosomes **12 Hrs.**

1. Prokaryotic vs eukaryotic chromosome. Morphology of a eukayotic chromosome.
2. Euchromatin and Heterochromatin; Karyotype and ideogram.
3. Brief account of chromosomal aberrations - structural and numerical changes
4. Organization of DNA in a chromosome (solenoid and nucleosome models).

Unit – 3:Mendelian and Non-Mendelian genetics **14Hrs.**

1. Mendel's laws of inheritance. Incomplete dominance and co-dominance; Multiple allelism.
2. Complementary, supplementary and duplicate gene interactions (plant based examples are to be dealt).
3. A brief account of linkage and crossing over; Chromosomal mapping - 2 point and 3 point test cross.
4. Concept of maternal inheritance (Corren's experiment on *Mirabilis jalapa*); Mitochondrial DNA.

Unit – 4:Structure and functions of DNA **12 Hrs.**

1. Watson and Crick model of DNA. Brief account on DNA Replication (Semi-conservative method).
2. Brief account on Transcription, types and functions of RNA. Gene concept and genetic code and Translation.
3. Regulation of gene expression in prokaryotes - Lac Operon.

Unit – 5:Plant Breeding **12 Hrs.**

1. Plant Breeding and its scope; Genetic basis for plant breeding. Plant Introduction and acclimatization.
2. Definition, procedure; applications and uses; advantages and limitations of :(a) Mass selection, (b) Pure line selection and (c) Clonal selection.
3. Hybridization – schemes, and technique; Heterosis(hybrid vigour).
4. A brief account on Molecular breeding – DNA markers in plant breeding. RAPD, RFLP.

THREE YEAR UG, B.Sc. DEGREE
Domain Subject: **BOTANY**
III Year B. Sc.– Semester – V

Course 6C: PLANT TISSUE CULTURE

(Skill Enhancement Course (Elective), Credits: 03

Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Comprehend the basic knowledge and applications of plant tissue culture.
2. Identify various facilities required to set up a plant tissue culture laboratory.
3. Acquire a critical knowledge on sterilization techniques related to plant tissue culture.
4. Demonstrate skills of callus culture through hands on experience.
5. Understand the biotransformation technique for production of secondary metabolites.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Field training: 05, others incl. unit tests: 05) (Syllabi of theory, practical and lab (skills) training together shall be completed in 80 hours)

Unit - 1: Basic concepts of plant tissue culture (10h)

1. Plant tissue culture: Definition, history, scope and significance.
2. Totipotency, differentiation, dedifferentiation, and redifferentiation; types of cultures.
3. Infrastructure and equipment required to establish a tissue culture laboratory.

Unit - 2: Sterilization techniques and culture media (10h)

1. Aseptic conditions – Fumigation, wet and dry sterilization, UV sterilization, ultrafiltration.
2. Nutrient media: Composition of commonly used nutrient culture media with respect to their contents like inorganic chemicals, organic constituents, vitamins, amino acids etc.
3. Composition and preparation of Murashige and Skoog culture medium.

Unit - 3: Callus culture technique (10h)

1. Explant: Definition, different explants for tissue culture: shoot tip, axillary buds, leaf discs, cotyledons, inflorescence and floral organs, their isolation and surface sterilization; inoculation methods.
2. Callus culture: Definition, various steps in callus culture.
3. Initiation and maintenance of callus - Growth measurements and subculture; soma clonal variations.

Unit – 4: Micropropagation (10h)

1. Direct and indirect morphogenesis, organogenesis,role of PGRs; somatic embryogenesis and synthetic seeds.
2. Greenhouse hardening unit operation and management; acclimatization and hardening of plantlets - need, process, packaging, exports.
3. Pathogen (Virus) indexing- significance, methods, advantages, applications.

Unit – 5: Applications of plant tissue culture (10h)

1. Germplasm conservation: cryopreservation methods, slow growth, applications and limitations; cryoprotectants.
2. Plant transformation techniques and bioreactors; production of secondary metabolites-optimization of yield, commercial aspects, applications, limitations.
3. Transgenic plants- gene transfer methods; BT cotton.

1. *Kalyan Kumar De (2001) An Introduction to Plant Tissue Culture, New Central Book Agency (P) Ltd., Calcutta*
2. *Razdan, M.K. (2005) Introduction to Plant Tissue Culture, Oxford & IBH Publishers, Delhi*
3. *Bhojwani, S.S. (1990) Plant Tissue Culture: Theory and Practical (a revised edition). Elsevier Science Publishers, New York, USA.*
4. *Vasil, I.K. and Thorpe, T.A. (1994) Plant Cell and Tissue Culture. Kluwer Academic Publishers, the Netherlands.*
5. *Web resources suggested by the teacher concerned and the college librarian including reading material*

2023-24

Core p1apers

Semester-wise Revised Syllabus under CBCS, 2022-23

Course Code: *Max Marks: 75*

THREE YEAR UG, B.Sc. DEGREE
Domain Subject: **BOTANY**
III Year B. Sc.– Semester – V

Course 7C: Mushroom Cultivation

Skill enhancement course (Elective) Credits: 03

Learning out comes:

1. Understand the structure and life of a mushroom and discriminate edible and Poisonous Mushrooms.
2. Identify the basic infrastructure to establish a mushroom unit.
3. Demonstrate skills for preparation of compost and span.
4. Quire a critical knowledge on cultivation of some edible mushrooms.
5. Explain the methods of storage, preparation of value -added products and marketing.

Unit – 1: Introduction and value of mushrooms (10h)

1. Mushrooms: Definition, structure of a mushroom and a brief account of life cycle; historical account and scope of mushroom cultivation; difference between edible and poisonous mushrooms.
2. Morphological features of any four edible mushrooms; Button mushroom (*Agaricus bisporus*), Milky mushroom (*Calocybe indica*), Oyster mushroom (*Pleurotus sajor-caju*) and Paddy straw mushroom (*Volvariella volvacea*).
3. Nutraceutical value of mushrooms; medicinal mushrooms in South India - *Ganoderma lucidum, Phellinus rimosus, Pleurotus florida and Pleurotus pulmonaris* – their therapeutic value; Poisonous mushrooms - harmful effects.

Unit – 2: Basic requirements for cultivation system (10h)

1. Small village unit and larger commercial unit; layout of a mushroom farm - location of building plot, design of farm, bulk chamber, composting, equipment and facilities, pasteurization room and growing rooms.
2. Compost and composting: Definition, machinery required for compost making, materials for compost preparation.
3. Methods of composting- long method of composting and short method of composting.

Unit – 3: Spawning and casing (10h)

1. Spawn and spawning: Definition, facilities required for spawn preparation; preparation of spawn substrate.

2. Preparation of pure culture, media used in raising pure culture; culture maintenance, storage of spawn.
3. Casing: Definition, Importance of casing mixture, Quality parameters of casing soil, different types of casing mixtures, commonly used materials.

Unit – 4: Mushroom cultivation (10h)

Raw material, compost, spawning, casing, cropping, and problems in cultivation (diseases, pests and nematodes, weed molds and their management strategies), picking and packing for any Four of the following mushrooms:

(a) Button mushroom (b) Oyster mushroom (c) Milky mushroom and (d) Paddy straw mushroom

Unit – 5: marketing & Post harvest technology (10h)

1. Shelf life of mushrooms; preservation of mushrooms - freezing, dry freezing, drying and canning.
2. Quality assurance and entrepreneurship - economics of different types of mushrooms; value added products of mushrooms.
3. Management of spent substrates and waste disposal of various mushrooms.

2023-24

Core papers

Electronics

2022-23

Core papers

Core papers
Electronics

B.Sc. Electronics CBCS SYLLABUS3rd.YEAR
V SEMESTER

INDUSTRIAL ELECTRONIC

SKR & SKR GOVT. COLLEGE FOR WOMEN (A), KADAPA

Semester-wise Revised Syllabus under CBCS, 2020-21 Four Year B.Sc.
Domain Subject: **ELECTRONICS**
IV Year B.Sc., - Semester – V
Course 6A: Industrial Electronics
(Skill Enhancement Course (Elective), 3+2 Credits) Max. Marks: Theory:100 + Practical:50

I. Learning Outcomes: Students after successful completion of the course will be able to:
1. Identify various facilities required to set up a basic Instrumentation Laboratory.
2. Acquire a critical knowledge of various Electrical Instruments used in the Laboratory.
3. Demonstrate skills in using instruments like Rectifiers, Multimeters, Power supplies, Voltage Regulators etc. through hands-on experience.
4. Understand the Principle and operation of different Electronic Heating devices.

***II.* Syllabus:** *(Total Hours: 90 including Teaching, Lab, Field Training, Unit tests etc.)*

Syllabus:

UNIT-I (20 hours)

Rectifiers and filters: Rectifiers– Half wave, full-wave and bridge rectifiers- Efficiency- Ripple factor- Regulation– Types of filters- Choke input (inductor) filter- Shunt capacitor filter- L section and section filters.

Voltage Regulators: Transistor Series voltage regulator - Transistor Shunt voltage regulator – Three terminal regulators (78XX and 79XX).

UNIT-II (10 hours)

Power Supplies: Block diagram of regulated power supply – A simple regulated transistorized power supply, IC regulated power supply (circuit and working) – Principle and working of switch mode power supply (SMPS).

UNIT-III (10 hours)

Voltage Multipliers: Half wave voltage doubler, Full wave voltage doubler, Voltage Tripler circuit diagram and working mentioning of applications of voltage multipliers.

UNIT-IV (10 hours)

Controlled rectifiers: SCR Half wave rectifier circuit, working with wave forms, mathematical analysis for resistive load - SCR Full wave rectifier circuit, working with wave forms, mathematical analysis for resistive load – SCR as inverter parallel and series circuits.

UNIT-V (10 hours)

Heat effects: Resistance, inductance and dielectric heating. Principle of operations and its applications.

Reference Books:

1. 1. Electronic Instrumentation by H.S.Kalsi , TMH Publishers
2. Electronic Instrument Hand Book by Clyde F. Coombs , McGraw Hill
3. Introduction to Biomedical Instrumentation byMandeep Singh, PHI Learning.
4. Biomedical Instrumentation and Measurements by Leslie Cromwell ,Prentice HallIndia.
5. Electronic Measurements and Instrumentation by Kishor, K Lal, Pearson, New Delhi

SKR & SKR GOVT. COLLEGE FOR WOMEN (A), KADAPA

Semester-wise Revised Syllabus under CBCS, 2020-21 Four Year B.Sc.
Domain Subject: **ELECTRONICS**
IV Year B.Sc., - Semester – V
Course 6A: Industrial Electronics
(Skill Enhancement Course (Elective), 3+2 Credits) Max. Marks: Theory:100 + Practical:50

I. Learning Outcomes: Students after successful completion of the course will be able to:

1. Identify various facilities required to set up a basic Instrumentation Laboratory.
2. Acquire a critical knowledge of various Electrical Instruments used in the Laboratory.
3. Demonstrate skills in using instruments like Rectifiers, Multimeters, Power supplies, Voltage Regulators etc. through hands-on experience.
4. Understand the Principle and operation of different Electronic Heating devices.

***II.* Syllabus:** *(Total Hours: 90 including Teaching, Lab, Field Training, Unit tests etc.)*

Syllabus:

UNIT-I (20 hours)

Rectifiers and filters: Rectifiers– Half wave, full-wave and bridge rectifiers- Efficiency- Ripple factor- Regulation– Types of filters- Choke input (inductor) filter- Shunt capacitor filter- L section and section filters.

Voltage Regulators: Transistor Series voltage regulator - Transistor Shunt voltage regulator – Three terminal regulators (78XX and 79XX).

UNIT-II (10 hours)

Power Supplies: Block diagram of regulated power supply – A simple regulated transistorized power supply, IC regulated power supply (circuit and working) – Principle and working of switch mode power supply (SMPS).

UNIT-III (10 hours)

Voltage Multipliers: Half wave voltage doubler, Full wave voltage doubler, Voltage Tripler circuit diagram and working mentioning of applications of voltage multipliers.

UNIT-IV (10 hours)

Controlled rectifiers: SCR Half wave rectifier circuit, working with wave forms, mathematical analysis for resistive load - SCR Full wave rectifier circuit, working with wave forms, mathematical analysis for resistive load – SCR as inverter parallel and series circuits.

UNIT-V (10 hours)

Heat effects: Resistance, inductance and dielectric heating. Principle of operations and its applications.

Reference Books:

1. 1. Electronic Instrumentation by H.S.Kalsi , TMH Publishers
2. Electronic Instrument Hand Book by Clyde F. Coombs , McGraw Hill
3. Introduction to Biomedical Instrumentation byMandeep Singh, PHI Learning.
4. Biomedical Instrumentation and Measurements by Leslie

2023-24

Core papers
Electronics

B.Sc. Electronics CBCS SYLLABUS3rd.YEAR
V SEMESTER

ELECTRONICINSTRUMENTATION

INSTRUMENTATION OBJECTIVES:

UNIT-I (10hrs)

Measurements:

Basic block diagram of measurement system, Accuracy and precision, resolution, sensitivity, linearity, Errors, systematic and random errors, standards &calibrations of an instrument.

Applications of instrument

UNIT –II (10hrs)

Basic Measurement Instruments: DC measurement-ammeter, voltmeter, ohm meter, AC measurement, Digital voltmeter systems (integrating and non-integrating). Digital Multimeter; Block diagram principle of measurement of I, V, C. Accuracy and resolution of measurement.

Measurement of Impedance- A.C. bridges, Measurement of Self Inductance (Anderson's bridge), Measurement of Capacitance (De Sauty bridge), Measurement of frequency (Wien's bridge).

UNIT-III (15hrs)

Lock-in-amplifier: Basic Principles of phase locked loop (PLL), Phase detector (XOR& edge triggered), Voltage Controlled Oscillator (Basics, varactor), lock and capture. Basic idea of PLL IC (565 or 4046). Lock-in-amplifier, Idea of techniques for sum and averaging of signals.

Signal Generators: Function generator, Pulse Generator, (Qualitative only).

UNIT-IV (15hrs)

Analytical instruments

Spectrophotometer, working with block diagram, features of spectrophotometer,

P_H meter - principle working with block diagram, features of P_H meter.

TEMPERATURE TRANSDUCERS

Standards and calibration, Fluid expansion and metal expansion type transducers, like bimetallic strip, Thermometer, RTD, Thermo couple and their characteristics.

UNIT-V : (10hrs)

Direct digital control (DDC), Distributed control system (DCS),

PLC'S: Block diagram, hardware, PLC operation, basic logic program (ladder logic), Applications of PLC'S

TEXT BOOKS

1,Introduction to instrumentation and control
By A.K.Ghosh 2.Sensors and transducers PHI
2Ed By D.Patranabis

Physics Syllabus

2023-24

SEMESTER-I

COURSE 1: ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL ANDCHEMICAL SCIENCES

Theory Credits: 4 5 hrs/week

Course Objective:

The objective of this course is to provide students with a comprehensive understanding of the essential concepts and applications of mathematical, physical, and chemical sciences. The course aims to develop students' critical thinking, problem-solving, and analytical skills in these areas, enabling them to apply scientific principles to real-world situations.

Learning outcomes:

1. Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.

2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations

3. To Explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to Connect their knowledge of chemistry to daily life.

4. Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.

5 To explore the history and evolution of the Internet and to gain an understanding of network security concepts, including threats, vulnerabilities, and countermeasures.

UNIT I: ESSENTIALS OF MATHEMATICS:

Complex Numbers: Introduction of the new symbol i – General form of a complex number – Modulus-Amplitude form and conversions

Trigonometric Ratios: Trigonometric Ratios and their relations – Problems on calculation of angles**Vectors:** Definition of vector addition – Cartesian form – Scalar and vector product and problems **Statistical Measures**: Mean, Median, Mode of a data and problems

UNIT II: ESSENTIALS OF PHYSICS:

Definition and Scope of Physics- Measurements and Units - Motion of objects: Newtonian Mechanics and relativistic mechanics perspective - Laws of Thermodynamics and Significance- Acoustic waves and electromagnetic waves- Electric and Magnetic fields and their interactions- Behaviour of atomic and nuclear particles- Wave-particle duality, the uncertainty principle- Theories and understanding of universe

UNIT III: ESSENTIALS OF CHEMISTRY: :

Definition and Scope of Chemistry- Importance of Chemistry in daily life -Branches of chemistry and significance- Periodic Table- Electronic Configuration, chemical changes, classification of matter, Biomolecules- carbohydrates, proteins, fats and vitamins.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY:

Applications of Mathematics in Physics & Chemistry: Calculus , Differential Equations & Complex Analysis

Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, Automotive and Aerospace Industries, Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies.

Application of Chemistry in Industry and Technology: Chemical Manufacturing, Pharmaceuticals and Drug Discovery, Materials Science, Food and Beverage Industry.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

Milestones of computer evolution - Internet, history, Internet Service Providers, Types of Networks, IP, Domain Name Services, applications.
Ethical and social implications: Network and security concepts- Information Assurance Fundamentals, Cryptography-Symmetric and Asymmetric, Malware, Firewalls, Fraud Techniques- Privacy and Data Protection

Recommended books:

1. Functions of one complex variable by John.B.Conway, Springer- Verlag.
2. Elementary Trigonometry by H.S.Hall and S.R.Knight
3. Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. Basic Statistics by B.L.Agarwal, New age international Publishers
5. University Physics with Modern Physics by Hugh D. Young and Roger A. Freedman
6. Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker
7. Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway and John W. Jewett Jr.
8. Physics for Technology and Engineering" by John Bird
9. Chemistry in daily life by Kirpal Singh
10. Chemistry of bio molecules by S. P. Bhutan
11. Fundamentals of Computers by V. Raja Raman
12. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

STUDENT ACTIVITIES

UNIT I: ESSENTIALS OF MATHEMATICS:

1: Complex Number Exploration

Provide students with a set of complex numbers in both rectangular and polar forms.

They will plot the complex numbers on the complex plane and identify their properties

2: Trigonometric Ratios Problem Solving

Give students a set of problems that require the calculation of trigonometric ratios and their relations.

Students will solve the problems using the appropriate trigonometric functions (sine, cosine, tangent, etc.) and trigonometric identities.

3: Vector Operations and Applications

Provide students with a set of vectors in Cartesian form.

Students will perform vector addition and subtraction operations to find the resultant vectors.

They will also calculate the scalar and vector products of given vectors.

4: Statistical Measures and Data Analysis

Give students a dataset containing numerical values.

Students will calculate the mean, median, and mode of the data, as well as other statistical measures if appropriate (e.g., range, standard deviation).
They will interpret the results and analyze the central tendencies and distribution of the data.

UNIT II: ESSENTIALS OF PHYSICS:

1. Concept Mapping

Divide students into groups and assign each group one of the topics.

Students will create a concept map illustrating the key concepts, relationships, and applications related to their assigned topic.

Encourage students to use visual elements, arrows, and labels to represent connections and interdependencies between concepts.

2. Laboratory Experiment

Select a laboratory experiment related to one of the topics, such as motion of objects or electric and magnetic fields.
Provide the necessary materials, instructions, and safety guidelines for conducting the experiment.
Students will work in small groups to carry out the experiment, collect data, and analyze the results.

After the experiment, students will write a lab report summarizing their findings, observations, and conclusions.

UNIT III: ESSENTIALS OF CHEMISTRY

1: Chemistry in Daily Life Presentation

Divide students into groups and assign each group a specific aspect of daily life where chemistry plays a significant role, such as food and nutrition, household products, medicine,or environmental issues.
Students will research and create a presentation (e.g., PowerPoint, poster, or video) that showcases the importance of chemistry in their assigned aspect.
2: Periodic Table Exploration

Provide students with a copy of the periodic table.

Students will explore the periodic table and its significance in organizing elements based on their properties.
They will identify and analyze trends in atomic structure, such as electronic configuration, atomic size, and ionization energy.

3: Chemical Changes and Classification of Matter

Provide students with various substances and chemical reactions, such as mixing acids and bases or observing a combustion reaction.
Students will observe and describe the chemical changes that occur, including changes in color, temperature, or the formation of new substances.
4: Biomolecules Investigation

Assign each student or group a specific biomolecule category, such as carbohydrates,proteins, fats, or vitamins.
Students will research and gather information about their assigned biomolecule category, including its structure, functions, sources, and importance in the human body.

They can create informative posters or presentations to present their findings to the class.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

1: Interdisciplinary Case Studies

Divide students into small groups and provide them with interdisciplinary case studies that involve the interdisciplinary application of mathematics, physics, and chemistry.

Each case study should present a real-world problem or scenario that requires the integration of concepts from all three disciplines.

2: Design and Innovation Project

Challenge students to design and develop a practical solution or innovation that integrates mathematics, physics, and chemistry principles.

Students can choose a specific problem or area of interest, such as renewable energy, environmental conservation, or materials science.
3: Laboratory Experiments

Assign students laboratory experiments that demonstrate the practical applications of

mathematics, physics, and chemistry.

Examples include investigating the relationship between concentration and reaction rate, analyzing the behavior of electrical circuits, or measuring the properties of materials.

.4: Mathematical Modeling

Present students with real-world problems that require mathematical modeling and analysis.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

1. Identifying the attributes of network (Topology, service provider, IP address and bandwidth of
2. your college network) and prepare a report covering network architecture.
3. Identify the types of malwares and required firewalls to provide security.
4. Latest Fraud techniques used by hackers.

SEMESTER-I

COURSE 2: ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Theory Credits: 4 5 hrs/week

Course Objective:

The objective of this course is to provide students with an in-depth understanding of the recent advances and cutting-edge research in mathematical, physical, and chemical sciences. The course aims to broaden students' knowledge beyond the foundational concepts and expose them to the latest developments in these disciplines, fostering critical thinking, research skills, and the ability to contribute to scientific advancements.

Learning outcomes:

1. Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems.

2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations.

3. Understand the different sources of renewable energy and their generation processes and advances in nanomaterials and their properties, with a focus on quantum dots. To study the emerging field of quantum communication and its potential applications. To gain an understanding of the principles of biophysics in studying biological systems. Explore the properties and applications of shape memory materials.

3. Understand the principles and techniques used in computer-aided drug design and drug delivery systems, to understand the fabrication techniques and working principles of nanosensors. Explore the effects of chemical pollutants on ecosystems and human health.

4. Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.

5 Understand and convert between different number systems, such as binary, octal, decimal, and hexadecimal. Differentiate between analog and digital signals and understand their characteristics.Gain knowledge of different types of transmission media, such as wired (e.g., copper cables, fiber optics) and wireless (e.g., radio waves, microwave, satellite)..

UNIT I: ADVANCES IN BASICS MATHEMATICS

Straight Lines: Different forms – Reduction of general equation into various forms – Point ofintersection of two straight lines

Limits and Differentiation: Standard limits – Derivative of a function –Problems on product ruleand quotient rule

Integration: Integration as a reverse process of differentiation – Basic methods of integration

Matrices: Types of matrices – Scalar multiple of a matrix – Multiplication of matrices – Transpose ofa matrix and determinants

UNIT II: ADVANCES IN PHYSICS:

Renewable energy: Generation, energy storage, and energy-efficient materials and devices. **Recent advances in the field of nanotechnology**: Quantum dots, Quantum Communication- recent advances in biophysics- recent advances in medical physics- Shape Memory Materials.

UNIT III: ADVANCES IN CHEMISTRY:

Computer aided drug design and delivery, nano sensors, Chemical Biology, impact of chemical pollutants on ecosystems and human health, Dye removal - Catalysis method

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

Mathematical Modelling applications in physics and chemistry

Application of Renewable energy: Grid Integration and Smart Grids,

Application of nanotechnology: Nanomedicine,

Application of biophysics: Biophysical Imaging, Biomechanics, Neurophysics,

Application of medical physics: Radiation Therapy, Nuclear medicine

Solid waste management, Environmental remediation- Green Technology, Water treatment.

UNIT V: Advanced Applications of computer Science

Number System-Binary, Octal, decimal, and Hexadecimal, Signals-Analog, Digital, Modem, Codec, Multiplexing, Transmission media, error detection and correction- Parity check and CRC, Networking devices- Repeater, hub, bridge, switch, router, gateway.

Recommended books:

1. Coordinate Geometry by S.L.Lony, Arihant Publications
2. Calculus by Thomas and Finny, Pearson Publications
3. Matrices by A.R.Vasishtha and A.K.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. "Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle
5. "Energy Storage: A Nontechnical Guide" by Richard Baxter
6. "Nanotechnology: Principles and Applications" by Sulabha K. Kulkarni and Raghvendra A. Bohara
7. "Biophysics: An Introduction" by Rodney Cotterill
8. "Medical Physics: Imaging" by James G. Webster
9. "Shape Memory Alloys: Properties and Applications" by Dimitris C. Lagoudas
10. Nano materials and applications by M.N.Borah

11. Environmental Chemistry by Anil.K.D.E.

12. Digital Logic Design by Morris Mano

13. Data Communication & Networking by Bahrouz Forouzan.

STUDENT ACTIVITIES

UNIT I: ADVANCES IN BASIC MATHEMATICS

1: Straight Lines Exploration

Provide students with a set of equations representing straight lines in different forms, suchas slope-intercept form, point-slope form, or general form.

Students will explore the properties and characteristics of straight lines, including theirslopes, intercepts, and point of intersection.

2: Limits and Differentiation Problem Solving

Students will apply the concept of limits to solve various problems using standard limits.

Encourage students to interpret the results and make connections to real-world applications,such as analyzing rates of change or optimizing functions.

3: Integration Exploration

Students will explore the concept of integration as a reverse process of differentiation andapply basic methods of integration, such as the product rule, substitution method, or integration by parts.

Students can discuss the significance of integration in various fields, such as physics andchemistry

4: Matrices Manipulation

Students will perform operations on matrices, including scalar multiplication, matrixmultiplication, and matrix transpose.

Students can apply their knowledge of matrices to real-world applications, such as solvingsystems of equations or representing transformations in geometry.

UNIT II: ADVANCES IN PHYSICS:

1: Case Studies

Provide students with real-world case studies related to renewable energy, nanotechnology,biophysics, medical physics, or shape memory materials.

Students will analyze the case studies, identify the challenges or problems presented, andpropose innovative solutions based on the recent advances in the respective field.

They will consider factors such as energy generation, energy storage, efficiency, sustainability, materials design, biomedical applications, or technological advancements.

2: Experimental Design

Assign students to design and conduct experiments related to one of the topics: renewableenergy, nanotechnology, biophysics, medical physics, or shape memory materials.

They will identify a specific research question or problem to investigate and design anexperiment accordingly.

Students will collect and analyze data, interpret the results, and draw conclusions based ontheir findings.

They will discuss the implications of their experimental results in the context of recentadvances in the field.

3: Group Discussion and Debate

Organize a group discussion or debate session where students will discuss the ethical, social, and environmental implications of the recent advances in renewable energy, nanotechnology, biophysics, medical physics, and shape memory materials.

Assign students specific roles, such as proponent, opponent, or moderator, and provide them with key points and arguments to support their positions.

UNIT III: ADVANCES IN CHEMISTRY:

1. Experimental Design and Simulation

In small groups, students will design experiments or simulations related to the assigned topic.

For example, in the context of computer-aided drug design, students could design a virtualscreening experiment to identify potential drug candidates for a specific disease target.

For nano sensors, students could design an experiment to demonstrate the sensitivity andselectivity of nano sensors in detecting specific analytes.
Chemical biology-related activities could involve designing experiments to study enzyme-substrate interactions or molecular interactions in biological systems.
Students will perform their experiments or simulations, collect data, analyze the results, and draw conclusions based on their findings.

2. Case Studies and Discussion

Provide students with real-world case studies related to the impact of chemical pollutants onecosystems and human health.
Students will analyze the case studies, identify the sources and effects of chemical pollutants,and propose mitigation strategies to minimize their impact.

Encourage discussions on the ethical and environmental considerations when dealing withchemical pollutants.
For the dye removal using the catalysis method, students can explore case studies wherecatalytic processes are used to degrade or remove dyes from wastewater.

Students will discuss the principles of catalysis, the advantages and limitations of thecatalysis method, and its applications in environmental remediation.
3: Group Project

Assign students to work in groups to develop a project related to one of the topics.

The project could involve designing a computer-aided drug delivery system, developing anano sensor for a specific application, or proposing strategies to mitigate the impact of chemical pollutants on ecosystems.
Students will develop a detailed project plan, conduct experiments or simulations, analyzedata, and present their findings and recommendations.
Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS &CHEMISTRY
1: Mathematical Modelling Experiment

Provide students with a mathematical modelling experiment related to one of the topics. Forexample, in the context of renewable energy, students can develop a mathematical model tooptimize the placement and configuration of solar panels in a solar farm.
Students will work in teams to design and conduct the experiment, collect data, and analyzethe results using mathematical models and statistical techniques.
They will discuss the accuracy and limitations of their model, propose improvements, and

interpret the implications of their findings in the context of renewable energy or the specific application area.

2: Case Studies and Group Discussions

Assign students to analyze case studies related to the applications of mathematical modellingin nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment.

Students will discuss the mathematical models and computational methods used in the case studies, analyze the outcomes, and evaluate the effectiveness of the modelling approach.

Encourage group discussions on the challenges, ethical considerations, and potential advancements in the field.

Students will present their findings and engage in critical discussions on the advantages andlimitations of mathematical modelling in solving complex problems in these areas.

3. Group Project

Assign students to work in groups to develop a group project that integrates mathematical modelling with one of the application areas: renewable energy, nanotechnology, biophysics,medical physics, solid waste management, environmental remediation, or water treatment.

The project could involve developing a mathematical model to optimize the delivery of radiation therapy in medical physics or designing a mathematical model to optimize wastemanagement practices.

Students will plan and execute their project, apply mathematical modelling techniques,analyze the results, and present their findings and recommendations.

Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT V: Advanced Applications of computer Science

Students must be able to convert numbers from other number system to binary numbersystems

1. Identify the networking media used for your college network

Identify all the networking devices used in your college premises.

SEMESTER-II

COURSE 3: MECHANICS AND PROPERTIES OF MATTER

Theory Credits: 3 3 hrs/week

COURSE OBJECTIVE:

The course on Mechanics and Properties of Matter aims to provide students with a fundamental understanding of the behaviour of physical systems, both in terms of mechanical motion and in terms of the properties of matter

LEARNING OUTCOMES:

1. Students will be able to understand and apply the concepts of scalar and vector fields, calculate the gradient of a scalar field, determine the divergence and curl of a vector field.
2. Students will be able to apply the laws of motion, solve equations of motion for variable mass systems
3. Students will be able to define a rigid body and comprehend rotational kinematic relations, derive equations of motion for rotating bodies, analyze the precession of a top and gyroscope, understand the precession of the equinoxes
4. Students will be able to define central forces and provide examples, understand the characteristics and conservative nature of central forces, derive equations of motion under central forces.
5. Students will be able to differentiate between Galilean relativity and the concept of absolute frames, comprehend the postulates of the special theory of relativity, apply Lorentz transformations, understand and solve problems

UNIT-I VECTOR ANALYSIS

Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field with derivations and physical interpretation. Vector integration (line, surface and volume), Statement and proof of Gauss and Stokes theorems.

UNIT-II MECHANICS OF PARTICLES

Laws of motion, motion of variable mass system, Equation of motion of a rocket. Conservation of energy and momentum, Collisions in two and three dimensions, Concept of impact parameter, scattering cross-section, Rutherford scattering-derivation.

UNIT-III MECHANICS OF RIGID BODIES AND CONTINUOUS MEDIA

Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body, Precession of a top, Gyroscope, Precession of the equinoxes. Elastic constants of isotropic solids and their relations, Poisson's ratio and expression for Poisson's ratio. Classification of beams, types of bending, point load, distributed load.

UNIT-IV CENTRAL FORCES

Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, conservative force as a negative gradient of potential energy, equations of motion under a . Derivation of Kepler's laws. Motion of satellites

UNIT-V SPECIAL THEORY OF RELATIVITY

Galilean relativity, Absolute frames. Michelson-Morley experiment, The negative result. Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation.

REFERENCE BOOKS:

1. BSc Physics -Telugu Akademy, Hyderabad
2. Mechanics - D.S. Mathur, Sulthan Chand & Co, New Delhi
3. Mechanics - J.C. Upadhyaya, Ramprasad & Co., Agra
4. Properties of Matter - D.S. Mathur, S.Chand & Co, New Delhi ,11th Edn., 2000
5. Physics Vol. I - Resnick-Halliday-Krane ,Wiley, 2001
6. Properties of Matter – Brijlal & Subrmanyam, S. Chand &Co. 1982
7. Dynamics of Particles and Rigid bodies– Anil Rao, Cambridge Univ Press, 2006
8. Mechanics-EM Purcell, Mc Graw Hill
9. University Physics-FW Sears, MW Zemansky & HD Young, Narosa Publications, Delhi
10. College Physics-I. T. Bhima sankaram and G. Prasad. Himalaya Publishing House.
11. Mechanics, S. G. Venkata chalapathy, Margham Publication, 2003.

SEMESTER-II
COURSE 3: MECHANICS AND PROPERTIES OF MATTER

Practical Credits: 1 2hrs/week

COURSE OBJECTIVE:

To develop practical skills in the use of laboratory equipment and experimental techniques for measuring properties of matter and analyzing mechanical systems.

LEARNING OUTCOMES:

1. Mastery of experimental techniques: Students should become proficient in using laboratory equipment and experimental techniques to measure properties of matter and analyze mechanical systems.
2. Application of theory to practice: Students should be able to apply theoretical concepts learned in lectures to real-world situations, and understand the limitations of theoretical models.
3. Accurate recording and analysis of data: Students should be able to accurately record and analyze experimental data, including understanding the significance of error analysis and statistical methods.
4. Critical thinking and problem solving: Students should be able to identify sources of error, troubleshoot experimental problems, and develop critical thinking skills in experimental design and analysis.
5. Understanding of physical principles: Students should develop an understanding of the physical principles governing mechanical systems and the properties of matter, including elasticity, viscosity, and thermal expansion.

Minimum of 6 experiments to be done and recorded

1. Viscosity of liquid by the flow method (Poiseuille's method)
2. Young's modulus of the material of a bar (scale) by uniform bending
3. Young's modulus of the material a bar (scale) by non- uniform bending
4. Surface tension of a liquid by capillary rise method
5. Determination of radius of capillary tube by Hg thread method
6. Viscosity of liquid by Searle's viscometer method
7. Bifilar suspension –moment of inertia of a regular rectangular body.
8. Determination of moment of inertia using Fly-wheel
9. Determination of the height of a building using a sextant.
10. Rigidity modulus of material of a wire-dynamic method (torsional pendulum)

STUDENT ACTIVITIES

Unit I: Vector Analysis
Activity: Field Mapping

Students can choose a physical field (e.g., temperature, magnetic field) and create a field map by taking measurements at different points. They can then calculate the gradient of the field and analyse the variations. This activity helps them understand the concept of gradient in a scalar field.

Unit II: Mechanics of Particles
Activity: Collision Experiments

Students can set up simple collision experiments using marbles, carts, or other objects. They can measure the initial and final velocities, masses, and analyze the momentum conservation. By varying the conditions (e.g., masses, initial velocities), they can observe the effects on the collision outcomes.

Unit III: Mechanics of Rigid Bodies and Continuous Media
Activity: Balancing Act

Students can experiment with balancing various objects (e.g., rulers, books) on different points to understand the concept of center of mass and stability. They can analyse the equilibrium conditions and explore how the position of the center of mass affects the stability.

Unit IV: Central Forces
Activity: Pendulum Motion

Students can investigate the motion of a simple pendulum by varying its length and measuring the time period. They can analyze the relationship between the period and the length, and discuss the concept of centripetal force and its role in circular motion.

Unit V: Special Theory of Relativity
Activity: Time Measurement

Students can perform a time measurement experiment using simple devices like water clocks or sand timers. They can compare the measured time between two events at different relative speeds and discuss the concept of time dilation

Semester-II
Paper 4

Theory Credits: 3 3hrs/week

COURSE OBJECTIVE:

This course provides students with a broad understanding of the physical principles of the oscillations, to help them develop critical thinking and quantitative reasoning skills, to empower them to think creatively and critically about scientific problems and experiments.

LEARNING OUTCOMES:

The student should be able

1. To describe the basic characteristics of waves such as frequency, wavelength, amplitude, period, and speed.
2. To utilize mathematical relationships related to wave characteristics.
3. To compare particle motion and wave motion in different types of waves.
4. To distinguish between Longitudinal and Transverse waves.
5. To get the knowledge about how to construct and analysis the square waves, saw tooth waves, etc. from Fourier analysis

UNIT-I Simple Harmonic oscillations

Simple harmonic oscillator and solution of the differential equation-Physical characteristics of SHM, torsion pendulum-measurements of rigidity modulus, compound pendulum- measurement of 'g', Principle of superposition, beats, combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies. Lissajous figures.

UNIT-II Damped and forced oscillations

Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy considerations, comparison with un-damped harmonic oscillator, logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, amplitude resonance and velocity resonance.

UNIT-III Complex vibrations **9hr**

Fourier theorem and evaluation of the Fourier coefficients, analysis of periodic wave functions-square wave, triangular wave, saw tooth wave, simple problems on evolution of Fourier coefficients.

UNIT-IV Vibrating Strings and Bars

Transverse wave propagation along a stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at ends, overtones and harmonics. Energy

transport and transverse impedance. Longitudinal vibrations in bars-wave equation and its general solution. Special cases (i) bar fixed at both ends (ii) bar fixed at the midpoint (iii) bar fixed at one end. Tuning fork.

UNIT-V Ultrasonics:

Ultrasonics, properties of ultrasonic waves, production of ultrasonics by piezoelectric and magneto strictive methods, detection of ultrasonics, determination of wavelength of ultrasonic waves. Applications and uses of ultrasonic waves.

REFERENCE BOOKS:

1. BSc Physics Vol.1, Telugu Academy, Hyderabad.
2. Fundamentals of Physics. Halliday/Resnick/Walker ,Wiley India Edition 2007.
3. Waves & Oscillations. S.Badami, V. Balasubramanian and K.R. Reddy, Orient Longman.
4. College Physics-I. T. Bhimasankaram and G. Prasad. Himalaya Publishing House.
5. Science and Technology of Ultrasonics- Baldevraj, Narosa, New Delhi,2004
6. Introduction to Physics for Scientists and Engineers. F.J. Buche. McGraw Hill.

COURSE OBJECTIVE:

This course provides students with a broad understanding of the physical principles of the oscillations, to help them develop critical thinking and quantitative reasoning skills, to empower them to think creatively and critically about scientific problems and experiments.

LEARNING OUTCOMES:

1. Students are made to determine the unknown frequency of tuning fork by volume resonator experiment
2. Students are made to determine 'g' by compound/bar pendulum
3. Students are made to determine the force constant of a spring by static and dynamic method.
4. Students are made to determine the elastic constants of the material of a flat spiral spring.
5. Students are made to verify the laws of vibrations of stretched string –sonometer
6. Students are made to determine the frequency of a bar –Melde's experiment.
7. Students are made to study the damped oscillation using the torsional pendulum immersed in liquid-decay constant and damping correction of the amplitude.
8. Students are made to form Lissajous figures using CRO.

Minimum of 6 experiments to be done and recorded

Experiments

1. Volume resonator experiment
2. Determination of 'g' by compound/bar pendulum
3. Simple pendulum normal distribution of errors-estimation of time period and the error of the mean by statistical analysis
4. Determination of the force constant of a spring by static and dynamic method.
5. Determination of the elastic constants of the material of a flat spiral spring.
6. Coupled oscillators
7. Verification of laws of vibrations of stretched string –sonometer
8. Determination of frequency of a bar –Melde's experiment.
9. Study of a damped oscillation using the torsional pendulum immersed in liquid-decay constant and damping correction of the amplitude.
10. Formation of Lissajous figures using CRO.

STUDENT ACTIVITIES

Unit-I Simple Harmonic oscillations:

Activity: Measuring the period of a simple pendulum and verifying the relationship between the period and the length of the pendulum. Students can use a stopwatch and a ruler to measure the time for a fixed number of oscillations and calculate the period.

Unit-II Damped and forced oscillations:

Activity: Measuring the damping coefficient of a mass-spring system and calculating the quality factor. Students can measure the amplitude of the system as it undergoes damped oscillations and use the logarithmic decrement formula to calculate the damping coefficient. They can then use the formula for the quality factor to evaluate the quality of the system.

Unit-III Complex vibrations:

Activity: Constructing a square wave using Fourier series and analyzing its Fourier coefficients. Students can use a software tool or a programming language to generate a square wave and then compute the Fourier coefficients. They can then plot the magnitude spectrum of the waveform and observe the harmonic components.

Unit-IV Vibrating Strings and Bars:

Activity: Measuring the speed of sound in a metal rod and comparing it with the theoretical value. Students can use a microphone and an oscilloscope to measure the time delay between two reflections of a sound pulse in the rod. They can then use the formula for the speed of sound in a solid to calculate the speed and compare it with the theoretical value.

Unit-V Ultrasonics:

Activity: Measuring the wavelength of ultrasonic waves using the diffraction of light. Students can use a laser and a diffraction grating to create a diffraction pattern of an ultrasonic wave. They can then measure the distance between the diffraction fringes and use the formula for the diffraction of light to calculate the wavelength of the ultrasonic wave.

2023-24

B.Sc. PHYSICS SYLLABUS UNDER CBCS

For Mathematics Combinations

[2020-21 Batch onwards]

II Year B.Sc.-Physics: III Semester

Course-III: HEAT AND THERMODYNAMICS

Work load:60hrs per semester **4 hrs/week**

Course outcomes:

On successful completion of this course, the student will be able to:

- *Understand the basic aspects of kinetic theory of gases, Maxwell-Boltzman distribution law, equipartition of energies, mean free path of molecular collisions and the transport phenomenon in ideal gases*
- *Gain knowledge on the basic concepts of thermodynamics, the first and the second law of thermodynamics, the basic principles of refrigeration,the concept of entropy,the thermodynamic potentials and their physical interpretations.*
- *Understand the working of Carnot's ideal heat engine, Carnot cycle and its efficiency*
- *Develop critical understanding of concept of Thermodynamic potentials,the formulation of Maxwell's equations and its applications.*
- *Differentiate between principles and methods to produce low temperature and liquefy air and also understand the practical applications of substances at low temperatures.*
- *Examine the nature of black body radiations and the basic theories.*

UNIT-I: Kinetic Theory of gases: **(12 hrs)**

Kinetic Theory of gases-Introduction, Maxwell's law of distribution of molecular velocities (qualitative treatment only Mean free path, Transport phenomenon in ideal gases: viscosity, Thermal conductivity and diffusion of gases.

UNIT-II: Thermodynamics: **(12hrs)**

Introduction- Isothermal and Adiabatic processes, Reversible and irreversible processes, Carnot's engine and its efficiency, Carnot's theorem,

Second law of thermodynamics: Kelvin's and Clausius statements Entropy, Physical significance, Change in entropy in reversible and irreversible processes; Entropy and disorder-Entropy of Universe; Temperature-Entropy (T-S) diagram and its uses ; change of entropy when ice changes into steam.

UNIT-III: Thermodynamic Potentials and Maxwell's equations: (12hrs)

Thermodynamic potentials-Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy and their significance, Derivation of Maxwell's thermodynamic relations from thermodynamic potentials, Applications to (i) Clausius-Clayperon's equation (ii) Value of C_P-C_V (iii) Value of C_P/C_V

UNIT-IV: Low temperature Physics: (12hrs)

Methods for producing very low temperatures, Joule Kelvin effect, Porous plug experiment , Joule expansion, Distinction between adiabatic and Joule Thomson expansion, Expression for Joule Thomson cooling, Liquefaction of air by Linde's method, Production of low temperatures by adiabatic demagnetization (qualitative), Practical applications of substances at low temperatures.

UNIT-V: Quantum theory of radiation: (12 hrs)

Blackbody and its spectral energy distribution of black body radiation, Kirchoff's law, Wein's displacement law, Stefan-Boltzmann's law and Rayleigh-Jean's law (No derivations), Planck's law of black body radiation-Derivation, Deduction of Wein's law and Rayleigh-Jean's law from Planck's law, Solar constant , Estimation of surface temperature of Sun.

2023-24

B.Sc. PHYSICS SYLLABUS UNDER CBCS

For Mathematics Combinations

[2020-21 Batch onwards]

II Year B.Sc.-Physics: IV Semester

Course-IV: ELECTRICITY, MAGNETISM AND ELECTRONICS

Work load:60 hrs per semester **4 hrs/week**

Course outcomes:

On successful completion of this course, the students will be able to:

- *Understand the Gauss law and its application to obtain electric field in different cases and formulate the relationship between electric displacement vector, electric polarization, Susceptibility, Permittivity and Dielectric constant.*
- *Distinguish between the magnetic effect of electric current and electromagnetic induction and apply the related laws in appropriate circumstances.*
- *Understand Biot and Savart's law and Ampere's circuital law to describe and explain the generation of magnetic fields by electrical currents.*
- *Develop an understanding on the unification of electric and magnetic fields and Maxwell's equations governing electromagnetic waves.*
- *Phenomenon of resonance in LCR AC-circuits, sharpness of resonance,Q-factor,Power factor and the comparative study of series and parallel resonant circuits.*
- *Describe the operation of p-n junction diodes, zener diodes, light emitting diodes and transistors*
- *Understand the operation of basic logic gates and universal gates and their truth tables.*

2022-23

UNIT-I

1. Electrostatics: (6hrs)

Gauss's law-Statement and its proof, Electric field intensity due to (i) uniformly charged solid sphere and (ii) an infinite conducting sheet of charge, Electrical potential–Equipotential surfaces, Potential due to a (i) dipole (ii)uniformly charged sphere

2.Dielectrics: (6 hrs)

Dielectrics-Polar and Non-polar dielectrics- Effect of electric field on dielectrics,Dielectric strength, Capacitance of a parallel plate condenser with dielectric slab between the plates, Electric displacement D, electric polarization P,Relation between D, E and P, Dielectric constant and electric susceptibility.

UNIT-II

3.Magnetostatics: (6 hrs)

Biot-Savart's law and its applications: (i) circular loop and (ii) solenoid, Divergence and curl of magnetic field, Ampere's Circuital Law and its application to Solenoid,Hall effect, determination of Hall coefficient and applications.

4.Electromagnetic Induction: (6 hrs)

Faraday's laws of electromagnetic induction, Lenz's law,Self induction and Mutual induction, Self inductance of a long solenoid, Mutual inductance of two coils, Energy stored in magnetic field.

UNIT-III

5.Alternating currents: (6 hrs)

Alternating current - Relation between current and voltage in LR and CR circuits,Phasor and Vector diagrams, LCR series and parallel resonant circuit, Q –factor, Power in ac circuits, Power factor.

6.Electromagnetic waves-Maxwell's equations: (6 hrs)

Idea of displacement current,Maxwell's equations-Derivation, Maxwell's wave equation (with derivation), Transverse nature of electromagnetic waves, Poynting theorem (Statement).

UNIT-IV

7. Basic Electronic devices: (12 hrs)

PN junction diode, Zenerdiode andLight Emitting Diode (LED) and their I-V characteristics, Zener diode as a regulator- Transistors and its operation, CB, CE and CC configurations, Input and output characteristicsofa transistor in CE mode, Relation between alpha, beta and gamma.

UNIT-V:

8. Digital Electronics: (12 hrs)

Number systems, Conversion of binary to decimal system and vice versa, Binary addition & Binary subtraction (1's and 2's complement methods), Laws of Boolean algebra, DeMorgan's laws-Statements and Proofs, Basic logic gates, NAND and NOR as universal gates, Exclusive-OR gate, Half adder and Full adder circuits.

B.Sc. PHYSICS SYLLABUS UNDER CBCS

For Mathematics Combinations

[2020-21 Batch onwards]

II Year B.Sc.-Physics: IV Semester

Course V: MODERN PHYSICS

Work load:60hrs per semester **4 hrs/week**

Course outcomes:

On successful completion of this course, the students will be able to:

- *Develop an understanding on the concepts of Atomic and Modern Physics, basic elementary quantum mechanics and nuclear physics.*
- *Develop critical understanding of concept of Matter waves and Uncertainty principle.*
- *Get familiarized with the principles of quantum mechanics and the formulation of Schrodinger wave equation and its applications.*
- *Examine the basic properties of nuclei, characteristics of Nuclear forces, salient features of Nuclear models and different nuclear radiation detectors.*
- *Classify Elementary particles based on their mass, charge, spin, half life and interaction.*
- *Get familiarized with the nano materials, their unique properties and applications.*
- *Increase the awareness and appreciation of superconductors and their practical applications.*

UNIT-I :

1. Atomic and Molecular Physics:(12 hrs)

Vector atom model and Stern-Gerlach experiment, Quantum numbers associated with it, Angular momentum of the atom, Coupling schemes, Zeeman effect,Experimental arrangement to study Zeeman effect;Raman effect, Characteristics of Raman effect,

Experimental arrangement to study Raman effect, Quantum theory of Raman effect,Applications of Raman effect.

UNIT-II:

2. Matter waves&Uncertainty Principle: (12 hrs)

Matter waves, de Broglie's hypothesis, Wave length of matter waves, Properties of matter waves, Davisson and Germer's experiment, Phase and group velocities, Heisenberg's uncertainty principle for position and momentum& energy and time, Illustration of uncertainty principle using diffraction of beam of electrons (Diffraction by a single slit)

UNIT-III

3.Quantum (Wave) Mechanics:(12 hrs)

Basic postulates of quantum mechanics, Schrodinger time independent and time dependent wave equations-Derivations, Physical interpretation of wave function, Eigen functions, Eigen values, Application of Schrodinger wave equation to (i) one dimensional potential box of infinite height(InfinitePotential Well).

UNIT-IV:

3. Nuclear Physics:(12 hrs)

Nuclear Structure:General Properties of Nuclei, Mass defect, Binding energy; *Nuclear forces*: Characteristics of nuclear forces- Yukawa's meson theory. *Nuclear Radiation detectors*: G.M. Counter, Cloud chamber, *Elementary Particles*: Elementary Particles and their classification

UNIT-V:

4. Nano materials:(7hrs)

Nanomaterials – Introduction, Electron confinement, Size effect, Surface to volume ratio, Quantum dots, Nano wires, Fullerene, CNT, Graphene(Mention structures and *mechanical, optical, electrical, and magnetic properties*); Mention of applications of nano materials: (*Fuel cells,Phosphors for HD TV, Next Generation Computer chips, elimination of pollutants, sensors*)

5. Superconductivity: (5 hrs)

Introduction to Superconductivity, Experimental results-critical temperature, critical magnetic field, Meissner effect , Isotope effect,Type I and Type II superconductors, BCS theory (elementary ideas only),Applications of superconductors

B.Sc. PHYSICS SYLLABUS UNDER CBCS

For Mathematics Combinations

SKR & SKR GOVT. COLLEGE FOR WOMEN (A), KADAPA

B.Sc. 5th Semester Physics Syllabus under CBCS

III Year B.Sc.-Physics: V Semester

Course-6C : Applications of Electricity &Electronics

(Skill Enhancement Course (Elective), Credits: 05)

I. **Work load:** (Total Hours: 90 including Teaching, Lab, Field Training, Unit tests etc.)

Unit-I Introduction To Passive Elements (10 hrs.)

Passive and Active elements-Examples, **Resistor**-Types of Resistors, Color coding - Applications of a Resistor as a heating element in heaters and as a fuse element. **Capacitor**-Types of Capacitors, Color coding, Energy stored in a capacitor, Applications of Capacitor in power supplies, motors(Fans) etc., **Inductor**-Types of Inductors, EMF induced in an Inductor, Applications of Inductor, Application of choke in a fan and in a radio tuning circuit.

Unit-II Power Sources (Batteries) (10 hrs.)

Types of power sources-DC & AC sources, Different types of batteries, Rechargeable batteries –Lead acid batteries, Li-ion batteries-Series, Parallel& Series-Parallel configuration of batteries, Constant Voltage source-ConstantCurrent Source-Applications of Current sources & Voltage sources,

Unit-III Alternating Currents (10 hrs)

A.C Power source-Generator, Construction and its working principle, Transformers-Construction and its working principle, Types of Transformers-Step-down and Step-up Transformers, Relation between primary turns and secondary turns of the transformer with emf., Use of a Transformer in a regulated Power supplies, Single phase ,3 phase motor ,Applications of motors(like water pump, fan etc.).

Unit-IV Power Supplies (Skill Based) (10 hrs.)

Working of a DC regulated power supply, Construction of a 5 volts regulated power supply, Design of a step-down (ex: 220-12V) and step-up (ex: 120-240V) transformers-Simple Design of FM Radio circuit using LCR series resonance (tuning) circuit, Checking the output voltage of a battery eliminator using a MultiMater.(Trouble shooting), Design ofa simple 5 volts DC charger,

Unit-V Applications of Electromagnetic Induction (10 hrs.)

DC motor –Construction and operating principle, Calculation of power, voltage and current in a DC motor, Design of a simple Motor (for example Fan) with suitable turns of coil-DC generator-Construction, operating principle and EMF equation, Construction of a simple DC generator, Difference between DC and AC generators

II. References:

1. Grob's Basic Electronics by Mitchel Schultz , TMH or McGraw Hill
2. Electronic and Electrical Servicing by Ian Robertson Sinclair, John Dunton, ElsevierPublications
3. Troubleshooting Electronic Equipment by R.S.Khandapur , TMH

B.Sc. PHYSICS SYLLABUS UNDER CBCS

For Mathematics Combinations

SKR & SKR GOVT. COLLEGE FOR WOMEN (A), KADAPA

B.Sc. 5th Semester Physics Syllabus under CBCS

III Year B.Sc.-Physics: V Semester

Course 7C: ELECTRONIC INSTRUMENTATION

[Skill Enhancement Course (Elective), Credits: 05]

I. **Work load:** (Total Hours: 90 including Teaching, Lab, Field Training, Unit tests etc.)

UNIT-I INTRODUCTION TO INSTRUMENTS (10 hrs)

Types of electronic Instruments- Analog instruments & Digital Instruments, DC Voltmeter and AC Voltmeter, Construction and working of an Analog Multimeter and Digital Multimeter (Block diagram approach),Sensitivity.

UNIT-II OSCILLOSCOPE (10 hrs)

Cathode Ray Oscilloscope-Introduction, Block diagram of basic CRO, Cathode ray tube, Electron gun assembly, Time base operation, Vertical deflection system, Horizontal deflection system, Use of CRO for the measurement of voltage (DC and AC), frequency, phase difference, Different types of oscilloscopes and their uses.

UNIT-III TRANSDUCERS (10 hrs)

Classification of transducers, Selection of transducers, Resistive, capacitive & inductive transducers, Resistive and capacitive touch screen transducer used in mobiles, Displacement transducer- Piezoelectric transducer, Photo transducer, Digital transducer.

UNIT-IVDISPLAY INSTRUMENTS (10 hrs)

Introduction to Display devices, LED Displays, Seven Segment Displays, Construction and operation (Display of numbers),Types of SSDs(Common Anode &Common Cathode type), Limitations of SSDs, Liquid Crystal Displays, Principle and working of LCD modules, Applications of LCD modules.

UNIT-V BIOMEDICAL INSTRUMENTS (10 hrs)

Basic operating principles and uses of (i) Clinical thermometer (ii) Stethescope (iii) ECG machine (iv) Ultrasound scanning (v) Ventilator (vi) Pulse oxymeter (vii) Glucometer, Basic ideas of CT scan and MRI scan

III Reference Books:

1. Electronic Instrumentation by H.S.Kalsi , TMH Publishers
2. Electronic Instrument Hand Book by Clyde F. Coombs , McGraw Hill
3. Introduction to Biomedical Instrumentation byMandeep Singh, PHI Learning.
4. Biomedical Instrumentation and Measurements by Leslie Cromwell ,Prentice HallIndia.
5. Electronic Measurements and Instrumentation by Kishor, K Lal, Pearson, New Delhi
6. Electrical and Electronic Measurements by Sahan, A.K., Dhanpat Rai, New Delhi
7. Electronic Instruments and Measurement Techniques by Cooper, W.D. Halfrick, A.B.,PHI Learning, New Delhi
8. Web sources suggested by the teacher concerned and the college librarian includingreading material.

Course 7C: Electronic Instrumentation– PRACTICAL SYLLABUS

2023-24

CHEMISTRY

I -SEMESTER

COURSE 1: ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Hours: 5hrs/week Credits: 4

Course Objective:

The objective of this course is to provide students with a comprehensive understanding of the essential concepts and applications of mathematical, physical, and chemical sciences. The course aims to develop students' critical thinking, problem-solving, and analytical skills in

these areas, enabling them to apply scientific principles to real-world situations.

Learning outcomes:

1. Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.

2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations

3. To Explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to Connect their knowledge of chemistry to daily life.

4. Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical

principles can be used to explain and predict phenomena in different contexts.

5 To explore the history and evolution of the Internet and to gain an understanding of network security concepts, including threats, vulnerabilities, and countermeasures.

UNIT I: ESSENTIALS OF MATHEMATICS: 9hrs

Complex Numbers: Introduction of the new symbol i – General form of a complex number – Modulus- Amplitude form and conversions

Trigonometric Ratios: Trigonometric Ratios and their relations – Problems on calculation of

3. Theories of bonding in metals: **4h**

Valence bond theory andFree electron theory, explanation of thermal and electrical conductivity of metals based on these theories, Band theory- formation of bands, explanation of conductors, semiconductors and insulators.

UNIT-III

Solidstate **10h**

Symmetry in crystals. Law of constancy of interfacial angles. The law of rationality of indices. The law of symmetry. Miller indices, Definition of lattice point, space lattice, unit cell. Bravais lattices and crystal systems. X-ray diffraction and crystal structure. Bragg's law. Powder method. Defects in crystals. Stoichiometric and non-stoichiometric defects.

UNIT-IV

1. Gaseous state **6h**

van der Waal's equation of state. Andrew's isotherms of carbon dioxide, continuity of state. Critical phenomena. Relationship between critical constants and vander Waal's constants. Law of corresponding states. Joule- Thomson effect. Inversion temperature.

2.Liquid state **4h**

Liquid crystals,mesomorphicstate. Differences between liquid crystal and solid/liquid. Classification of liquid crystals into Smectic and Nematic. Application of liquid crystals as LCD devices.

UNIT-V

Solutions, Ionic equilibrium& dilute solutions

1. Solutions **6h**

Azeotropes-HCl-H_2O system and ethanol-water system. Partially miscible liquids-phenol-water system. Critical solution temperature (CST), Effect of impurity on consulate temperature. Immiscible liquids and steam distillation.Nernst distribution law. Applications of distribution law.

2. Ionic equilibrium **3h**

Ionic product, common ion effect, solubility and solubility product.

3.Dilute solutions **7h**

Colligative properties- RLVP, Osmotic pressure, Elevation in boing point and depression in freezing point. Experimental methods for the determination of molar mass of a non-volatile solute using osmotic pressure, Elevation in boing point and depression in freezing point. Abnormal colligative properties. Van't Hoff factor.

Co-curricular activities and Assessment Methods

1. Continuous Evaluation: Monitoring the progress of student's learning
2. Class Tests, worksheets and Quizzes

angles Vectors: Definition of vector addition – Cartesian form – Scalar and vector product and problems Statistical Measures: Mean, Median, Mode of a data and problems

UNIT II: ESSENTIALS OF PHYSICS: 9hrs

Definition and Scope of Physics- Measurements and Units - Motion of objects: Newtonian Mechanics and relativistic mechanics perspective - Laws of Thermodynamics and Significance- Acoustic waves and electromagnetic waves- Electric and Magnetic fields and their interactions- Behaviour of atomic and nuclear particles- Wave-particle duality, the uncertainty principle- Theories and understanding of universe

UNIT III: ESSENTIALS OF CHEMISTRY: : 9hrs

efinition and Scope of Chemistry- Importance of Chemistry in daily life -Branches of chemistry and significance- Periodic Table- Electronic Configuration, chemical changes, classification of matter, Biomolecules- carbohydrates, proteins, fats and vitamins.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY: 9hrs

Applications of Mathematics in Physics & Chemistry: Calculus , Differential Equations & Complex Analysis

Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, Automotive and Aerospace Industries, Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies.

Application of Chemistry in Industry and Technology: Chemical Manufacturing, Pharmaceuticals and Drug Discovery, Materials Science, Food and Beverage Industry.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

Milestones of computer evolution - Internet, history, Internet Service Providers, Types of Networks, IP, Domain Name Services, applications.

Ethical and social implications: Network and security concepts- Information Assurance Fundamentals, Cryptography-Symmetric and Asymmetric, Malware, Firewalls, Fraud Techniques- Privacy and Data Protection

I - SEMESTER

COURSE 2: ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Hours: 5 hrs/week Credits: 4

Course Objective:

The objective of this course is to provide students with an in-depth understanding of the recent advances and cutting-edge research in mathematical, physical, and chemical sciences. The course aims to broaden students' knowledge beyond the foundational concepts and expose them to the latest developments in these disciplines, fostering critical thinking, research skills, and the ability to contribute to scientific advancements.

Learning outcomes:

1. Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems.

2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations.

3. Understand the different sources of renewable energy and their generation processes and advances in nanomaterials and their properties, with a focus on quantum dots. To study the emerging field of quantum communication and its potential applications. To gain an understanding of the principles of biophysics in studying biological systems. Explore the properties and applications of shape memory materials.

3. Understand the principles and techniques used in computer-aided drug design and drug delivery systems, to understand the fabrication techniques and working principles of nanosensors. Explore the effects of chemical pollutants on ecosystems and human health.

4. Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.

5 Understand and convert between different number systems, such as binary, octal, decimal, and hexadecimal. Differentiate between analog and digital signals and understand their characteristics.Gain knowledge of different types of transmission media, such as wired (e.g.,

copper cables, fiber optics) and wireless (e.g., radio waves, microwave, satellite)..

UNIT I: ADVANCES IN BASICS MATHEMATICS 9hrs

Straight Lines: Different forms – Reduction of general equation into various forms –Point of intersection of two straight lines

Limits and Differentiation: Standard limits – Derivative of a function –Problems on product rule and quotient rule

Integration: Integration as a reverse process of differentiation – Basic methods of integration

Matrices: Types of matrices – Scalar multiple of a matrix – Multiplication of matrices – Transpose of a matrix and determinants

UNIT II: ADVANCES IN PHYSICS: 9hrs

Renewable energy: Generation, energy storage, and energy-efficient materials and devices. Recent advances in the field of nanotechnology: Quantum dots, Quantum Communication- recent advances in biophysics- recent advances in medical physics- Shape Memory Materials.

UNIT III: ADVANCES IN CHEMISTRY: 9hrs

Computer aided drug design and delivery, nano sensors, Chemical Biology, impact of chemical pollutants on ecosystems and human health, Dye removal - Catalysis method

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY 9hrs

Mathematical Modelling applications in physics and chemistry Application of Renewable energy: Grid Integration and Smart Grids, Application of nanotechnology: Nanomedicine,

Application of biophysics: Biophysical Imaging, Biomechanics, Neurophysics,

Application of medical physics: Radiation Therapy, Nuclear medicine

Solid waste management, Environmental remediation- Green Technology, Water treatment.

UNIT V: Advanced Applications of computer Science 9hrs

II - SEMESTER

Course Code 3: GENERAL AND INORGANIC CHEMISTRY

Credits: 03

Course Outcomes: At the end of the course the student will be able to-

1. Understand the structure of atom and the arrangement of elements in the periodic table.
2. Understand the nature and properties of ionic compounds.
3. Identify the structure of a given inorganic compound.
4. Explain the existence of special types of compounds through weak chemical forces.
5. Define acids and bases and predict the nature of salts.

Syllabus:

Unit I: Atomic Structure and Periodic table (9 h)

Electronic configuration: Bohr theory, duel nature of electrons, Heisenberg uncertainty principle, the Schrodinger equation, significance of wave functions, normalization of wave function, radial and angular wave functions, Pauli's exclusion principle, Hund's rule, sequence of energy levels (Aufbau principle).

Periodicity: periodic law and arrangement of elements in the periodic table, IUPAC nomenclature and group number, horizontal, vertical, and diagonal relationships in the periodic table. 1.3 General properties of atoms: size of atoms and ions-atomic radii, ionic radii, covalent radii; trend in ionic radii, ionization potential, electron affinity; electronegativity - Pauling, Mulliken-Jaffe, Allred-Rochow definitions; oxidation states and variable valency; isoelectronic relationship; inert-pair effect;

UNIT 2: Ionic bond (9 h)

Properties of ionic compounds, factors favouring the formation of ionic compounds-ionization potential, electron affinity, and electronegativity. Lattice energy: definition, factors affecting lattice energy, Born-Haber cycle-enthalpy of formation

of ionic compound and stability. Stability of ionic compounds in terms of ΔH_f and U_o. Solubility and thermal stability of ionic compounds. Covalent character in ionic compounds-polarization and Fajan's rules; effects of polarization-solubility, melting points, and thermal stability of typical ionic compounds.

UNIT 3: The Covalent Bond (9 h)

Valance Bond theory-arrangement of electrons in molecules, hybridization of atomic orbitals and geometry of molecules-$BeCl_2$, BF_3, CH_4, PCl_5, SF_6– VSEPR model-effect of bonding and nonbonding electrons on the structure of molecules, effect of electronegativity,

isoelectronic principle, illustration of structures by VESPR model-NH_3, H_2O, SF_4, ICl^-, ^{4} ICl^-, ^{2} XeF_4, XeF_6

Molecular orbital theory -LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules (N_2, O_2, CO and NO)

UNIT 4: Metallic and Weak Bonds (9 h)

The Metallic bond: metallic properties, free electron theory, Valence Bond Theory, band theory of metals. Explanation of conductors, semiconductors and insulators.

Weak bonds: hydrogen bonding-intra- and intermolecular hydrogen bonding, influence on the physical properties of molecules, comparison of hydrogen bond strength and properties of hydrogen bonded N, O and F compounds; associated molecules-ethanol and acetic acid; Vanderwaals forces, ion dipole-dipole interactions.

UNIT 5: Acids and Bases (9 h)

Theories of acids and bases: Arrhenius theory, Bronsted-Lowry theory, Lewis theory, the solvent system, Nonaqueous solvents: classification-protonic and aprotic solvents, liquid ammonia as solvent-solutions of alkali and alkaline earth metals in ammonia.

Types of chemical reactions: acid-base, oxidation-reduction, calculation of oxidation

number. Definition of pH, pK_a, pK_b. Types of salts, Salt hydrolysis. Pearson's concept, HSAB principle & its importance, bonding in Hard-Hard andSoft-Soft combinations.

List of Reference Books:

1. J. D. Lee, Concise Inorganic Chemistry, 5th ed., Blackwell Science, London, 1996.
2. . B. R. Puri, L. R. Sharma, K. C. Kalia, Principles of Inorganic Chemistry, Shoban Lal Nagin Chand and Co., 1996.
3. D. F. Shriver and P. W. Atkins, Inorganic Chemistry, 3rd ed., W. H. Freeman and Co, London,

II - SEMESTER

Course Code 3: GENERAL AND INORGANIC CHEMISTRY

Credits: 01

Practical- I Qualitative Analysis of SIMPLE SALT

Qualitative inorganic analysis (Minimum of Six simple salts should be analysed) 50 M

I. Course outcomes:

At the end of the course, the student will be able to;

1. Understand the basic concepts of qualitative analysis of inorganic simple salt.
2. Use glassware, equipment and chemicals and follow experimental procedures in the laboratory
3. Apply the concepts of common ion effect, solubility product and concepts related to qualitative analysis

II. Laboratory course syllabus: Analysis of SIMPLE SALT 50 M

Analysis of simple salt containing ONE anion and ONE cation from the following:

Anions: Carbonate, Sulphate, Chloride, Bromide, Acetate, Nitrate, Borate, Phosphate. Cations: Lead, Copper, Iron, Aluminium, Zinc, Nickel, Manganese, Calcium, Strontium, Barium, Magnesium and Ammonium.

Co-curricular activities and Assessment Methods

1. Continuous Evaluation: Monitoring the progress of student's learning.
2. Class Tests, Work sheets and Quizzes
3. Presentations, Projects and Assignments and Group Discussions: Enhances critical thinking skills and personality
4. SEMESTER -End Examination: critical indicator of student's learning and teaching methods adopted by teachers throughout the SEMESTER

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II - SEMESTER

Course Code 4: INORGANIC CHEMISTRY- I

Credits: 03

Course outcomes:

At the end of the course, the student will be able to:

1. Understand the basic concepts of p-block elements.
2. Explain the concepts of d-block elements
3. Distinguish lanthanides and actinides.
4. Describe the importance of radioactivity.

Syllabus:

UNIT –I Chemistry of p-block elements – I 9 h

Group 13: Preparation & structure of Diborane, Borazine and $(BN)_x$ Group14: Preparation, classification and uses of silicones and Silanes. Group 15: Preparation & structure of Phosphonitrilic Chloride $P_3N_3Cl_6$

Unit II Chemistry of p-block elements – II 9 h

Group 16: Classification of Oxides, structures of oxides and Oxoacids of Sulphur Group 17: Preparation and Structures of Interhalogen compounds. Pseudohalogens,

UNIT-III Chemistry of d-block elements: 9 h

Characteristics of d-block elements with special reference to electronic configuration, variable valence, colour, magnetic properties, catalytic properties and ability to form complexes. Stability of various oxidation states of 3d series-Latimer diagrams.

UNIT-IV Chemistry of f-block elements: 9 h

Chemistry of lanthanides - electronic configuration, oxidation states, lanthanide contraction, consequences of lanthanide contraction, colour, magnetic properties.

Separation of lathanides by ion exchange method.

Chemistry of actinides - electronic configuration, oxidation states, actinide contraction, comparison of lanthanides and actinides.

Unit – V Radioactivity 9 h

Definition, Isotopes, n/p ratio, binding energy, types of radioactivity, Soddy-Fajan's displacement law,Law of Radioactivity, Radioactive decay series, Nuclear Reactions-fission and fusion, Applications of radioactivity.

List of Reference books:

1. Basic Inorganic Chemistry by Cotton and Wilkinson
2. Advance Inorganic chemistry vol-I by Satya Prakash
3. Inorganic chemistry by Puri and Sharma
4. Concise Inorganic Chemistry by J D Lee
5. Nuclear Chemistry by Maheshwar Sharon, 2009

II -SEMESTER

Course Code 4: INORGANIC CHEMISTRY- I

Credits: 01

Course outcomes:

At the end of the course, the student will be able to:

1. Understand the basic concepts of inorganic preparations.
2. Use glassware, equipment and chemicals and follow experimental procedures in the laboratory
3. Apply the properties of various elements for the preparation of inorganic compounds.

Syllabus:

UNIT-II

Carbon-Carbon pi Bonds (Alkenes and Alkynes) **12h**

General methods of preparation, physical and chemical properties. Mechanism of E1, E2, E1CB reactions, Saytzeff and Hoffmann eliminations, Electrophilic Additions, mechanism (Markownikoff/Antimarkownikoff addition) with suitableexamples,,*syn*and*anti*-addition; addition of H_2, X_2, HX. oxymercuration-demercuration, hydroboration-oxidation, ozonolysis, hydroxylation, Diels Alderreaction,1,2- and1,4-addition reactions in conjugated dienes.

Reactions of alkynes; acidity, electrophilic and nucleophilic additions, hydration to form carbonyl compounds, Alkylation of terminal alkynes.

UNIT-III

Benzene and its reactivity **12h**

Concept of aromaticity, Huckel's rule - application to Benzenoid (Benzene, Naphthalene) and Non-Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation) Reactions - General mechanism of electrophilic aromatic substitution, mechanism of nitration, Friedel- Craft's alkylation and acylation. Orientation of aromatic substitution - ortho, para and meta directing groups. Ring activating and deactivating groups with examples (Electronic interpretation of various groups like NO_2 and Phenolic). Orientation of (i) Amino, methoxy and methyl groups (ii) Carboxy, nitro, nitrile, carbonyl and sulphonic acid groups (iii) Halogens (Explanation by taking minimum of one example from each type)

GENERAL CHEMISTRY **24 h**

UNIT-IV

1. Surface chemistry and chemical bonding

Surface chemistry **6h**

Colloids- Coagulation of colloids, Hardy-Schulze rule. Stability of colloids, Protection of Colloids, Gold number.

Adsorption-Physical and chemical adsorption, Langmuir adsorption isotherm, applications of adsorption.

2. Chemical Bonding **6h**

Valence bond theory, hybridization, VB theory as applied to ClF_3, $Ni(CO)_4$, Molecular orbital theory -LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules (N_2, O_2, CO and NO).

3. HSAB **2h**

Pearson's concept, HSAB principle & its importance, bonding in Hard-Hard and Soft-Soft combinations.

UNIT-V

Stereochemistry of carbon compounds **10h**

Molecular representations- Wedge, Fischer, Newman and Saw-Horse formulae.

Optical isomerism: Optical activity- wave nature of light, plane polarised light, optical rotation and specific rotation.

diastereomers – Explanation of optical isomerism with examples- Glyceraldehyde, Lactic acid, Alanine, Tartaric acid, 2,3-dibromopentane.

D,L, R,S and E,Z- configuration with examples.

Definition of Racemic mixture – Resolution of racemic mixtures (any 3 techniques)

Co-curricular activities and Assessment Methods

ContinuousEvaluation:Monitoringtheprogressof student'slearning

ClassTests,WorksheetsandQuizzes

Presentations,ProjectsandAssignmentsandGroupDiscussions:Enhancescriticalthinkingskillsand personality

Semester-endExamination:criticalindicatorofstudent'slearningandteachingmethodsadoptedby teachersthroughoutthesemester.

2023-24

CHEMISTRY

SEMESTER - III

Course III (ORGANICCHEMISTRY&SPECTROSCOPY) 60hrs (4 h / w)

Course outcomes:

At the end of the course, the student will be able to;

1. Understand preparation, properties and reactions of halo alkanes, halo arenes and oxygen containing functional groups.
2. Use the synthetic chemistry learnt in this course to do functional group transformations.
3. To propose possible mechanisms for any relevant reaction

ORGANIC CHEMISTRY **34h**

UNIT – I

1. Chemistry of Halogenated Hydrocarbons: **6h**

Alkylhalides: Methods of preparation and properties, nucleophilic substitution reactions– SN1, SN2 and SNi mechanisms with stereochemical aspects and effect of solvent etc.; nucleophilic substitution vs elimination, Williamson's synthesis. Arylhalides: Preparation (including preparation from diazonium salts) and properties, nucleophilic aromatic substitution; S_N^{Ar}, Benzyne mechanism. Relative reactivity of alkyl, allyl, benzyl, vinyl and arylhalides towards nucleophilic substitution reactions.

2. Alcohols &Phenols **6h**

Alcohols: preparation, properties and relative reactivity of 1°, 2°, 3° alcohols, Oxidation of diols by periodicacid and lead tetra acetate, Pinacol- Pinacolone rearrangement;

Phenols: Preparation and properties; Acidity and factors effecting it, Ring substitution reactions, Reimer–Tiemann and Kolbe's–Schmidt Reactions, Fries and Claisen rearrangements with mechanism;

UNIT-II

Carbonyl Compounds **10h**

Structure, reactivity, preparation and properties; Nucleophilicaddition-elimination reactions with ammonia derivatives.

Mechanisms of Aldol and Benzoin condensation, Claisan-Schmidt, Perkin, Cannizzaro and Wittig reaction, Beckmann, haloform reaction and Baeyer-Villiger oxidation, α- substitution reactions, oxidations and reductions (Clemmensen, wolf –kishner, with LiAlH4 & NaBH4).

Addition reactions of α, β-unsaturated carbonyl compounds: Michael addition.

Active methylene compounds:

Keto-Enol tautomerism. Preparation of diethyl malonate, ethyl aceto acetate (Claisen Condensation) and synthesis of propanoic acid, succinic acid and crotonic acids

UNIT-III

Carboxylic Acids and their Derivatives **12h**

Effect of Substituents on acidic strength, Typical reactions of dicarboxylic acids, hydroxyl acids and unsaturated acids. Comparative study of nucleophilic substitution atacylgroup-Mechanism of acidic and alkaline hydrolysis of esters, Claisen condensation, Reformatsky reaction and Curtius rearrangement.

Reactions involving H, OH and COOH groups- salt formation, anhydride formation, acid chloride formation, amide formation and esterification (mechanism). Degradation of carboxylic acids by Huns-Diecker reaction, decarboxylation by Schimdt reaction, Arndt-Eistert synthesis, halogenation by Hell- Volhard- Zelinsky reaction.

SPECTROSCOPY **26 h**

UNIT-IV

Molecular Spectroscopy: **18h**

Interaction of electromagnetic radiation with molecules and various types of spectra;

Rotation spectroscopy: Selection rules, intensities of spectral lines, determination of bond lengths of diatomic and linear triatomic molecules, isotopic substitution.

Vibrationalspectroscopy: Classicalequationofvibration, computationofforceconstant, Harmonic and anharmonic oscillator, Morsepotential curve,vibrational degreesoffreedom forpolyatomic molecules, modesofvibration. Selection rules for vibrational transitions, Fundamentalfrequencies, overtones and hotbands.

Electronic spectroscopy: Energy levels of molecular orbitals (σ, π, n). Selection rules for electronic spectra. Types of electronic transitions in molecules, effect of conjugation. Concept of chromophore. bathochromic and hypsochromic shifts.Beer-Lambert's law and its limitations.

Nuclear Magnetic Resonance (NMR) spectroscopy: Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals. Chemical shift, NMR splitting of signals - spin-spin coupling, coupling constants. Applications of NMR with suitable examples - ethyl bromide, ethanol, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate, toluene and acetophenone.

UNIT-V **8h**

Application of Spectroscopy to Simple Organic Molecules

Application of visible, ultraviolet and Infrared spectroscopy in organic molecules.

Application of electronic spectroscopy and Woodward rules for calculating λ_{max} of conjugated dienes and α,β – unsaturated compounds.

Infrared radiation and types of molecular vibrations, functional group and fingerprint region. IR spectra of alkanes, alkenes and simple alcohols (inter and intramolecular hydrogen bonding), aldehydes, ketones, carboxylic acids and their derivatives (effect of substitution on >C=O stretching absorptions).

Co-curricular activities and Assessment Methods

1. Continuous Evaluation: Monitoring the progress of student's learning Class Tests, Work sheets and Quizzes

2. Presentations, projects and Assignments and Group Discussions: Enhances critical thinking skills and personality

3. Semester-endExamination: critical indicator of student's learning and teaching methods adopted by teachers throughout the semester.

List of Reference Books

1. A Text Book of Organic Chemistry by Bahl and Arunbahl
2. A Text Book of Organic chemistry by I L FinarVol I
3. Organic chemistry by Bruice
4. Organic chemistry by Clayden
5. Spectroscopy by William Kemp
6. Spectroscopy by Pavia
7. Organic Spectroscopy by J. R. Dyer

2023-24

CHEMISTRY

SEMESTER - IV

Course IV (INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY) 60hrs (4 h / w)

Course outcomes:

At the end of the course, the student will be able to;

1. To learn about the laws of absorption of light energy by molecules and the subsequent photo chemical reactions.
2. To understand the concept of quantum efficiency and mechanism of photochemical reactions.

UNIT - I

Organo metallic Compounds **8h**

Definition and classification of organo metallic Compounds on the basis of bond type, Concept of hapticity of organic ligands. Metalcarbonyls: 18electronrule, electron count of mononuclear, poly nuclear and substituted metal carbonyls of Fe and Co. Pi-acceptor behaviour of carbon monoxide. Synergic effects (VB approach)

UNIT – II

Carbohydrates **8h**

Occurrence, classification and their biological importance, Monosaccharides: Constitution and absolute configuration of glucose and fructose, epimers and anomers, mutarotation, determination of ring size of glucose and fructose, Haworth projections and conformational structures; Inter conversions of aldoses and ketoses; Killiani-Fischer synthesis and Ruff degradation;

UNIT- III

Amino acids and proteins **6h**

Introduction: Definition of Amino acids, classification of Amino acids into alpha, beta, and gamma amino acids. Natural and essential amino acids - definition and examples, classification of alpha amino acids into acidic, basic and neutral amino acids with examples. Methods of synthesis: General methods of synthesis of alpha amino acids (specific examples - Glycine, Alanine, valine and leucine) by following methods: a) from halogenated carboxylic acid b) Gabriel Phthalimide synthesis c) strecker's synthesis.

Physical properties: Zwitter ion structure - salt like character - solubility, melting points, amphoteric character, definition of isoelectric point.

Chemical properties: General reactions due to amino and carboxyl groups - lactams from gamma and delta amino acids by heating- peptide bond (amide linkage).

Heterocyclic Compounds **7h**

Introduction and definition: Simple five membered ring compounds with one hetero atom Ex. Furan. Thiophene and pyrrole - Aromatic character – Preparation from 1, 4, -dicarbonyl compounds, Paul-Knorr synthesis.

Properties: Acidic character of pyrrole - electrophillic substitution at 2 or 5 position, Halogenation, Nitration and Sulphonation under mild conditions - Diels Alder reaction in furan.

Pyridine – Structure - Basicity - Aromaticity- Comparison with pyrrole- one method of preparation and properties - Reactivity towards Nucleophilic substitution reaction.

UNIT- IV

NitrogenContainingFunctionalGroups

Preparation, properties and important reactions of nitro compounds, amines and diazoniumsalts.

1. Nitro hydrocarbons **3h**

Nomenclature and classification-nitro hydrocarbons, structure -Tautomerism of nitroalkanes leading to aci and keto form, Preparation of Nitroalkanes, reactivity -halogenation, reaction with HONO (Nitrous acid), Nef reaction and Mannich reaction leading to Micheal addition and reduction.

2.Amines: **11h**

Introduction, classification, chirality in amines (pyramidal inversion), importance and general methods of preparation.

Properties : Physical properties, Basicity of amines: Effect of substituent, solvent and steric effects. Distinction between Primary, Secondary and tertiary amines using Hinsberg's method and nitrous acid. Discussion of the following reactions with emphasis on the mechanistic pathway: Gabriel Phthalimide synthesis, Hoffmann-Bromamidereaction, Carbylamine reaction, Mannich reaction, Hoffmann's exhaustive methylation, Hofmann-elimination reaction and Cope elimination.

Diazonium Salts: Preparation and synthetic applications of diazoniumsalts including preparation of arenes, haloarenes, phenols, cyano and nitro compounds. Coupling reactions of diazonium salts (preparation of azo dyes).

UNIT- V

Photochemistry **5h**

Difference between thermal and photochemical processes, Laws of photochemistry- Grothus-Draper's law and Stark-Einstein's law of photochemical equivalence, Quantum yield-Photochemical reaction mechanism- hydrogen- chlorine and hydrogen- bromine reaction.

Qualitative description of fluorescence, phosphorescence, Jablonski diagram, Photosensitized reactions- energy transfer processes (simple example).

Thermodynamics **12 h**

The first law of thermodynamics-statement, definition of internal energy and enthalpy, Heat capacities and their relationship, Joule-Thomson effect- coefficient, Calculation of work for the expansion of perfect gas under isothermal and adiabatic conditions for reversible processes, State function. Temperature dependence of enthalpy of formation- Kirchoff s equation, Second law of thermodynamics Different Statements of the law, Carnot cycle and its efficiency, Carnot theorem, Concept of entropy, entropy as a state function, entropy changes in reversible and irreversible processes. Entropy changes in spontaneous and equilibrium processes.

Co-curricular activities and Assessment Methods

1. Continuous Evaluation: Monitoring the progress of student's learning Class Tests, Work sheets and Quizzes
2. Presentations, projects and Assignments and Group Discussions: Enhances critical thinking skills and personality
3. Semester-endExamination: critical indicator of student's learning and teaching methods adopted by teachers throughout the semester.

2023-24

CHEMISTRY

SEMESTER - IV

Course V (INORGANIC &PHYSICAL CHEMISTRY) 60 hrs (4 h / w)

Course outcomes:

At the end of the course, the student will be able to;

1. Understand concepts of boundary conditions and quantization, probability distribution, most probable values, uncertainty and expectation values
2. Application of quantization to spectroscopy.
3. Various types of spectra and their use in structure determination.

INORGANIC CHEMISTRY **26 h**

UNIT –I

Coordination Chemistry **12 h**

IUPAC nomenclature of coordination compounds, Structural and stereoisomerism in complexes with coordination numbers 4 and 6. Valence Bond Theory (VBT): Inner and outer orbital complexes. Limitations of VBT, Crystal field effect, octahedral symmetry. Crystal field stabilization energy (CFSE), Crystal field effects for weak and strong fields. Tetrahedral symmetry, Factors affecting the magnitude of crystal field splitting energy, Spectrochemical series, Comparison of CFSE for Octahedral and Tetrahedral complexes, Tetragonal distortion of octahedral geometry,Jahn-Teller distortion, square planar coordination.

UNIT –II

1. InorganicReactionMechanism: **4h**

Introduction to inorganic reaction mechanisms. Concept of reaction pathways, transition state, intermediate and activated complex. Labile and inert complexes, ligand substitution reactions SN^1 and SN^2, Substitution reactions in square planar complexes, Trans-effect, theories of trans effect and its applications

2. Stability of metal complexes: **2h**

Thermodynamic stability and kinetic stability, factors affecting the stability of metal complexes, chelate effect, determination of composition of complex by Job's method and mole ratio method.

Bioinorganic Chemistry: **8h**

Toxicityofmetalions(Hg,Pb,CdandAs), reasons for toxicity, Use of chelating agents in medicine, Cisplatin as an anti-cancer drug. Iron and its application in bio-systems, Haemoglobin, Myoglobin.

PHYSICAL CHEMISTRY **34 h**

UNIT-III

1 .Phase rule **6h**

Concept of phase, components, degrees of freedom. Thermodynamic derivation of Gibbs phase rule. Phase diagram of one component system - water system, Study of Phase diagrams of Simple eutectic systems i) Pb-Ag system, desilverisation of lead ii) NaCl-Water system, Congruent and incongruent melting point- Definition and examples for systems having congruent and incongruent melting point , freezing mixtures.

UNIT-IV

Electrochemistry **14h**

Specific conductance, equivalent conductance and molar conductance- Definition and effect of dilution. Cell constant. Strong and weak electrolytes, Kohlrausch's law and its applications, Definition of transport number, determination of transport number by Hittorf's method. Debye-Huckel-Onsagar's equation for strong electrolytes (elementary treatment only), Application of conductivity measurements- conductometric titrations.

Electrochemical Cells- Single electrode potential, Types of electrodes with examples: Metal-metal ion, Gas electrode, Inert electrode, Redox electrode, Metal-metal insoluble salt- salt anion. Determination of EMF of a cell, Nernst equation, Applications of EMF measurements - Potentiometric titrations.

Fuel cells- Basic concepts, examples and applications

UNIT-V

ChemicalKinetics: **14 h**

The concept of reaction rates. Effect of temperature, pressure, catalyst and other factors on reaction rates. Order and molecularity of a reaction, Derivation of integrated rate equations for zero, first and second order reactions (both for equal and unequal concentrations of reactants). Half–life of a reaction. General methods for determination of order of a reaction. Concept of activation energy and its calculation from Arrhenius equation. Theories of Reaction Rates: Collision theory and Activated Complex theory of bimolecular reactions. Comparison of the two theories (qualitative treatment only).

Co-curricular activities and Assessment Methods

1. Continuous Evaluation: Monitoring the progress of student's learning Class Tests, Work

2022-23

CHEMISTRY

B.Sc. V Semester Chemistry Syllabus under CBCS

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SEMESTER – V

Domain Subject: Chemistry

Course VI – 6B: Analytical methods in Chemistry – I

Skill enhancement course (Elective) Credits: 05

Max Marks: 100+50

I. Learning outcomes:

Students after successful completion of the course will be able to:

1. Identify the importance of solvent extraction and ion exchange method.

2. Acquire knowledge on the basic principles of volumetric analysis and gravimetric analysis.

3. Demonstrate the usage of common laboratory apparatus used in Quantitative analysis.

4. Understand the theories of different types of titrations.

5. Gain Knowledge on different types of errors and their minimization methods.

II. Syllabus:

(Total Hours: 90 including Teaching, lab, Field skills training, Unit tests Etc.,)

UNIT: I Basic Concepts in Analytical Chemistry 8 Hrs

A brief introduction to analytical methods in chemistry., Concentration terms – Molarity , Molality, Normality, v/v, w/v, ppm and ppb, preparing solutions – Standard solutions, Primary standards and secondary standards. PH , Buffer solutions in chemical analysis.

Description and use of common laboratory apparatus – Volumetric Flask, Burette, Pipette, calibration of standard flask, crucible, desiccator, separating funnel. Steps involved in chemical analysis.

UNIT: II Quantitative Analysis 12Hrs

Principles of Volumetric analysis: Theories of Acid – Base indicators (Including study of acid – base titration curves), redox, complex metric , iodometric and preceptation titration – choice of indicators for the saturartions.

Principles of gravimetric analysis: Precipitation, Coagulation, Peptization, Co Precipitation, post precipitation, Digestion, filtration and washing of precipitate, drying and ignition.

UNIT: III Treatments of analytical Data 8 Hrs

Types of Errors – Relative and absolute, significant figures and its importance,

Accuracy - methods of expressing accuracy, classification of errors – determinate and Indeterminate and minimization of errors, precision – methods of expressing Precision, Standard deviation and confidence interval. Least square regression analysis, readability of balance.

UNIT: IV Separation techniques 12Hrs

Types of extractions: (1) Solvent extraction – Introduction, principle, techniques, factors affecting solvent extractions, Batch extraction, continues extraction and counter current extraction Synergism. Application - Determination of Iron (III).

(2) Ion Exchange method: Introduction, action of ion exchange resins, applications, softening of Hard Water.

UNIT: V Analysis of Water 10 Hrs

Determination of dissolved solids, total hardness of Water, turbidity, alkalinity, Dissolved oxygen,

BOD, COD, determination of chloride using Mohr's method.

III. References:

1. Fundamentals of analytical chemistry by F. James holler, Stanley R. Crouch, Donald

M.Westand Douglas A.Skoog, Ninth edition, Cengage.

2. Analytical chemistry by Gary D.Christian, PurnenduK.Dasgupta and Kevin A.Schug, Seventh edition, Wileve.

3. Quantitative analysis by R.A.Dayjr. And A.L. Under woodn, 6 th edition pearson

4. Text book of Vogel's quantitative chemical analysis 6 th edition pearson

5. Text book of environmental chemistry and pollution control by S.S.Dara and D.D.Mishra,revised edition, S.Chand and Coltd.

Course 6B: Analytical methods in chemistry – I: PRACTICAL SYLLABUS

IV. Learning outcomes:

On successful completion of this practical course, student shall be able to:

1. Estimate Iron (II) using standard potassium dichromate solution.

2. Learn the procedure for the estimation of total hardness of water.

3. Demonstrate the determination of chloride using Mohr's method.

4. Acquire skills in the operation and calibration of P_H meter.

5. Perform the strong acid vs strong base titration using P_H meter.

V. Practical (Laboratory) syllabus (30Hrs) Max 50m

1. Estimation of Ion (II) using standard potassium dichromate solution(using DI'A indicator)

2. Estimation of total hardness of water using EDTA

3. Determination of chloride ion by using Mohr's method.

4. Study the effect on P_H of addition of HCl/NaOH to solutions of acetic acid,sodium acetate and their Solutions.

5. Preparation of Buffer solutions of different P_H (i) sodium acetate – acetic acid, (ii) Ammonium

2023-24

B.Sc. V Semester Chemistry Syllabus under CBCS

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SEMESTER – V

Domain Subject: Chemistry

Course VII – 7 B: Analytical methods in Chemistry – 2

Skill enhancement course (Elective) Credits: 05

Max Marks: 100+50

I. Learning outcomes:

Students after successful completion of the course will be able to:

1. Identify the importance of chromatography in the separation and identification of compounds in a mixture.
2. Acquire a critical knowledge on various chromatographic techniques.
3. Demonstrates skills related to analysis of water using different techniques.
4. Understand the principles of spectro chemistry in the determination of metal ions.
5. Comprehend the applications of atomic spectroscopic.

II. Syllabus: (Total Hours: 90 including teaching, Lab, Field skills training, Unit tests Etc.,

UNIT – 1: Chromatography – Introduction and classification 10 Hrs

Principle, Classification of chromatography methods, nature of adsorbents, eluents, R_f values, Factors affecting Rf values, Resolution, Plate theory, retention time, retention volume.

UNIT 2: **TLC and Paper chromatography 12 Hrs**

1. Thin Layer chromatography: Principle, experimental procedure, preparation of plates, adsorbents and solvents, development of chromatogram, detection of spots, applications and advantages.
2. Paper chromatography: Principle, Experimental procedure, choice of paper and solvents, various modes of development – ascending, descending, radial and two dimensional, applications.

UNIT 3: **Column Chromatography 12 Hrs**

1. Column chromatography: Principle, classification, experimental procedure, stationary and mobile phases, development of the chromatogram, applications.
2. HPLC: Basic principles, Normal phase, reverse phase, instrumentation – Block diagram components and applications.

UNIT 4: **Spectro photometry 08 Hrs**

Principle, instrumentation: Single beam and double beam spectro meter, Beer – Lambert's Law – Derivation and deviations from Beer – Lambert's Law. Applications of Beer – Lambert's Law – Quantitative determination of Fe^{+2}, Mn^{+2} and Pb^{+2}.

UNIT 5: **Atomic spectroscopy 08 Hrs**

Types, atomizer, atomic absorption principle, emission and applications.

III. References:

1. Fundamentals of analytical chemistry by F. James holler, Stanley R. Crouch, Donald

M.Westand Douglas A.Skoog, Ninth edition , Cengage.

2. Analytical chemistry by Gary D.Christian, PurnenduK.Dasgupta and Kevin A.Schug, Seventh edition , Wileve.

3. Quantitative analysis by R.A.Dayjr. and A.L. Under woodn, 6 th edition pearson

4. Text book of Vogel's quantitative chemical analysis 6 th edition pearson

Course 7B: Analytical methods in chemistry – II : PRACTICAL SYLLABUS

IV. Learning outcomes:

On successful completion of this practical course , student shall be able to :

1. Perform the separation of a given dye mixture using TLC.

2. Learn the preparation of TLC plates.

3. Demonstrate the separation of mixture of amino acids using paper chromatography.

4. Acquire skills in using column chromatography for the separation of dye mixture.

V. Practical (Laboratory) Syllabus (30Hrs) Max 50 M

1. Separation of a given dye mixture (Methyl orange and methylene blue) using TLC (using alumina as adsorbents).

2. Separation of mixture of methyl orange and methylene blue by column chromatography.

3. Separation of given mixture of amino acids (glycine and phenyl alanine) using ascending paper chromatography.

4. Separation of food dyes using column chromatography.

5. Estimation of Iron by colorimetry.

6. Verification of Beer – Labert's Law (Using potassium permanganate solution) using colorimeter/ Spectro photometer.

2023-24

Computer Science

I SEMESTER

COURSE 1 : ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Hours: 5hrs/week Credits: 4

Course Objective:

The objective of this course is to provide students with a comprehensive understanding of the essential concepts and applications of mathematical, physical, and chemical sciences. The course aims to develop students' critical thinking, problem-solving, and analytical skills in these areas, enabling them to apply scientific principles to real-world situations.

Learning outcomes:

1. Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.
2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations
3. To Explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to Connect their knowledge of chemistry to daily life.
4. Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical
5. principles can be used to explain and predict phenomena in different contexts.
6. To explore the history and evolution of the Internet and to gain an understanding of network security concepts, including threats, vulnerabilities, and countermeasures.

UNIT I: ESSENTIALS OF MATHEMATICS:9hrs

Complex Numbers: Introduction of the new symbol i – General form of a complex number – Modulus- Amplitude form and conversions

Trigonometric Ratios: Trigonometric Ratios and their relations – Problems on calculation of angles Vectors: Definition of vector addition – Cartesian form – Scalar and vector product and problems Statistical Measures: Mean, Median, Mode of a data and problems

UNIT II: ESSENTIALS OF PHYSICS: 9hrs

Definition and Scope of Physics- Measurements and Units - Motion of objects: Newtonian Mechanics and relativistic mechanics perspective - Laws of Thermodynamics and Significance- Acoustic waves and electromagnetic waves- Electric and Magnetic fields and their interactions- Behaviour of atomic and nuclear particles- Wave-particle duality, the uncertainty principle- Theories and understanding of universe

Introduction to Algorithms and Programming Languages: Algorithm–Key features of Algorithms, Flow Charts, Programming Languages – Generations of Programming Languages – Structured Programming Language- Design and Implementation of Correct, Efficient and Maintainable Programs.

UNIT II

Introduction to C: Introduction–Structure of C Program–Writing the first C Program–File used in C Program – Compiling and Executing C Programs – Using Comments – Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples.

Decision Control and Looping Statements: Introduction to Decision Control Statements– Conditional Branching Statements – Iterative Statements – Nested Loops – Break and Continue Statement – Goto Statement

UNIT III

Arrays: Introduction–Declaration of Arrays–Accessing elements of the Array–StoringValues in Array– Operations on Arrays – one dimensional, two dimensional and multi dimensional arrays, character handling and strings.

UNIT IV

Functions: Introduction–using functions–Function declaration/ prototype–Function definition – function call – return statement – Passing parameters – Scope of variables – Storage Classes – Recursive functions.

Structure, Union, and Enumerated Data Types: Introduction–Nested Structures–Arrays of Structures – Structures and Functions– Union – Arrays of Unions Variables – Unions inside Structures – Enumerated Data Types.

UNIT V

Pointers: Understanding Computer Memory–Introduction to Pointers–declaring Pointer Variables – Pointer Expressions and Pointer Arithmetic – Null Pointers - Passing Arguments to Functions using Pointer – Pointer and Arrays – Memory Allocation in C Programs – Memory Usage – Dynamic Memory Allocation – Drawbacks of Pointers

Files: Introduction to Files–Using Files in C–Reading Data from Files–Writing Data to Files – Detecting the End-of-file – Error Handling during File Operations – Accepting Command Line Arguments.

Definition and Scope of Chemistry- Importance of Chemistry in daily life -Branches of chemistry and significance- Periodic Table- Electronic Configuration, chemical changes, classification of matter, Biomolecules- carbohydrates, proteins, fats and vitamins.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY: 9hrs

Applications of Mathematics in Physics & Chemistry: Calculus , Differential Equations & Complex Analysis

Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, Automotive and Aerospace Industries, Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies.

Application of Chemistry in Industry and Technology: Chemical Manufacturing, Pharmaceuticals and Drug Discovery, Materials Science, Food and Beverage Industry.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

Milestones of computer evolution - Internet, history, Internet Service Providers, Types of Networks, IP, Domain Name Services, applications.

Ethical and social implications: Network and security concepts- Information Assurance Fundamentals, Cryptography-Symmetric and Asymmetric, Malware, Firewalls, Fraud Techniques- Privacy and Data Protection

Recommended books:

1. Functions of one complex variable by John.B.Conway, Springer- Verlag.
2. Elementary Trigonometry by H.S.Hall and S.R.Knight
3. Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd. 4.Basic Statistics by B.L.Agarwal, New age international Publishers
4. University Physics with Modern Physics by Hugh D. Young and Roger A. Freedman
5. Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker
6. Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway and John W. Jewett Jr.
7. Physics for Technology and Engineering" by John Bird
8. Chemistry in daily life by Kirpal Singh
9. Chemistry of bio molecules by S. P. Bhutan
10. Fundamentals of Computers by V. Raja Raman
11. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

I Semester

Course 2: ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Hours: 5 hrs/week Credits: 4

Course Objective:

The objective of this course is to provide students with an in-depth understanding of the recent advances and cutting-edge research in mathematical, physical, and chemical sciences. The course aims to broaden students' knowledge beyond the foundational concepts and expose them to the latest developments in these disciplines, fostering critical thinking, research skills, and the ability to contribute to scientific advancements.

Learning outcomes:

Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems.

To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations.

Understand the different sources of renewable energy and their generation processes and advances in nanomaterials and their properties, with a focus on quantum dots. To study the emerging field of quantum communication and its potential applications. To gain an understanding of the principles of biophysics in studying biological systems. Explore the properties and applications of shape memory materials.

Understand the principles and techniques used in computer-aided drug design and drug delivery systems, to understand the fabrication techniques and working principles of nanosensors. Explore the effects of chemical pollutants on ecosystems and human health.

Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.

5 Understand and convert between different number systems, such as binary, octal, decimal, and hexadecimal. Differentiate between analog and digital signals and understand their characteristics.Gain knowledge of different types of transmission media, such as wired (e.g., copper cables, fiber optics) and wireless (e.g., radio waves, microwave, satellite)..

UNIT I: ADVANCES IN BASICS MATHEMATICS 9hrs

Straight Lines: Different forms – Reduction of general equation into various forms –Point of intersection of two straight lines

Limits and Differentiation: Standard limits – Derivative of a function –Problems on product rule and quotient rule

Integration: Integration as a reverse process of differentiation – Basic methods of integration

Matrices: Types of matrices – Scalar multiple of a matrix – Multiplication of matrices – Transpose of a matrix and determinants

UNIT II: ADVANCES IN PHYSICS: 9hrs

Renewable energy: Generation, energy storage, and energy-efficient materials and devices. Recent advances in the field of nanotechnology: Quantum dots, Quantum Communication- recent advances in biophysics- recent advances in medical physics- Shape Memory Materials.

UNIT III: ADVANCES IN CHEMISTRY: 9hrs

Computer aided drug design and delivery, nano sensors, Chemical Biology, impact of chemical pollutants on ecosystems and human health, Dye removal - Catalysis method

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY 9hrs

Mathematical Modelling applications in physics and chemistry Application of Renewable energy: Grid Integration and Smart Grids, Application of nanotechnology: Nanomedicine,

Application of biophysics: Biophysical Imaging, Biomechanics, Neurophysics,

Application of medical physics: Radiation Therapy, Nuclear medicine

Solid waste management, Environmental remediation- Green Technology, Water treatment.

UNIT V: Advanced Applications of computer Science 9hrs

Number System-Binary, Octal, decimal, and Hexadecimal, Signals-Analog, Digital, Modem, Codec, Multiplexing, Transmission media, error detection and correction- Parity check and CRC, Networking devices- Repeater, hub, bridge, switch, router, gateway.

Recommended books:

1. Coordinate Geometry by S.L.Lony, Arihant Publications
2. Calculus by Thomas and Finny, Pearson Publications
3. Matrices by A.R.Vasishtha and A.K.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. "Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle
5. "Energy Storage: A Nontechnical Guide" by Richard Baxter
6. "Nanotechnology: Principles and Applications" by Sulabha K. Kulkarni and Raghvendra A. Bohara
7. "Biophysics: An Introduction" by Rodney Cotterill

8. "Medical Physics: Imaging" by James G. Webster
9. "Shape Memory Alloys: Properties and Applications" by Dimitris C. Lagoudas
10. Nano materials and applications by M.N.Borah
11. Environmental Chemistry by Anil.K.D.E.
12. Digital Logic Design by Morris Mano
13. Data Communication & Networking by Bahrouz Forouzan.

STUDENT ACTIVITIES

UNIT I: ADVANCES IN BASIC MATHEMATICS

1: Straight Lines Exploration

Provide students with a set of equations representing straight lines in different forms, such as slope-intercept form, point-slope form, or general form.

Students will explore the properties and characteristics of straight lines, including their slopes, intercepts, and point of intersection.

2: Limits and Differentiation Problem Solving

Students will apply the concept of limits to solve various problems using standard limits.

Encourage students to interpret the results and make connections to real-world applications, such as analyzing rates of change or optimizing functions.

3: Integration Exploration

Students will explore the concept of integration as a reverse process of differentiation and apply basic methods of integration, such as the product rule, substitution method, or
integration by parts.

Students can discuss the significance of integration in various fields, such as physics and chemistry

4: Matrices Manipulation

Students will perform operations on matrices, including scalar multiplication, matrix multiplication, and matrix transpose.

Students can apply their knowledge of matrices to real-world applications, such as solving systems of equations or representing transformations in geometry.

UNIT II: ADVANCES IN PHYSICS:

1: Case Studies

Provide students with real-world case studies related to renewable energy, nanotechnology, biophysics, medical physics, or shape memory materials.

Students will analyze the case studies, identify the challenges or problems presented, and propose innovative solutions based on the recent advances in the respective field.

They will consider factors such as energy generation, energy storage, efficiency,
sustainability, materials design, biomedical applications, or technological advancements.

2: Experimental Design

Assign students to design and conduct experiments related to one of the topics: renewable energy, nanotechnology, biophysics, medical physics, or shape memory materials.

They will identify a specific research question or problem to investigate and design an experiment accordingly.

Students will collect and analyze data, interpret the results, and draw conclusions based on their findings.

They will discuss the implications of their experimental results in the context of recent advances in the field.

3: Group Discussion and Debate

Organize a group discussion or debate session where students will discuss the ethical, social, and environmental implications of the recent advances in renewable energy, nanotechnology, biophysics, medical physics, and shape memory materials.

Assign students specific roles, such as proponent, opponent, or moderator, and provide them with key points and arguments to support their positions.

UNIT III: ADVANCES IN CHEMISTRY:

Experimental Design and Simulation

In small groups, students will design experiments or simulations related to the assigned topic.

For example, in the context of computer-aided drug design, students could design a virtual screening experiment to identify potential drug candidates for a specific disease target.

For nano sensors, students could design an experiment to demonstrate the sensitivity and selectivity of nano sensors in detecting specific analytes.

Chemical biology-related activities could involve designing experiments to study enzyme- substrate interactions or molecular interactions in biological systems.

Students will perform their experiments or simulations, collect data, analyze the results, and draw conclusions based on their findings.

Case Studies and Discussion

Provide students with real-world case studies related to the impact of chemical pollutants on ecosystems and human health.

Students will analyze the case studies, identify the sources and effects of chemical pollutants, and propose mitigation strategies to minimize their impact.

Encourage discussions on the ethical and environmental considerations when dealing with chemical pollutants.

For the dye removal using the catalysis method, students can explore case studies where catalytic processes are used to degrade or remove dyes from wastewater.

Students will discuss the principles of catalysis, the advantages and limitations of the catalysis method, and its applications in environmental remediation.

3: Group Project

Assign students to work in groups to develop a project related to one of the topics.

The project could involve designing a computer-aided drug delivery system, developing a nano sensor for a specific application, or proposing strategies to mitigate the impact of chemical pollutants on ecosystems.

Students will develop a detailed project plan, conduct experiments or simulations, analyze data, and present their findings and recommendations.

Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

1: Mathematical Modelling Experiment

Provide students with a mathematical modelling experiment related to one of the topics. For example, in the context of renewable energy, students can develop a mathematical model to optimize the placement and configuration of solar panels in a solar farm.

Students will work in teams to design and conduct the experiment, collect data, and analyze the results using mathematical models and statistical techniques.

They will discuss the accuracy and limitations of their model, propose improvements, and

interpret the implications of their findings in the context of renewable energy or the specific application area.

2: Case Studies and Group Discussions

Assign students to analyze case studies related to the applications of mathematical modelling in nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment.

Students will discuss the mathematical models and computational methods used in the case studies, analyze the outcomes, and evaluate the effectiveness of the modelling approach.

Encourage group discussions on the challenges, ethical considerations, and potential advancements in the field.

Students will present their findings and engage in critical discussions on the advantages and limitations of mathematical modelling in solving complex problems in these areas.

Group Project

Assign students to work in groups to develop a group project that integrates mathematical modelling with one of the application areas: renewable energy, nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment.

The project could involve developing a mathematical model to optimize the delivery of radiation therapy in medical physics or designing a mathematical model to optimize waste management practices.

Students will plan and execute their project, apply mathematical modelling techniques, analyze the results, and present their findings and recommendations.

Encourage creativity, critical thinking, and collaboration throughout the project.

II Semester

Course 3: Problem Solving using C

Credits -3

Course Objectives

1. To explore basic knowledge on computers
2. Learn how to solve common types of computing problems.
3. Learn to map problems to programming features of C.
4. Learn to write good portable C programs.

Course Outcomes

Upon successful completion of the course, a student will be able to:

1. Understand the working of a digital computer and Fundamental constructs of Programming
2. Analyze and develop a solution to a given problem with suitable control structures
3. Apply the derived data types in program solutions
4. Use the 'C' language constructs in the right way
5. Apply the Dynamic Memory Management for effective memory utilization

UNIT-I

Introduction to computer and programming: Introduction, Basic block diagram and functions of various components of computer, Concepts of Hardware and software, Types of software, Compiler and interpreter, Concepts of Machine level, Assembly level and high-level programming, Flowcharts and Algorithms

Fundamentals of C: History of C, Features of C, C Tokens-variables and keywords and identifiers, constants and Data types, Rules for constructing variable names, Operators, Structure of C program, Input /output statements in C-Formatted and Unformatted I/O

UNIT-II

Control statements: Decision making statements: if, if else, else if ladder, switch statements. Loop control statements: while loop, for loop and do-while loop. Jump Control statements: break, continue and goto.

UNIT-III

Derived data types in C: Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays -Declaration, Initialization and Memory representation.

Strings: Declaring & Initializing string variables; String handling functions, Character handling functions

UNIT-IV

Functions: Function Prototype, definition and calling. Return statement. Nesting of functions. Categories of functions. Recursion, Parameter Passing by address & by value. Local and Global variables. **Storage classes**: automatic, external, static and register.

Pointers: Pointer data type, Pointer declaration, initialization, accessing values using pointers. Pointer arithmetic. Pointers and arrays, pointers and functions.

UNIT-V

Dynamic Memory Management: Introduction, Functions-malloc, calloc, realloc, free **Structures:** Basics of structure, structure members, accessing structure members, nested structures, array of

structures, structure and functions, structures and pointers. **Unions** - Union definition; difference between Structures and Unions.

Text Books:

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978-1-25- 90046-2
2. Herbert Schildt, —Complete Reference with C, Tata McGraw Hill, 4th Edn., ISBN- 13: 9780070411838, 2000
3. Computer fundamentals and programming in C, REEMA THAREJA, OXFORD UNIVERSITY PRESS

Reference Books

1. E Balagurusamy, COMPUTING FUNDAMENTALS & C PROGRAMMING – Tata McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.
2. Ashok N Kamthane, Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.
3. Henry Mullish&Huubert L.Cooper: The Spirit of C An Introduction to modern Programming, Jaico Pub. House,1996.
4. Y kanithkar, let us C BPB, 13 th edition-2013, ISBN:978-8183331630,656 pages.

SUGGESTED CO-CURRICULAR ACTIVITIES & EVALUATION METHODS:

Unit 1: Activity: Quiz on computer hardware and software concepts
Evaluation Method: Objective-based quiz assessing knowledge and understanding

Unit 2: Activity: Problem-solving using Decision-Making Statements
Evaluation Method: Correctness of decision-making logic

Unit 3: Activity: Array and String Program Debugging
Evaluation Method: Identification and correction of errors in code

Unit 4: Activity: Pair Programming Exercise on Functions
Evaluation Method: Collaboration and Code Quality

Unit 5: Activity: Structured Programming Assignment
Evaluation Method: Appropriate use of structures and nested structures

II Semester

Course 3: Problem Solving using C

Credits -1

List of Experiments

1. A. Write a program to calculate simple & compound interest
   B. Write a C program to interchange two numbers.
2. Find the biggest of three numbers using C.
3. Write a c program to find the sum of individual digits of a positive integer.
4. A Fibonacci sequence is defined as follows: the first and second terms in the sequenceare 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
5. Write a c program to check whether a number is Armstrong or not.
6. Write a c program to generate all the prime numbers between 1 and n, where n is avalue supplied by the user.
7. Write a c program that implements searching of given item in given list
8. Write a c program that uses functions to perform the following: Addition of twomatrices. Multiplication of two matrices.
9. Write a program for concatenation of two strings.
10. Write a program for length of a string with and without String Handling functions
11. Write a program to demonstrate Call by Value and Call by Reference mechanism
12. Write a Program to find GCD of Two numbers using Recursion
13. Write a c program to perform various operations using pointers.
14. Write a c program to read data of 10 employees with a structure of 1.employee id2.aadar no, 3.title, 4.joined date, 5.salary, 6.date of birth, 7.gender, 8.department.
15. Write a Program to demonstrate dynamic arrays using Dynamic Memory Management functions

II Semester

Course 4: Digital Logic Design

Credits -3

Course Objectives

To familiarize with the concepts of designing digital circuits.

Course Outcomes

Upon successful completion of the course, the students will be able to

1. Understand how to Convert numbers from one radix to another radix and performarithmetic operations.
2. Simplify Boolean functions using Boolean algebra and k- maps
3. Design adders and subtractors circuits
4. Design combinational logic circuits such as decoders, encoders, multiplexers and demultiplexers.
5. Use flip flops to design registers and counters.

UNIT – I

Number Systems: Binary, octal, decimal, hexadecimal number systems, conversion of numbers from one radix to another radix, r's, (r-1)'s complements, signed binary numbers, addition and subtraction of unsigned and signed numbers, weighted and unweighted codes.

UNIT – II

Logic Gates and Boolean Algebra: NOT, AND, OR, universal gates, X-OR and X-NOR gates, Boolean laws and theorems, complement and dual of a logic function, canonical and standard forms, two level realization of logic functions using universal gates, minimizations of logic functions (POS and SOP) using Boolean theorems, K-map (up to four variables), don't care conditions.

UNIT – III

Combinational Logic Circuits – 1: Design of half adder, full adder, half subtractor, fullsubtractor, ripple adders and subtractors, ripple adder / subtractor.

UNIT – IV

Combinational Logic Circuits – 2: Design of decoders, encoders, priority encoder, multiplexers, demultiplexers, higher order decoders, demultiplexers and multiplexers, realization of Boolean functions using decoders, multiplexers.

UNIT – V

Sequential Logic Circuits: Classification of sequential circuits, latch and flip-flop, RS- latch using NAND and NOR Gates, truth tables, RS, JK, T and D flip-flops, truth and excitation tables, conversion of flip- flops, flip-flops with asynchronous inputs (preset and clear).

Design of registers, shift registers, bidirectional shift registers, universal shift register, design of ripple counters, synchronous counters and variable modulus counters.

1. M. Morris Mano, Michael D Ciletti, "Digital Design", 5th edition, PEA.

Reference Books

1. Kohavi, Jha, "Switching and Finite Automata Theory", 3rd edition, Cambridge.
2. 2. Leach, Malvino, Saha, "Digital Principles and Applications", 7th edition, TMH.
3. 3. Roth, "Fundamentals of Logic Design", 5th edition, Cengage.

SUGGESTED CO-CURRICULAR ACTIVITIES & EVALUATION METHODS:

Unit 1: Activity: JAM (Just a Minute) Session: Explaining Radix Conversion
Evaluation Method: Communication Skills and Knowledge Presentation

Unit 2: Activity: Boolean Algebra Assignment
Evaluation Method: Assignment Completion and Correctness

Unit 3: Activity: Hands-on Lab Activity: Building Adder and Subtractor Circuits
Evaluation Method: Lab Performance and Correctness of Circuit Implementation

Unit 4: Activity: Group Discussion: Applications of Decoders, Encoders, Multiplexers
Evaluation Method: Participation and Critical Thinking

Unit 5: Activity: Quiz on Flip-Flops and Register-Counter Design
Evaluation Method: Quiz Performance and Knowledge Retention

II Semester
Course 4: Digital Logic Design
Credits -1

List of Experiments

The laboratory work can be done by using physical gates and necessary equipment or simulators.

Simulators: https://sourceforge.net/projects/gatesim/ or https://circuitverse.org/ or any free open-source simulator

1. Introduction to digital electronics lab- nomenclature of digital ICs, specifications, study of the data sheet, concept of Vcc and ground, verification of the truth tables of logic gates using TTL ICs.
2. Implementation of the given Boolean functions using logic gates in both SOP and POS forms
3. Realization of basic gates using universal gates.
4. Design and implementation of half and full adder circuits using logic gates.
5. Design and implementation of half and full subtractor circuits using logic gates.
6. Verification of stable tables of RS, JK, T and D flip-flops using NAND gates.
7. Verification of stable tables of RS, JK, T and D flip-flops using NOR gates.

2022-23

DATA STRUCTURES USING C

Semester	Course Code	Course Title	Hours	Credits
II	C2	DATA STRUCTURES USING C	60	3

Course Objectives

To introduce the fundamental concept of data structures and to emphasize the importance of various data structures in developing and implementing efficient algorithms.

Course Learning Outcomes:

Upon successful completion of the course, a student will be able to:

1. Understand available Data Structures for data storage and processing.
2. Comprehend Data Structure and their real-time applications - Stack, Queue, Linked List, Trees and Graph
3. Choose a suitable Data Structures for an application
4. Develop ability to implement different Sorting and Search methods
5. Have knowledge on Data Structures basic operations like insert, delete, search, update and traversal
6. Design and develop programs using various data structures
7. Implement the applications of algorithms for sorting, pattern matching etc

UNIT – I:

Introduction to Data Structures: Introduction to the Theory of Data Structures, Data Representation, Abstract Data Types, Data Types, Primitive Data Types, Data Structure and Structured Type, Atomic Type, Difference between Abstract Data Types, Data Types, and Data Structures, Refinement Stages

UNIT – II:

Arrays: Introduction to Linear and Non- Linear Data Structures, One- Dimensional Arrays, Array Operations, Two- Dimensional arrays, Multidimensional Arrays, Pointers and Arrays, an Overview of Pointers

Linked Lists: Introduction to Lists and Linked Lists, Dynamic Memory Allocation, Basic Linked List Operations, Doubly Linked List, Circular Linked List, Atomic Linked List, Linked List in Arrays, Linked List versus Arrays

UNIT – III:

Stacks: Introduction to Stacks, Stack as an Abstract Data Type, Representation of Stacksthrough Arrays, Representation of Stacks through Linked Lists, Applications of Stacks, Stacks and Recursion

Queues: Introduction, Queue as an Abstract data Type, Representation of Queues, CircularQueues, Double Ended Queues- Deques, Priority Queues, Application of Queues

UNIT – IV:

Binary Trees: Introduction to Non- Linear Data Structures, Introduction Binary Trees, Types of Trees, Basic Definition of Binary Trees, Properties of Binary Trees, Representation of Binary Trees, Operations on a Binary Search Tree, Binary Tree Traversal, Counting Number of Binary Trees, Applications of Binary Tree

UNIT – V:

Searching and sorting: Sorting–An Introduction, Bubble Sort, Insertion Sort, Merge Sort,Searching – An Introduction, Linear or Sequential Search, Binary Search, Indexed Sequential Search

Graphs: Introduction to Graphs, Terms Associated with Graphs, Sequential Representationof Graphs, Linked Representation of Graphs, Traversal of Graphs, Spanning Trees, Shortest Path, Application of Graphs.

BOOKS:

1. "Data Structures using C", ISRD group Second Edition, TMH
2. "Data Structures through C", YashavantKanetkar, BPB Publications
3. "Data Structures Using C" Balagurusamy E. TMH

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

DATABASE MANAGEMENT SYSTEMS

Semester	Course Code	Course Title	Hours	Credits
III	C3	DATABASE MANAGEMENT SYSTEMS	60	3

Course Objective:

The objective of the course is to introduce the design and development of databases with special emphasis on relational databases.

Course Learning Outcomes:

On completing the subject, students will be able to:

1. Gain knowledge of Database and DBMS.
2. Understand the fundamental concepts of DBMS with special emphasis on relational data model.
3. Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database
4. Model databaseusing ER Diagrams and design database schemas based on the model.
5. Create a small database using SQL.
6. Store, Retrieve data in database.

UNIT I

Overview of Database Management System: Introduction to data, information, database, database management systems, file-based system, Drawbacks of file-Based System, database approach, Classification of Database Management Systems, advantages of database approach, Various Data Models, Components of Database Management System, three schema architecture of data base, costs and risks of database approach.

UNIT II

Entity-Relationship Model: Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization.

UNIT III

Relational Model: Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, Functional dependencies and normal forms upto 3rd normal form.

UNIT IV

Structured Query Language: Introduction, History of SQL Standard, Commands in SQL,Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Join Operation, Set Operations, View, Sub Query.

UNIT V

PL/SQL: Introduction, Shortcomings of SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL, Program, Iterative Control, Procedure, Function, Database Triggers, Types of Triggers.

BOOKS:

1. Database System Concepts by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill
2. Database Management Systems by Raghu Ramakrishnan, McGrawhill
3. Principles of Database Systems by J. D. Ullman
4. Fundamentals of Database Systems by R. Elmasri and S. Navathe
5. SQL: The Ultimate Beginners Guide by Steve Tale.

OBJECT ORIENTATED PROGRAMMING THROUGH JAVA

Semester	Course Code	Course Title	Hours	Credits
IV	C4	OBJECT ORIENTATED PROGRAMMING THROUGH JAVA	60	3

Objectives:

To introduce the fundamental concepts of Object-Oriented programming and to design & implement object oriented programming concepts in Java.

Course Learning Outcomes: At the end of this course student will:

1. Understand the benefits of a well-structured program
2. Understand different computer programming paradigms
3. Understand underlying principles of Object-Oriented Programming in Java
4. Develop problem-solving and programming skills using OOP concepts
5. Develop the ability to solve real-world problems through software development in high-level programming language like Java

UNIT – I

Introduction to Java: Features of Java, The Java virtual Machine, Parts of Java

Naming Conventions and Data Types: Naming Conventions in Java, Data Types in Java, Literals

Operators in Java: Operators, Priority of Operators

Control Statements in Java: if... else Statement, do... while Statement, while Loop, forLoop, switch Statement, break Statement, continue Statement, return Statement

Input and Output: Accepting Input from the Keyboard, Reading Input withJava.util.Scanner Class, Displaying Output with System.out.printf(), Displaying Formatted Output with String.format()

UNIT – II

Arrays: Types of Arrays, Three Dimensional Arrays (3D array), arrayname.length, Command Line Arguments

Strings: Creating Strings, String Class Methods, String Comparison, Immutability of Strings

Introduction to OOPs: Problems in Procedure Oriented Approach, Features of Object-Oriented Programming System (OOPS)

Classes and Objects: Object Creation, Initializing the Instance Variables, Access Specifiers, Constructors

Methods in Java: Method Header or Method Prototype, Method Body, Understanding Methods, Static Methods, Static Block, The keyword 'this', Instance Methods, Passing Primitive Data Types to Methods, Passing Objects to Methods, Passing Arrays to Methods, Recursion, Factory Methods

UNIT – III

Inheritance: Inheritance, The keyword 'super', The Protected Specifier, Types ofInheritance

Polymorphism: Polymorphism with Variables, Polymorphism using Methods,Polymorphism with Static Methods, Polymorphism with Private Methods, Polymorphism with Final Methods, final Class

Type Casting: Types of Data Types, Casting Primitive Data Types, Casting Referenced DataTypes, The Object Class

Abstract Classes: Abstract Method and Abstract Class

Interfaces: Interface, Multiple Inheritance using Interfaces

Packages: Package, Different Types of Packages, The JAR Files, Interfaces in a Package,Creating Sub Package in a Package, Access Specifiers in Java, Creating API Document

UNIT – IV

Exception Handling: Errors in Java Program, Exceptions, throws Clause, throw Clause,Types of Exceptions, Re – throwing an Exception

Streams: Stream, Creating a File using FileOutputStream, Reading Data from a File using FileInputStream, Creating a File using FileWriter, Reading a File using FileReader, Zipping and Unzipping Files, Serialization of Objects, Counting Number of Characters in a File, File Copy, File Class

UNIT – V

Threads: Single Tasking, Multi Tasking, Uses of Threads, Creating a Thread and Running it, Terminating the Thread, Single Tasking Using a Thread, Multi Tasking Using Threads, Multiple Threads Acting on Single Object, Thread Class Methods, Deadlock of Threads, Thread Communication, Thread Priorities, thread Group, Daemon Threads, Applications of Threads, Thread Life Cycle.

Applets: Creating an Applet, Uses of Applets, <APPLET> tag, A Simple Applet, An Applet with Swing Components, Animation in Applets, A Simple Game with an Applet, Applet Parameters

BOOKS:

1. Core Java: An Integrated Approach, Authored by Dr. R. Nageswara Rao &Kogent Learning Solutions Inc.
2. E.Balaguruswamy, Programming with JAVA, A primer, 3e, TATA McGraw-Hill Company.
3. John R. Hubbard, Programming with Java, Second Edition, Schaum's outline Series, TMH.
4. Deitel&Deitel. Java TM: How to Program, PHI (2007)

RECOMMENDED CO-CURRICULAR ACTIVITIES:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

OPERATING SYSTEMS

Semester	Course Code	Course Title	Hours	Credits
IV	C5	OPERATING SYSTEMS	60	2

Objectives:

This course aims to introduce the structure and organization of a file system. It emphasizes various functions of an operating system like memory management, process management, device management, etc.

Course Learning Outcomes:

Upon successful completion of the course, a student will be able to:

1. Know Computer system resources and the role of operating system in resource management with algorithms
2. Understand Operating System Architectural design and its services.
3. Gain knowledge of various types of operating systems including Unix and Android.
4. Understand various process management concepts including scheduling, synchronization, and deadlocks.
5. Have a basic knowledge about multithreading.
6. Comprehend different approaches for memory management.
7. Understand and identify potential threats to operating systems and the security features design to guard against them.
8. Specify objectives of modern operating systems and describe how operating systems have evolved over time.
9. Describe the functions of a contemporary operating system

UNIT- I

What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems– Multiprogramming Systems, Batch Systems, Time Sharing Systems; Operating Systems for Personal Computers, Workstations and Hand-held Devices, Process Control & Real time Systems.

UNIT- II

Processor and User Modes, Kernels, System Calls and System Programs, System View of the Process and Resources, ProcessAbstraction, ProcessHierarchy, Threads, Threading Issues, Thread Libraries; Process Scheduling, Non-Preemptive and Preemptive Scheduling Algorithms.

UNIT III

Process Management: Deadlock, Deadlock Characterization, Necessary and Sufficient Conditions for Deadlock, Deadlock Handling Approaches: Deadlock Prevention, Deadlock Avoidance and Deadlock Detection and Recovery.

Concurrent and Dependent Processes, Critical Section, Semaphores, Methods for Inter-process Communication; Process Synchronization, Classical Process Synchronization Problems: Producer-Consumer, Reader-Writer.

UNIT IV

Memory Management: Physical and Virtual Address Space; Memory Allocation Strategies– Fixed and -Variable Partitions, Paging, Segmentation, Virtual Memory.

UNIT V

File and I/O Management, OS security : Directory Structure, File Operations, FileAllocation Methods, Device Management, Pipes, Buffer, Shared Memory, Security Policy Mechanism, Protection, Authentication and Internal Access Authorization

REFERENCE BOOKS:

1. Operating System Principles by Abraham Silberschatz, Peter Baer Galvin and Greg Gagne (7^{th}Edition) Wiley India Edition.
2. Operating Systems: Internals and Design Principles by Stallings (Pearson)
3. Operating Systems by J. Archer Harris (Author), Jyoti Singh (Author) (TMH)
4. Online Resources for UNIT V

2023-24

B.Sc Computer Science V Semester Syllabus under CBCS

Course 6A: Web Interface Designing Technologies

Course Objectives:

The objective of the course is to introduce the design and development of Become familiar with graphic design principles that relate to web design and learn how to implement theories into practice. Develop skills in analyzing the usability of a web site. Understand how to plan and conduct user research related to web usability. Learn the language of the web: HTML and CSS.

Course Learning Outcomes: Students after successful completion of the course will be able to:

1. Understand and appreciate the web architecture and services.
2. Gain knowledge about various components of a website.
3. Demonstrate skills regarding creation of a static website and an interface to dynamic website.
4. Learn how to install word press and gain the knowledge of installing various plug ins to use in their websites.

UNIT I:

HTML: Introduction to web designing, difference between web applications and desktop applications, introduction to HTML, HTML structure, elements, attributes, headings, paragraphs, styles, colours, HTML Hyperlinks, HTML formatting, Quotations, Comments, images, tables, lists, blocks and classes, HTML CSS, HTML frames, HTML responsive.

UNIT II:

HTML forms: HTML form elements, input types, input attributes, HTML5, HTML graphics, HTML media – video, audio, plug INS, you tube.

HTML API'S: Geo location, Drag/drop, local storage, HTML SSE.

CSS: CSS home, introduction, syntax, colours, background, borders, margins, padding, height/width, text, fonts, icons, tables, lists, position, float, CSS combinators, pseudo class, pseudo elements, opacity, tool tips, image gallery, CSS forms.

UNIT III:

Client side Validation: Introduction to JavaScript - What is DHTML, JavaScript, basics, variables, string manipulations, mathematical functions, statements, operators, arrays, functions. Objects in JavaScript - Data and objects in JavaScript, regular expressions, exception handling. DHTML with JavaScript - Data validation, opening a new window, messages and confirmations, the status bar, different frames, rollover buttons, moving images.

UNIT IV:

Word press: Introduction to word press, servers like wamp, bitnami e.tc, installing and configuring word press, understanding admin panel, working with posts and pages, using editor, text formatting with shortcuts, working with media-Adding, editing, deleting media elements, working with widgets, menus.

UNIT V:

Working with themes-parent and child themes, using featured images, configuring settings, user and user roles and profiles, adding external links, extending word press with plug-ins. Customizing the site, changing the appearance of site using css , protecting word press website from hackers.

Prescribed Text Books:

1. Chris Bates, Web Programming Building Internet Applications, Second Edition,Wiley (2007)

Reference Books:

1. Paul S.WangSanda S. Katila, an Introduction to Web Design plus Programming, Thomson (2007).

2. Head First HTML and CSS, Elisabeth Robson, Eric Freeman, O'Reilly Media Inc.

3. An Introduction to HTML and JavaScript: for Scientists and Engineers, David R. Brooks. Springer, 2007

4. Schaum's Easy Outline HTML, David Mercer, Mcgraw Hill Professional.

5. Word press for Beginners, Dr.Andy Williams.

6. Professional word press, Brad Williams, David damstra, Hanstern

2023-24

B.Sc Computer Science V Semester Syllabus under CBCS

Course 7A: Web Applications Development using PHP & MYSQL

Course Objectives:

To introduce the fundamental concepts PHP has experienced in a short time a real revolution and, from its functions, in these moments you can perform a multitude of useful tasks for web development.

Course Learning Outcomes:

Students after successful completion of the course will be able to:

1. Write simple programs in PHP.
2. Understand how to use regular expressions, handle exceptions, and validate data using PHP.
3. Apply In-Built functions and Create User defined functions in PHP programming.
4. Write PHP scripts to handle HTML forms.
5. Write programs to create dynamic and interactive web-based applications using PHP and MYSQL.
6. Know how to use PHP with a MySQL database and can write database driven webpages.

UNIT – I:

The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants. Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output. Working with Functions: What is function? Calling functions, Defining Functions, Returning the values from User-Defined Functions, Variable Scope.

UNIT – II:

Working with Arrays: What are Arrays? Creating Arrays, Some Array-Related Functions. Working with Objects: Creating Objects, Object Instance Working with Strings, Dates and Time: Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

UNIT – III:

Working with Forms: Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, and Working with File Uploads. Working with Cookies and User Sessions: Introducing Cookies, Settingng a Cookie with PHP, Session Function Overview, starting a Session, working with session variables, passing session IDs in the Query String, Destroying Sessions and Unsetting Variables, Using Sessions in an Environment with Registered Users.

UNIT – IV:

Working with Files and Directories: Including Files with inclue(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from Files, Writing or Appending to a File, Working with Directories, Open Pipes to and from Process Using popen(), Running Commands with exec(), Running Commands with system() or passthru().

Working with Images: Understanding the Image-Creation Process, Necessary Modifications to PHP, Drawing a New Image, Getting Fancy with Pie Charts, Modifying Existing Images, Image Creation from User Input.

UNIT – V:

Interacting with MySQL using PHP: MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data. Creating an Online Address Book: Planning and Creating Database Tables, Creating Menu, Creating Record Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism, Adding Sub-entities to a Record Sets

Prescribed Text Book:

1. Core Python, Bean Tech Publishers

Reference Books:

1. Julie C. Meloni, SAMS Teach yourself PHP MySQL and Apache, Pearson Education (2007).
2. Steven Holzner , PHP: The Complete Reference, McGraw-Hill
3. Robin Nixon, Learning PHP, MySQL, JavaScript, CSS & HTML5, Third Edition O 'reilly, 2014
4. Xue Bai Michael Ekedahl, The web warrior guide to Web Programming, Thomson (2006).

2023-24

SEMESTER-I

COURSE 1: ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL ANDCHEMICAL SCIENCES

Theory | Credits: 4 | 5 hrs/week

Course Objective:

The objective of this course is to provide students with a comprehensive understanding of the essential concepts and applications of mathematical, physical, and chemical sciences. The course aims to develop students' critical thinking, problem-solving, and analytical skills in these areas, enabling them to apply scientific principles to real-world situations.

Learning outcomes:

1. Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.

2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations

3. To Explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to Connect their knowledge of chemistry to daily life.

4. Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.

5 To explore the history and evolution of the Internet and to gain an understanding of network security concepts, including threats, vulnerabilities, and countermeasures.

UNIT I: ESSENTIALS OF MATHEMATICS:

Complex Numbers: Introduction of the new symbol i – General form of a complex number – Modulus-Amplitude form and conversions

Trigonometric Ratios: Trigonometric Ratios and their relations – Problems on calculation of angles**Vectors:** Definition of vector addition – Cartesian form – Scalar and vector product and problems **Statistical Measures**: Mean, Median, Mode of a data and problems

UNIT II: ESSENTIALS OF PHYSICS:

Definition and Scope of Physics- Measurements and Units - Motion of objects: Newtonian Mechanics and relativistic mechanics perspective - Laws of Thermodynamics and Significance- Acoustic waves and electromagnetic waves- Electric and Magnetic fields and their interactions- Behaviour of atomic and nuclear particles- Wave-particle duality, the uncertainty principle- Theories and understanding of universe

UNIT III: ESSENTIALS OF CHEMISTRY: :

Definition and Scope of Chemistry- Importance of Chemistry in daily life -Branches of chemistry and significance- Periodic Table- Electronic Configuration, chemical changes, classification of matter, Biomolecules- carbohydrates, proteins, fats and vitamins.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY:

Applications of Mathematics in Physics & Chemistry: Calculus , Differential Equations & Complex Analysis

Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, Automotive and Aerospace Industries, Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies.

Application of Chemistry in Industry and Technology: Chemical Manufacturing, Pharmaceuticals and Drug Discovery, Materials Science, Food and Beverage Industry.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

Milestones of computer evolution - Internet, history, Internet Service Providers, Types of Networks, IP, Domain Name Services, applications.
Ethical and social implications: Network and security concepts- Information Assurance Fundamentals, Cryptography-Symmetric and Asymmetric, Malware, Firewalls, Fraud Techniques- Privacy and Data Protection

Recommended books:

1. Functions of one complex variable by John.B.Conway, Springer- Verlag.
2. Elementary Trigonometry by H.S.Hall and S.R.Knight
3. Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. Basic Statistics by B.L.Agarwal, New age international Publishers
5. University Physics with Modern Physics by Hugh D. Young and Roger A. Freedman
6. Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker
7. Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway and John W. Jewett Jr.
8. Physics for Technology and Engineering" by John Bird
9. Chemistry in daily life by Kirpal Singh
10. Chemistry of bio molecules by S. P. Bhutan
11. Fundamentals of Computers by V. Raja Raman
12. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

STUDENT ACTIVITIES

UNIT I: ESSENTIALS OF MATHEMATICS:

1: Complex Number Exploration

Provide students with a set of complex numbers in both rectangular and polar forms.

They will plot the complex numbers on the complex plane and identify their properties

2: Trigonometric Ratios Problem Solving

Give students a set of problems that require the calculation of trigonometric ratios and their relations.

Students will solve the problems using the appropriate trigonometric functions (sine, cosine, tangent, etc.) and trigonometric identities.

3: Vector Operations and Applications

Provide students with a set of vectors in Cartesian form.

Students will perform vector addition and subtraction operations to find the resultant vectors.

They will also calculate the scalar and vector products of given vectors.

4: Statistical Measures and Data Analysis

Give students a dataset containing numerical values.

Students will calculate the mean, median, and mode of the data, as well as other statistical measures if appropriate (e.g., range, standard deviation).
They will interpret the results and analyze the central tendencies and distribution of the data.

UNIT II: ESSENTIALS OF PHYSICS:

1. Concept Mapping

Divide students into groups and assign each group one of the topics.

Students will create a concept map illustrating the key concepts, relationships, and applications related to their assigned topic.

Encourage students to use visual elements, arrows, and labels to represent connections and interdependencies between concepts.

2. Laboratory Experiment

Select a laboratory experiment related to one of the topics, such as motion of objects or electric and magnetic fields.
Provide the necessary materials, instructions, and safety guidelines for conducting the experiment.
Students will work in small groups to carry out the experiment, collect data, and analyze the results.

After the experiment, students will write a lab report summarizing their findings, observations, and conclusions.

UNIT III: ESSENTIALS OF CHEMISTRY

1: Chemistry in Daily Life Presentation

Divide students into groups and assign each group a specific aspect of daily life where chemistry plays a significant role, such as food and nutrition, household products, medicine,or environmental issues.
Students will research and create a presentation (e.g., PowerPoint, poster, or video) that showcases the importance of chemistry in their assigned aspect.
2: Periodic Table Exploration

Provide students with a copy of the periodic table.

Students will explore the periodic table and its significance in organizing elements based on their properties.
They will identify and analyze trends in atomic structure, such as electronic configuration, atomic size, and ionization energy.

3: Chemical Changes and Classification of Matter

Provide students with various substances and chemical reactions, such as mixing acids and bases or observing a combustion reaction.
Students will observe and describe the chemical changes that occur, including changes in color, temperature, or the formation of new substances.
4: Biomolecules Investigation

Assign each student or group a specific biomolecule category, such as carbohydrates,proteins, fats, or vitamins.
Students will research and gather information about their assigned biomolecule category, including its structure, functions, sources, and importance in the human body.

They can create informative posters or presentations to present their findings to the class.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

1: Interdisciplinary Case Studies

Divide students into small groups and provide them with interdisciplinary case studies that involve the interdisciplinary application of mathematics, physics, and chemistry.

Each case study should present a real-world problem or scenario that requires the integration of concepts from all three disciplines.

2: Design and Innovation Project

Challenge students to design and develop a practical solution or innovation that integrates mathematics, physics, and chemistry principles.

Students can choose a specific problem or area of interest, such as renewable energy, environmental conservation, or materials science.
3: Laboratory Experiments

Assign students laboratory experiments that demonstrate the practical applications of

mathematics, physics, and chemistry.

Examples include investigating the relationship between concentration and reaction rate, analyzing the behavior of electrical circuits, or measuring the properties of materials.

.4: Mathematical Modeling

Present students with real-world problems that require mathematical modeling and analysis.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

1. Identifying the attributes of network (Topology, service provider, IP address and bandwidth of
2. your college network) and prepare a report covering network architecture.
3. Identify the types of malwares and required firewalls to provide security.
4. Latest Fraud techniques used by hackers.

SEMESTER-I

COURSE 2: ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Theory | Credits: 4 | 5 hrs/week

Course Objective:

The objective of this course is to provide students with an in-depth understanding of the recent advances and cutting-edge research in mathematical, physical, and chemical sciences. The course aims to broaden students' knowledge beyond the foundational concepts and expose them to the latest developments in these disciplines, fostering critical thinking, research skills, and the ability to contribute to scientific advancements.

Learning outcomes:

1. Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems.

2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations.

3. Understand the different sources of renewable energy and their generation processes and advances in nanomaterials and their properties, with a focus on quantum dots. To study the emerging field of quantum communication and its potential applications. To gain an understanding of the principles of biophysics in studying biological systems. Explore the properties and applications of shape memory materials.

3. Understand the principles and techniques used in computer-aided drug design and drug delivery systems, to understand the fabrication techniques and working principles of nanosensors. Explore the effects of chemical pollutants on ecosystems and human health.

4. Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.

5 Understand and convert between different number systems, such as binary, octal, decimal, and hexadecimal. Differentiate between analog and digital signals and understand their characteristics.Gain knowledge of different types of transmission media, such as wired (e.g., copper cables, fiber optics) and wireless (e.g., radio waves, microwave, satellite)..

UNIT I: ADVANCES IN BASICS MATHEMATICS

Straight Lines: Different forms – Reduction of general equation into various forms – Point ofintersection of two straight lines

Limits and Differentiation: Standard limits – Derivative of a function –Problems on product ruleand quotient rule

Integration: Integration as a reverse process of differentiation – Basic methods of integration

Matrices: Types of matrices – Scalar multiple of a matrix – Multiplication of matrices – Transpose ofa matrix and determinants

UNIT II: ADVANCES IN PHYSICS:

Renewable energy: Generation, energy storage, and energy-efficient materials and devices. **Recent advances in the field of nanotechnology**: Quantum dots, Quantum Communication- recent advances in biophysics- recent advances in medical physics- Shape Memory Materials.

UNIT III: ADVANCES IN CHEMISTRY:

Computer aided drug design and delivery, nano sensors, Chemical Biology, impact of chemical pollutants on ecosystems and human health, Dye removal - Catalysis method

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

Mathematical Modelling applications in physics and chemistry

Application of Renewable energy: Grid Integration and Smart Grids,

Application of nanotechnology: Nanomedicine,

Application of biophysics: Biophysical Imaging, Biomechanics, Neurophysics,

Application of medical physics: Radiation Therapy, Nuclear medicine

Solid waste management, Environmental remediation- Green Technology, Water treatment.

UNIT V: Advanced Applications of computer Science

Number System-Binary, Octal, decimal, and Hexadecimal, Signals-Analog, Digital, Modem, Codec, Multiplexing, Transmission media, error detection and correction- Parity check and CRC, Networking devices- Repeater, hub, bridge, switch, router, gateway.

Recommended books:

1. Coordinate Geometry by S.L.Lony, Arihant Publications
2. Calculus by Thomas and Finny, Pearson Publications
3. Matrices by A.R.Vasishtha and A.K.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. "Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle
5. "Energy Storage: A Nontechnical Guide" by Richard Baxter
6. "Nanotechnology: Principles and Applications" by Sulabha K. Kulkarni and Raghvendra A. Bohara
7. "Biophysics: An Introduction" by Rodney Cotterill
8. "Medical Physics: Imaging" by James G. Webster
9. "Shape Memory Alloys: Properties and Applications" by Dimitris C. Lagoudas
10. Nano materials and applications by M.N.Borah

11. Environmental Chemistry by Anil.K.D.E.

12. Digital Logic Design by Morris Mano

13. Data Communication & Networking by Bahrouz Forouzan.

STUDENT ACTIVITIES

UNIT I: ADVANCES IN BASIC MATHEMATICS

1: Straight Lines Exploration

Provide students with a set of equations representing straight lines in different forms, suchas slope-intercept form, point-slope form, or general form.

Students will explore the properties and characteristics of straight lines, including theirslopes, intercepts, and point of intersection.

2: Limits and Differentiation Problem Solving

Students will apply the concept of limits to solve various problems using standard limits.

Encourage students to interpret the results and make connections to real-world applications,such as analyzing rates of change or optimizing functions.

3: Integration Exploration

Students will explore the concept of integration as a reverse process of differentiation andapply basic methods of integration, such as the product rule, substitution method, or integration by parts.

Students can discuss the significance of integration in various fields, such as physics andchemistry

4: Matrices Manipulation

Students will perform operations on matrices, including scalar multiplication, matrixmultiplication, and matrix transpose.

Students can apply their knowledge of matrices to real-world applications, such as solvingsystems of equations or representing transformations in geometry.

UNIT II: ADVANCES IN PHYSICS:

1: Case Studies

Provide students with real-world case studies related to renewable energy, nanotechnology,biophysics, medical physics, or shape memory materials.

Students will analyze the case studies, identify the challenges or problems presented, andpropose innovative solutions based on the recent advances in the respective field.

They will consider factors such as energy generation, energy storage, efficiency, sustainability, materials design, biomedical applications, or technological advancements.

2: Experimental Design

Assign students to design and conduct experiments related to one of the topics: renewableenergy, nanotechnology, biophysics, medical physics, or shape memory materials.

They will identify a specific research question or problem to investigate and design an

experiment accordingly.

Students will collect and analyze data, interpret the results, and draw conclusions based ontheir findings.

They will discuss the implications of their experimental results in the context of recentadvances in the field.

3: Group Discussion and Debate

Organize a group discussion or debate session where students will discuss the ethical, social, and environmental implications of the recent advances in renewable energy, nanotechnology,biophysics, medical physics, and shape memory materials.

Assign students specific roles, such as proponent, opponent, or moderator, and provide them with key points and arguments to support their positions.

UNIT III: ADVANCES IN CHEMISTRY:

1. Experimental Design and Simulation

In small groups, students will design experiments or simulations related to the assigned topic.

For example, in the context of computer-aided drug design, students could design a virtualscreening experiment to identify potential drug candidates for a specific disease target.

For nano sensors, students could design an experiment to demonstrate the sensitivity and selectivity of nano sensors in detecting specific analytes.
Chemical biology-related activities could involve designing experiments to study enzyme-substrate interactions or molecular interactions in biological systems.
Students will perform their experiments or simulations, collect data, analyze the results, and draw conclusions based on their findings.

2. Case Studies and Discussion

Provide students with real-world case studies related to the impact of chemical pollutants on ecosystems and human health.
Students will analyze the case studies, identify the sources and effects of chemical pollutants, and propose mitigation strategies to minimize their impact.

Encourage discussions on the ethical and environmental considerations when dealing with chemical pollutants.
For the dye removal using the catalysis method, students can explore case studies where catalytic processes are used to degrade or remove dyes from wastewater.

Students will discuss the principles of catalysis, the advantages and limitations of the catalysis method, and its applications in environmental remediation.
3: Group Project

Assign students to work in groups to develop a project related to one of the topics.

The project could involve designing a computer-aided drug delivery system, developing anano sensor for a specific application, or proposing strategies to mitigate the impact of chemical pollutants on

ecosystems.
Students will develop a detailed project plan, conduct experiments or simulations, analyzedata, and present their findings and recommendations.
Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS &CHEMISTRY

1: Mathematical Modelling Experiment

Provide students with a mathematical modelling experiment related to one of the topics. For example, in the context of renewable energy, students can develop a mathematical model to optimize the placement and configuration of solar panels in a solar farm.
Students will work in teams to design and conduct the experiment, collect data, and analyze the results using mathematical models and statistical techniques.
They will discuss the accuracy and limitations of their model, propose improvements, and interpret the implications of their findings in the context of renewable energy or the specific application area.

2: Case Studies and Group Discussions

Assign students to analyze case studies related to the applications of mathematical modellingin nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment.
Students will discuss the mathematical models and computational methods used in the casestudies, analyze the outcomes, and evaluate the effectiveness of the modelling approach.
Encourage group discussions on the challenges, ethical considerations, and potential advancements in the field.

Students will present their findings and engage in critical discussions on the advantages and limitations of mathematical modelling in solving complex problems in these areas.

3. Group Project

Assign students to work in groups to develop a group project that integrates mathematical modelling with one of the application areas: renewable energy, nanotechnology, biophysics,medical physics, solid waste management, environmental remediation, or water treatment.

The project could involve developing a mathematical model to optimize the delivery of radiation therapy in medical physics or designing a mathematical model to optimize wastemanagement practices.
Students will plan and execute their project, apply mathematical modelling techniques,analyze the results, and present their findings and recommendations.
Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT V: Advanced Applications of computer Science

Students must be able to convert numbers from other number system to binary numbersystems

1. Identify the networking media used for your college network
Identify all the networking devices used in your college premises.

SEMESTER-II

COURSE 3: DIFFERENTIAL EQUATIONS

Theory | Credits: 4 | 5 hrs/week

Course Outcomes

After successful completion of this course, the student will be able to

1. solve first order first degree linear differential equations.
2. convert a non-exact homogeneous equation to exact differential equation by using an integrating factor.
3. know the methods of finding solution of a differential equation of first order but not of first degree.
4. solve higher-order linear differential equations for both homogeneous and non-homogeneous, with constant coefficients.
5. understand and apply the appropriate methods for solving higher order differential equations.

Course Content

Unit – 1

Differential Equations of first order and first degree

Linear Differential Equations – Bernoulli's Equations - Exact Differential Equations –Integrating factors - Equations reducible to Exact Equations by Integrating Factors -

i) Inspection Method ii) $\frac{1}{Mx+Ny}$ iii) $\frac{1}{Mx-Ny}$

Unit – 2

Differential Equations of first order but not of first degree

Equations solvable for p, Equations solvable for y, Equations solvable for x – Clairaut's equation - Orthogonal Trajectories: Cartesian and Polar forms.

Unit – 3

Higher order linear differential equations

Solutions of homogeneous linear differential equations of order n with constant coefficients - Solutions of non-homogeneous linear differential equations with constant coefficients by means of polynomial operators

(i) $Q(x) = e^{ax}$ (ii) $Q(x) = Sin\, ax$ (or) $Cos\, ax$

Unit – 4

Higher order linear differential equations (continued.)

Solution to a non-homogeneous linear differential equation with constant coefficients

P.I. of $f(D)y = Q$ when $Q = bx^k$

P.I. of $f(D)y = Q$ when $Q = e^{ax}V$, where V is a function of x

P.I. of $f(D)y = Q$ when $Q = xV$, where V is a function of x

Unit – 5

Higher order linear differential equations with non-constant coefficients

Linear differential Equations with non-constant coefficients; Cauchy-Euler Equation; Legendre Equation; Method of variation of parameters

Activities

Seminar/ Quiz/ Assignments/ Applications of Differential Equations to Real life Problem /Problem Solving Sessions.

Text Book

Differential Equations and Their Applications by Zafar Ahsan, published by Prentice-Hall of India Pvt. Ltd, New Delhi-Second edition.

Reference Books

1. Ordinary and Partial Differential Equations by Dr. M.D. Raisinghania, published by S. Chand &Company, New Delhi.
2. Differential Equations with applications and programs – S. Balachandra Rao & HR Anuradha-Universities Press.
3. Differential Equations -Srinivas Vangala&Madhu Rajesh, published by Spectrum University Press.

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SEMESTER-II

COURSE 4: ANALYTICAL SOLID GEOMETRY

Theory Credits: 4 5 hrs/week

Course Outcomes

After successful completion of this course, the student will be able to

1. understand planes and system of planes
2. know the detailed idea of lines
3. understand spheres and their properties
4. know system of spheres and coaxial system of spheres
5. understand various types of cones

Course Content

Unit – 1
The Plane

Equation of plane in terms of its intercepts on the axis - Equations of the plane through the given points - Length of the perpendicular from a given point to a given plane - Bisectors of angles between two planes - Combined equation of two planes - Orthogonal projection on a plane.

Unit – 2
The Line

Equation of a line - Angle between a line and a plane - The condition that a given line may lie in a given plane - The condition that two given lines are coplanar - Number of arbitrary constants in the equations of straight line - Sets of conditions which determine a line - The shortest distance between two lines - The length and equations of the line of shortest distance between two straight lines - Length of the perpendicular from a given point to a given line.

Unit – 3
The Sphere

Definition and equation of the sphere - Equation of the sphere through four given points - Plane sections of a sphere - Intersection of two spheres - Equation of a circle - Sphere through a given circle - Intersection of a sphere and a line - Power of a point - Tangent plane - Plane of contact; Polar plane - Pole of a Plane - Conjugate points - Conjugate planes.

Unit – 4
Spheres (continued)

Angle of intersection of two spheres - Conditions for two spheres to be orthogonal - Radical plane; Coaxial system of spheres - Simplified from of the equation of two spheres.

Unit – 5
Cones

Definitions of a cone – vertex, guiding curve and generators - Equation of the cone with a given vertex and guiding curve - Equations of cones with vertex at origin are homogenous - Condition that the general equation of the second degree should represent a cone - Enveloping cone of a sphere - Right circular cone - Equation of the right circular cone with a given vertex, axis and semi vertical angle.

Activities

Seminar/ Quiz/ Assignments/Three dimensional analytical Solid geometry and its applications/ Problem Solving Sessions.

Text Book

Analytical Solid Geometry by Shanti Narayan and P.K. Mittal, published by S. Chand & Company Ltd. 7th Edition.

Reference Books

1. A text Book of Analytical Geometry of Three Dimensions, by P.K. Jain and Khaleel Ahmed, published by Wiley Eastern Ltd., 1999.
2. Co-ordinate Geometry of two and three dimensions by P. Balasubrahmanyam, K.Y. Subrahmanyam, G.R. Venkataraman published by TataMcGraw -Hill Publishers.
3. Solid Geometry by B. Rama Bhupal Reddy, published by Spectrum University Press.

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UNIT – III (12 Hours)

Higher order linear differential equations-I:

Solution of homogeneous linear differential equations of order n with constant coefficients; Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.General Solution of f(D)y=0.

General Solution of f(D)y=Q when Q is a function of x, $\frac{1}{f(D)}$ is expressed as partial fractions.

P.I. of f(D)y = Q when Q= be^{ax}

P.I. of f(D)y = Q when Q is bsinax or b cos ax.

UNIT – IV (12 Hours)

Higher order linear differential equations-II:

Solution of the non-homogeneous linear differential equations with constant coefficients.

P.I. of f(D)y = Q when Q= bx^k

P.I. of f(D)y = Q when Q= e^{ax} V , where V is a function of x.

of f(D)y = Q when Q= xV , where V is a function of x.

of f(D)y = Q when Q= x^mV , where V is a function ofx.

UNIT –V (12 Hours)

Higher order linear differential equations-III :

Method of variation of parameters; Linear differential Equations with non-constant coefficients; The Cauchy-Euler Equation, Legendre's linear equations.

Co-Curricular Activities(15 Hours)

Seminar/ Quiz/ Assignments/ Applications of Differential Equations to Real life Problem /Problem Solving.

2022-23

Core papers

COURSE-II

CBCS/ SEMESTER SYSTEM

(w.e.f. 2020-21 Admitted Batch)

B.A./B.Sc. MATHEMATICS

THREE DIMENSIONAL ANALYTICAL SOLID GEOMETRY

Syllabus (75 Hours)

Course Outcomes:

After successful completion of this course, the student will be able to;

1. get the knowledge of planes.
2. basic idea of lines, sphere and cones.
3. understand the properties of planes, lines, spheres and cones.
4. express the problems geometrically and then to get the solution.

Course Syllabus:

UNIT – I (12 Hours)

The Plane :

Equation of plane in terms of its intercepts on the axis, Equations of the plane through the given points, Length of the perpendicular from a given point to a given plane, Bisectors of angles between two planes, Combined equation of two planes.

UNIT – II (12 hrs)

The Line :

Equation of a line; Angle between a line and a plane; The condition that a given line may lie in a given plane; The condition that two given lines are coplanar; Number of arbitrary constants in the equations of straight line; Sets of conditions which determine a line; The shortest distance between two lines; The length and equations of the line of shortest distance between two straight lines; Length of the perpendicular from a given point to a given line.

UNIT – III (12 hrs)

The Sphere :

Definition and equation of the sphere; Equation of the sphere through four given points; Plane sections of a sphere; Intersection of two spheres; Equation of a circle; Sphere through a given circle;

Intersection of a sphere and a line; Power of a point; Tangent plane; Plane of contact; Polar plane; Pole of a Plane; Conjugate points; Conjugate planes;

UNIT – IV (12 hrs)

The Sphere and Cones :

Angle of intersection of two spheres; Conditions for two spheres to be orthogonal; Radical plane; Coaxial system of spheres; Simplified from of the equation of two spheres.

Definitions of a cone; vertex; guiding curve; generators; Equation of the cone with a given vertex and guiding curve; equations of cones with vertex at origin are homogenous; Condition that the general equation of the second degree should represent a cone;

UNIT – V (12 hrs)

Cones :

Enveloping cone of a sphere; right circular cone: equation of the right circular cone with a given vertex, axis and semi vertical angle: Condition that a cone may have three mutually perpendicular generators; intersection of a line and a quadric cone; Tangent lines and tangent plane at a point; Condition that a plane may touch a cone; Reciprocal cones; Intersection of two cones with a common vertex.

Co-Curricular Activities(15 Hours)

Seminar/ Quiz/ Assignments/Three dimensional analytical Solid geometry and its applications/ Problem Solving.

2023-24

Core papers

COURSE-III

CBCS/ SEMESTER SYSTEM

(w.e.f. 2020-21 Admitted Batch)

B.A./B.Sc. MATHEMATICS

ABSTRACT ALGEBRA

SYLLABUS (75 Hours)

Course Outcomes:

After successful completion of this course, the student will be able to;

1. acquire the basic knowledge and structure of groups, subgroups and cyclic groups.
2. get the significance of the notation of a normal subgroups.
3. get the behavior of permutations and operations on them.
4. study the homomorphisms and isomorphisms with applications.
5. understand the ring theory concepts with the help of knowledge in group theory and to prove the theorems.
6. understand the applications of ring theory in various fields.

Course Syllabus:

UNIT – I (12 Hours)

GROUPS :

Binary Operation – Algebraic structure – semi group-monoid – Group definition and elementary properties Finite and Infinite groups – examples – order of a group, Composition tables with examples.

UNIT – II (12 Hours)

SUBGROUPS :

Complex Definition – Multiplication of two complexes Inverse of a complex-Subgroup definition-examples-criterion for a complex to be a subgroups. Criterion for the product of two subgroups to be a subgroup-union and Intersection of subgroups.

UNIT – II (12 Hours)

SUBGROUPS :

Complex Definition – Multiplication of two complexes Inverse of a complex-Subgroup definition-examples-criterion for a complex to be a subgroups. Criterion for the product of two subgroups to be a subgroup-union and Intersection of subgroups.

Co-sets and Lagrange's Theorem :

Cosets Definition – properties of Cosets–Index of a subgroups of a finite groups–Lagrange's Theorem.

UNIT –III (12 Hours)

NORMAL SUBGROUPS :

Definition of normal subgroup – proper and improper normal subgroup–Hamilton group – criterion for a subgroup to be a normal subgroup – intersection of two normal subgroups – Sub group of index 2 is a normal sub group –quotient group – criteria for the existence of a quotient group.

UNIT – IV (12 Hours)

HOMOMORPHISM :

Definition of homomorphism – Image of homomorphism elementary properties of homomorphism – Isomorphism – automorphism definitions and elementary properties–kernel of a homomorphism – fundamental theorem on Homomorphism and applications.

UNIT – V (12 Hours)

RINGS :

Definition of Ring and basic properties, Boolean Rings, divisors of zero and cancellation laws Rings, Integral Domains, Division Ring and Fields, The characteristic of a ring - The characteristic of an Integral Domain, The characteristic of a Field, Sub Rings.

Co-Curricular Activities(15 Hours)

Seminar/ Quiz/ Assignments/ Group theory and its applications / Problem Solving.

Text Book :

A text book of Mathematics for B.A. / B.Sc. by B.V.S.S. SARMA and others, published by S.Chand & Company, New Delhi.

Reference Books :

1. Abstract Algebra by J.B. Fraleigh, Published by Narosa publishing house.
2. Modern Algebra by M.L. Khanna.
3. Rings and Linear Algebra by Pundir & Pundir, published by Pragathi Prakashan.

2023-24

COURSE-IV

CBCS/ SEMESTER SYSTEM

(w.e.f. 2020-21 Admitted Batch)

B.A./B.Sc. MATHEMATICS

REAL ANALYSIS

SYLLABUS (75 Hours)

Course Outcomes:

After successful completion of this course, the student will be able to

1. get clear idea about the real numbers and real valued functions.
2. obtain the skills of analyzing the concepts and applying appropriate methods for testing convergence of a sequence/ series.
3. test the continuity and differentiability and Riemann integration of a function.
4. know the geometrical interpretation of mean value theorems.

Course Syllabus:

UNIT - I (12Hours)

REAL NUMBERS :

The algebraic and order properties of R, Absolute value and Real line, Completeness property of R, Applications of supremum property; intervals. Sequences and their limits, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence.

(No question is to be set from this portion).

INFINITIE SERIES :

Series : Introduction to series, convergence of series. Cauchy's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

INFINITIE SERIES :

Series : Introduction to series, convergence of series. Cauchy's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

1. P-test
2. Cauchy's n^{th} root test or Root Test.
3. D'-Alemberts' Test or Ratio Test.
4. Alternating Series – Leibnitz Test.

Absolute convergence and conditional convergence.

UNIT – II (12 Hours)

CONTINUITY :

Limits : Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity. (No question is to be set from this portion).

Continuous functions : Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

UNIT – III (12 Hours)

DIFFERENTIATION AND MEAN VALUE THEORMS :

The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Rolle's Theorem, Lagrange's Theorem, Cauchy's Mean value Theorem

UNIT – IV(12 Hours)

RIEMANN INTEGRATION :I

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Another definition of Riemann integral, Some classes of Bounded integrable functions.

UNIT –V(12 Hours)

RIEMANN INTEGRATION :II

Properties of integrals functions, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value Theorems.

Co-Curricular Activities(15 Hours)

Seminar/ Quiz/ Assignments/ Real Analysis and its applications / Problem Solving.

Text Book:

Introduction to Real Analysis by Robert G.Bartle and Donlad R. Sherbert, published by John Wiley.

Reference Books:

1.A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi.

2. Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisinghania, published by S. Chand & Company Pvt. Ltd., New Delhi.

2022-23

COURSE-V

CBCS/ SEMESTER SYSTEM

(w.e.f. 2020-21 Admitted Batch)

B.A./B.Sc. MATHEMATICS

LINEAR ALGEBRA

SYLLABUS (75 Hours)

Course Outcomes:

After successful completion of this course, the student will be able to;

1. understand the concepts of vector spaces, subspaces, basis, dimension and their properties
2. understand the concepts of linear transformations and their properties
3. understand the elementary properties of matrices and rank of matrix
4. apply Cayley- Hamilton theorem to problems for finding the inverse of a matrix and higher powers of matrices without using routine methods

Course Syllabus:

UNIT – I (12 Hours)

Vector Spaces-I:

Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linear independence and Linear dependence of Vectors.

UNIT –II (12 Hours)

Vector Spaces-II:

Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotient space.

UNIT –III (12 Hours)

Linear Transformations:

Linear transformations, linear operators, Properties of L.T, sum and product of LTs, Algebra of Linear Operators, Range and null space of linear transformation, Rank and Nullity of linear transformations – Rank – Nullity Theorem.

UNIT –IV (12 Hours)

Matrices – I :

Matrices, Elementary Properties of Matrices, Rank of Matrix, Normal form, Echelon form , Inverse of a matrix by using elementary operations.

UNIT –V (12 Hours)

Matrices – II :

Linear Equations: System of Homogeneous and non homogeneous Linear Equations.

Characteristic equations, Characteristic Values & Vectors of a square matrix, Cayley – Hamilton Theorem and problems.

Co-Curricular Activities(15 Hours)

Seminar/ Quiz/ Assignments/ Linear algebra and its applications / Problem Solving.

Text Book:

Linear Algebra by J.N. Sharma and A.R. Vasista, published by Krishna Prakashan Mandir, Meerut- 250002.

Reference Books :

1. Matrices by Shanti Narayana, published by S.Chand Publications.
2. Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low priced edition),New Delhi.
3. Linear Algebra by Stephen H. Friedberg et. al. published by Prentice Hall of India Pvt. Ltd. 4th Edition, 2007.

SKR & SKR GOVT. COLLEGE FOR WOMEN, KADAPA.
(AUTONOMOUS)
Reaccredited with 'B' Grade by NAAC
Y.S.R. Kadapa District – 516001, Andhra Pradesh, India.
Affiliated to Yogi Vemana University

2023-24

Core papers

COURSE-VI B CBCS/ SEMESTER SYSTEM

B.A./B.Sc. MATHEMATICS- Semester V

VI B. Multiple integrals and applications of Vector calculus

(Skill Enhancement Course (Elective)

SYLLABUS (75 Hours)

Learning Outcomes:

Students after successful completion of the course will be able to

1. Learn multiple integrals as a natural extension of definite integral to a function of two variables in the case of double integral / three variables in the case of triple integral.

2. Learn applications in terms of finding surface area by double integral and volume by triple integral.

3. Determine the gradient, divergence and curl of a vector and vector identities.

4. Evaluate line, surface and volume integrals.

5. Understand relation between surface and volume integrals (Gauss divergence theorem), relation between line integral and volume integral (Green's theorem), relation between line and surface integral (Stokes theorem)

Syllabus (Teaching Hours: 75)

Unit – 1: Multiple integrals-I (15h)

Introduction, Double integrals, Evaluation of double integrals, Properties of double integrals.Region of integration, double integration in Polar Co-ordinates, Change of variables in double integrals, change of order of integration.

Unit – 2: Multiple integrals-II (15h)

Triple integral, region of integration, change of variables. Plane areas by double integrals, surface area by double integral.Volume as a double integral, volume as a triple integral.

Unit – 3: Vector differentiation (15h)

Vector differentiation, ordinary derivatives of vectors.Differentiability, Gradient, Divergence, Curl operators,Formulae involving the separators.

Unit – 4: Vector integration (15h)

Line Integrals with examples, Surface Integral withexamples.Volume integral with examples.

Unit – 5: Vector integration applications (15h)

Gauss theorem and applications of Gauss theorem, Green's theorem in plane and applications of Green's theorem, Stokes's theorem and applications of Stokes theorem.

Text Book:

V.Venkateswararao, N. Krishnamurthy, B.V.S.S.Sarma and S.AnjaneyaSastry, A text Book of B.Sc., Mathematics Volume-III, S. Chand & Company, Pvt. Ltd., Ram Nagar,NewDelhi-110055.

Reference Books:

1. Dr.M.Babu Prasad, Dr.K.KrishnaRao, D.Srinivasulu, Y.AdiNarayana, Engineering Mathematics-II, Spectrum University Press, SR Nagar, Hyderabad-500038,INDIA.

2. Dr.MAnitha, Linear Algebra and Vector Calculus for Engineer, Spectrum University Press, SR Nagar, Hyderabad-500038, INDIA.

3. R.Gupta,Vector Calculus, Laxmi Publications.

4. P.C.Matthews, Vector Calculus, Springer Verlag publications.

5. Web resources suggested by the teacher and college librarian including reading material

2023-24

COURSE-VII B CBCS/ SEMESTER SYSTEMB.A./B.Sc.

MATHEMATICS- Semester V

VII B. Integral Transforms with applications(Skill

Enhancement Course (Elective) **SYLLABUS (75 Hours)**

Learning Outcomes:

Students after successful completion of the course will be able to

1. Evaluate Laplace transforms of certain functions, find Laplace transforms of derivatives and of integrals.
2. Determine properties of Laplace transform which may be solved by application of special functions namely Dirac delta function, error function, Bessel function and periodic function.
3. Understand properties of inverse Laplace transforms, find inverse Laplace transforms of derivatives and of integrals.
4. Solve ordinary differential equations with constant/ variable coefficients by using Laplace transform method.
5. Comprehend the properties of Fourier transforms and solve problems related to finite Fourier transforms.

Syllabus: (Teaching Hours: 75)

Unit – 1: Laplace transforms- I (15h)

Definition of Laplace transforms, linearity property-piecewise continuous function. Existence of Laplace transform, functions of exponential order and of class A.First shifting theorem, second shifting theorem and change of scale property.

Unit – 2: Laplace transforms- II (15h)

Laplace Transform of the derivatives, initial value theorem and final value theorem. Laplace transforms of integrals. Laplace transform of t^n .f (t), division by t, evolution of integrals by Laplace transforms. Laplace transform of some special functions-namely Dirac delta function, error function, Bessel function and Laplace transform of periodic function.

Unit – 3: Inverse Laplace transforms (15h)

Definition of Inverse Laplace transform, linear property, first shifting theorem, second shifting theorem, change of scale property, use of partial fractions. Inverse Laplace transforms of derivatives,

inverse, Laplace transforms of integrals, multiplication by powers of ‘p’, division by ‘p’. Convolution, convolution theorem proof and applications (Simple Problems).

Unit – 4: Applications of Laplace transforms (15h)

Solutions of differential equations with constants coefficients, solutions of differential equations with variable coefficients.Applications of Laplace transforms to integral equations- Abel’s integral equation.Converting the differential equations into integral equations, converting the integral equations into differential equations.

Unit – 5: Fourier transforms (15h)

Integral transforms, Fourier integral theorem (without proof), Fourier sine and cosine integrals. Properties of Fourier transforms, change of scale property, shifting property, modulation theorem. Convolution.Convolution theorem for Fourier transform, Parseval’s Identify (without problems)

Text Book

M.D.Raisinghania, H.C. Saxsena , H.K. Dass, Integral Transforms, S. Chand & Company Pvt. Ltd., Ram Nagar, New Delhi-110055.

Reference Books:

1. Dr.S.Sreenadh, S.Ranganatham, Dr.M.V.S.S.N.Prasad, Dr.V.RameshBabu, Fourier series and Integral Transforms, S. Chand & Company, Pvt. Ltd., Ram Nagar, New Delhi-110055.
2. A.R. Vasistha, Dr. R.K. Gupta, Laplace Transforms, Krishna Prakashan Media Pvt. Ltd. Meerut.
3. Dr. J.K. Goyal, K.P. Gupta, Laplace and Fourier Transforms, PragathiPrakashan, Meerut.
4. ShanthiNarayana , P.K. Mittal, A Course of Mathematical Analysis, S. Chand & Company Pvt.Ltd. Ram Nagar, New Delhi-110055.
5. Web resources suggested by the teacher and college librarian including reading material

2023-24

Core papers

ZOOLOGY

SEMESTER-I

COURSE 1: INTRODUCTION TO CLASSICAL BIOLOGY

Theory Credits: 4 5 hrs/week

Learning objectives

The student will be able to learn the diversity and classification of living organisms and understand their chemical, cytological, evolutionary and genetic principles.

Learning Outcomes

1. Learn the principles of classification and preservation of biodiversity
2. Understand the plant anatomical, physiological and reproductive processes.
3. Knowledge on animal classification, physiology, embryonic development and their economic importance.
4. Outline the cell components, cell processes like cell division, heredity and molecular processes.
5. Comprehend the chemical principles in shaping and driving the macromolecules and life processes.

Unit 1: Introduction to systematics, taxonomy and ecology.

1.1. Systematics – Definition and concept, Taxonomy – Definition and hierarchy.

1.2. Nomenclature – ICBN and ICZN, Binomial and trinomial nomenclature.

1.3. Ecology – Concept of ecosystem, Biodiversity and conservation.

1.4. Pollution and climate change.

Unit 2: Essentials of Botany.

2.1. The classification of plant kingdom.

2.2. Plant physiological processes (Photosynthesis, Respiration, Transpiration, phytohormones).

2.3. Structure of flower – Micro and macro sporogenesis, pollination, fertilization and structure of mono and dicot embryos.

2.4 Mushroom cultivation, floriculture and landscaping.

Unit 3: Essentials of Zoology

3.1. The classification of Kingdom Animalia and Chordata.

3.2 Animal Physiology – Basics of Organ Systems & their functions, Hormones and Disorders

3.3 Developmental Biology – Basic process of development (Gametogenesis, Fertilization, Cleavage and Organogenesis)

3.4 Economic Zoology – Sericulture, Apiculture, Aquaculture

Unit 4: Cell biology, Genetics and Evolution

4.1. Cell theory, Ultrastructure of prokaryotic and eukaryotic cell, cell cycle.

4.2. Chromosomes and heredity – Structure of chromosomes, concept of gene.

4.3. Central Dogma of Molecular Biology.

4.4. Origin of life

Unit 5: Essentials of chemistry

5.1. Definition and scope of chemistry, applications of chemistry in daily life.

5.2. Branches of chemistry

5.3. Chemical bonds – ionic, covalent, noncovalent – Vander Waals, hydrophobic, hydrogen bonds.

5.4. Green chemistry

References

1. Sharma O.P., 1993. Plant taxonomy. 2nd Edition. McGraw Hill publishers.

2. Pandey B.P., 2001. The textbook of botany Angiosperms. 4th edition. S. Chand publishers, New Delhi, India.

3. Jordan E.L., Verma P.S., 2018. Chordate Zoology. S. Chand publishers, New Delhi, India.

4. Rastogi, S.C., 2019. Essentials of animal physiology. 4th Edition. New Age International Publishers.

5. Verma P.S., Agarwal V.K., 2006. Cell biology, genetics, Molecular Biology, Evolution and Ecology. S. Chand publishers, New Delhi, India.

6. Sathyanarayana U., Chakrapani, U., 2013. Biochemistry. 4th Edition. Elsevier publishers.

7. Jain J.L., Sunjay Jain, Nitin Jain, 2000. Fundamentals of Biochemistry. S. Chand publishers, New Delhi, India.

8. Karen Timberlake, William Timberlake, 2019. Basic chemistry. 5th Edition. Pearson publishers.

9. Subrata Sen Gupta, 2014. Organic chemistry. 1st Edition. Oxford publishers.

ACTIVITIES:

1. Make a display chart of life cycle of nonflowering plants.

2. Make a display chart of life cycle of flowering plants.

3. Study of stomata

4. Activity to prove that chlorophyll is essential for photosynthesis

5. Study of pollen grains.

6. Observation of pollen germination.

7. Ikebana.

8. Differentiate between edible and poisonous mushrooms.

9. Visit a nearby mushroom cultivation unit and know the economics of mushroom cultivation.

SEMESTER-I

COURSE 2: INTRODUCTION TO APPLIED BIOLOGY

Theory Credits: 4 5 hrs/week

Learning objectives

The student will be able to learn the foundations and principles of microbiology, immunology, biochemistry, biotechnology, analytical tools, quantitative methods, and bioinformatics.

Learning Outcomes

1. Learn the history, ultrastructure, diversity and importance of microorganisms.
2. Understand the structure and functions of macromolecules.
3. Knowledge on biotechnology principles and its applications in food and medicine.
4. Outline the techniques, tools and their uses in diagnosis and therapy.
5. Demonstrate the bioinformatics and statistical tools in comprehending the complex biological data.

Unit 1: Essentials of Microbiology and Immunology

1.1. History and Major Milestones of Microbiology; Contributions of Edward Jenner, Louis Pasteur, Robert Koch and Joseph Lister.

1.2. Groups of Microorganisms – Structure and characteristics of Bacteria, Fungi, Archaea and Virus.

1.3. Applications of microorganisms in – Food, Agriculture, Environment, and Industry.

1.4. Immune system – Immunity, types of immunity, cells and organs of immune system.

Unit 2: Essentials of Biochemistry

2.1. Biomolecules I – Carbohydrates, Lipids.

2.2. Biomolecules II – Amino acids & Proteins.

2.3. Biomolecules III – Nucleic acids -DNA and RNA.

2.4. Basics of Metabolism – Anabolism and catabolism.

Unit 3: Essentials of Biotechnology

3.1. History, scope, and significance of biotechnology. Applications of biotechnology in Plant, Animal, Industrial and Pharmaceutical sciences.

3.2. Environmental Biotechnology – Bioremediation and Biofuels, Biofertilizers and Biopesticides.

3.3. Genetic engineering – Gene manipulation using restriction enzymes and cloning vectors; Physical, chemical, and biological methods of gene transfer.

3.4. Transgenic plants – Stress tolerant plants (biotic stress – BT cotton, abiotic stress – salt tolerance). Transgenic animals – Animal and disease models.

Unit 4: Analytical Tools and techniques in biology – Applications

4.1. Applications in forensics – PCR and DNA fingerprinting

4.2. Immunological techniques – Immunoblotting and ELISA.

4.3. Monoclonal antibodies – Applications in diagnosis and therapy.

4.4. Eugenics and Gene therapy

Unit 5: Biostatistics and Bioinformatics

5.1. Data collection and sampling. Measures of central tendency – Mean, Median, Mode.

5.2. Measures of dispersion – range, standard deviation and variance. Probability and tests of significance.

5.3. Introduction, Genomics, Proteomics, types of Biological data, biological databases- NCBI, EBI, Gen Bank; Protein 3D structures, Sequence alignment

5.4. Accessing Nucleic Acid and Protein databases, NCBI Genome Workbench

REFERENCES

1. Gerard J., Tortora, Berdell R. Funke, Christine L. Case., 2016. Microbiology: An Introduction. 11th Edition. Pearson publications, London, England.

2. Micale, J. Pelczar Jr., E.C.S. Chan., Noel R. Kraig., 2002. Pelczar Microbiology. 5th Edition. McGraw Education, New York, USA.

3. Sathyanarayana U., Chakrapani, U., 2013. Biochemistry. 4th Edition. Elsevier publishers.

4. Jain J.L., Sunjay Jain, Nitin Jain, 2000. Fundamentals of Biochemistry. S. Chand publishers, New Delhi, India.

5. R.C. Dubey, 2014. Advanced Biotechnology. S. Chand Publishers, New Delhi, India.

6. Colin Ratledge, Bjorn, Kristiansen, 2008. Basic Biotechnology. 3rd Edition. Cambridge Publishers.

7. U. Sathyanarayana, 2005. Biotechnology. 1st Edition. Books and Allied Publishers pvt. ltd., Kolkata.

8. Upadhyay, Upadhyay and Nath. 2016. Biophysical Chemistry, Principles and Techniques. Himalaya Publishing House.

9. Arthur M. Lesk. Introduction to Bioinformatics. 5th Edition. Oxford publishers.

10. AP Kulkarni, 2020. Basics of Biostatistics. 2nd Edition. CBS publishers.

ACTIVITIES

1. Identification of given organism as harmful or beneficial.

2. Observation of microorganisms from house dust under microscope.

3. Finding microorganism from pond water.

SEMESTER-II

COURSE 3: ANIMAL DIVERSITY-I BIOLOGY OF NON-CHORDATES

Theory Credits: 3 3 hrs/week

LEARNING OBJECTIVES:

- To understand the taxonomic position of protozoa to helminthes.
- To understand the general characteristics of animals belonging to protozoa to hemichordata.
- To understand the structural organization of animals phylum from protozoa to hemi chordata.
- To understand the origin and evolutionary relationship of different phyla from protozoa to hemi chordata.
- To understand the origin and evolutionary relationship of different phylum from annelids to hemichordates.

LEARNING OUTCOMES: By the completion of the course the graduate should able to –

- Describe concept of animal kingdom classification and general characters of Protozoa
- Classify Porifera and Coelenterata with taxonomic keys
- Classify Phylum Platy & Nemathelminthes using examples, parasitic adaptation
- Describe Phylum Annelida & Arthropoda using examples and economic importance of vermicomposting & economic importance of insects.
- Describe Mollusca, Echinodermata & Hemi chordata with suitable examples in relation to the phylogeny

SYLLABUS:

UNIT-I

1.1 Whittakers five kingdom concept and classification of Animal Kingdom.
1.2 Protozoa General Characters and classification up to classes with suitable examples
1.3 Protozoa Locomotion & nutrition
1.4 Protozoa reproduction

Activity: Assignment /Seminar on the above
Evaluation: Marks to be awarded for written and oral presentations

UNIT –II

2.1 Porifera General characters and classification up to classes with suitable examples
2.2 Canal system in sponges
2.3 Coelenterata General characters and classification up to classes with suitable examples
2.4 Polymorphism in coelenterates & Corals and coral reefs

Activity: Assignment /Seminar /Quiz/Project on the above
Evaluation: Evaluation of Written part + Evaluation of oral Presentation, Assessment of studentsin Quiz participation and Ranking - Evaluation of Project Report and oral presentation

UNIT – III

3.1 Platyhelminthes General characters and classification up to classes with suitable examples
3.2 Parasitic Adaptations in helminthes
3.3 Nemathelminthes General characters and classification up to classes with suitable examples
3.4 Life cycle and pathogenicity of *Ascaris lumbricoides*

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – IV

4.1 Annelida General characters and classification up to classes with suitable examples
4.2 Vermiculture - Scope, significance, earthworm species, processing, Vermicompost, economic importance of vermicompost
4.3 Arthropoda General characters and classification up to classes with suitable examples
4.4 *Peripatus* - Structure and affinities

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – V

5.1 Mollusca General characters and classification up to classes with suitable examples
5.2 Pearl formation in Pelecypoda
5.3 Echinodermata General characters and classification up to classes with suitable examples
Water vascular system in star fish
5.4 Hemichordata General characters and classification up to classes with suitable examples
Balanoglossus - Structure and affinities

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

Co-curricular activities (suggested)

- Preparation of chart/model of phylogenic tree of life, 5-kingdom classification
- Visit to Zoology Museum or Coral Island as part of Zoological tour
- Charts on polymorphism
- Clay models of canal system in sponges
- Plaster-of-paris model of *Peripatus*
- Construction of a vermicompost in each college, manufacture of manure by students and donating to local farmers
- Chart on pearl forming layers using clay
- Visit to a pearl culture rearing industry/institute
- Live model of water vascular system
- Observation of Balanoglossus for its tubicolous habit

REFERENCE BOOKS:

- L.H. Hyman „*The Invertebrates' Vol I, II and V*. – M.C. Graw Hill Company Ltd.

SEMESTER-II

COURSE 3: ANIMAL DIVERSITY-I BIOLOGY OF NON-CHORDATES

Practical | Credits: 1 | 2 hrs/week

LEARNING OBJECTIVES

- To understand the importance of preservation of museum specimens
- To identify animals based on special identifying characters
- To understand different organ systems through demo or virtual dissections
- To maintain a neat, labelled record of identified museum specimens

SYLLABUS:

Study of museum slides / specimens / models (Classification of animals up to orders)

- Protozoa: Amoeba, *Paramoecium, Paramoecium Binary fission and Conjugation, Vorticella, Entamoeba histolytica, Plasmodium vivax*
- Porifera: *Sycon, Spongilla, Euspongia, Sycon*- T.S & L.S, Spicules, Gemmule
- Coelenterata: *Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium,Gorgonia, Pennatula*
- Platyhelminthes: *Planaria, Fasciola hepatica, Fasciola* larval forms – Miracidium,Redia, Cercaria, *Echinococcus granulosus, Taenia solium, Schistosoma haematobium*
- Nemathelminths: *Ascaris (Male & Female), Drancunculus, Ancylostoma,Wuchereria*
- Annelida: *Nereis, Aphrodite, Chaetopteurs, Hirudinaria,* Trochophore larva
- Arthropoda: Cancer, *Palaemon*, Scorpion, *Scolopendra, Sacculina, Limulus, Peripatus,* Larvae - Nauplius, Mysis, Zoea, Mouth parts of male &female *Anopheles*and *Culex,* Mouthparts of Housefly and Butterfly.
- Mollusca:*Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus,* Glochidium larva
- Echinodermata: *Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon,* Bipinnaria larva
- Hemichordata: *Balanoglossus,* Tornaria larva

Dissections:

Computer - aided techniques should be adopted or show virtual dissections Dissection of edible (Prawn/Pila) invertebrate as per UGC guidelines

An "Animal album" containing photographs, cut outs, with appropriate write up about the above-mentioned taxa. Different taxa/ topics may be given to different setsof students for this purpose

RFERENCE WEB LINKS:

- https://virtualmicroscopy.peabody.yale.edu/
- https://tnhm.in/category/assorted-gallery-for-vertebrates-and-invetebrates/invertebrates/
- http://www.nhc.ed.ac.uk/index.php?page=24.25.312
- https://biologyjunction.com/invertebrate-notes/
- https://lanwebs.lander.edu/faculty/rsfox/invertebrates/
- http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf

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SEMESTER-II

COURSE 4: CELL & MOLECULAR BIOLOGY

Theory Credits: 3 3 hrs/week

LEARNING OBJECTIVES

- To understand the cell and distinguish between prokaryotic andeukaryotic cell
- To understand the role of different cell organelles in maintenance of lifeactivities
- To acquaint the students with the concept s of cell division and cell cycle
- To acquaint student with basic concepts of molecular biology as to how characters are expressed with a coordinated functioning of replication, transcription and translation in all living beings
- To acquaint the students on the biological importance of biomolecules.

LEARNING OUTCOMES:

The overall course outcome is that the student shall develop deeper understanding of what life is and how it functions at cellular level. This course will provide students with a deep knowledge in Cell and molecular biology by the completion of the course the graduate shall able to –

- Understand the basic unit of the living organisms and to differentiate the organisms by their cell structure.
- Describe fine structure and function of plasma membrane and different cell organelles of eukaryotic cell.
- Explain the cell cycle and bioenergetics of the cell
- Understand the central dogma of molecular biology and flow of genetic information from DNA to proteins
- Understand the gene expression phenomenon and biological importance of biomolecules

SYLLABUS:

UNIT – I Cell Biology-I

1.1 Definition, history, prokaryotic and eukaryotic cells, virus, viroids, mycoplasma
1.2 Electron microscopic structure of animal cell.
1.3 Plasma membrane –Models and Fluid mosaic model
1.4 Transport functions of plasma membrane-Active – passive- facilitated.

Activity: Model preparation of cell/Assignment /Students Seminar /Quiz/Project/Peer teaching on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – II Cell Biology-II

2.1 Structure and functions of Golgi complex & Endoplasmic Reticulum
2.2 Structure and functions of Lysosomes & Ribosomes
2.3 Structure and functions of Mitochondria & Centriole
2.4 Structure and functions of Nucleus & Chromosomes

Activity: Model preparation of cell organelles/Assignment /Students Seminar /Quiz/Project/Peer teaching on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – III Cell Biology-III
3.1 Cell Division- mitosis, meiosis
3.2 Cell cycle – stages- check points- regulation
3.3 Abnormal cell growth- cancer- apoptosis
3.4 Bio energetics- Glycolysis-Krebs cycle-ETS

Activity: Model preparation cell division /Assignment /Students Seminar /Quiz/Project/Peer teaching/Report writing after watching any video on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT IV: Molecular Biology-I
4.1 Central Dogma of Molecular Biology
4.2 Basic concepts of - DNA replication – Overview (Semi-conservative mechanism, Semi-discontinuous mode, Origin & Propagation of replication fork)
4.3 Transcription in prokaryotes – Initiation, Elongation and Termination, Post- transcriptional modifications (basics)
4.4 Translation – Initiation, Elongation and Termination

Activity: Model preparation of DNA/Assignment /Students Seminar /Quiz/Project/Peer teaching/Report writing after watching any video on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT V: Molecular Biology-II
5.1 Gene Expression in prokaryotes (Lac Operon); Gene Expression in eukaryotes
5.2 Biomolecules- Carbohydrates (Glucose- structure-properties- biological importance only)
5.3 Biomolecules- Protein (Amino acid- structure- properties- biological importance only)
5.4 Biomolecules- Lipids (Fatty acid- structure - properties- biological importance only)

Activity: Assignment /Students Seminar /Quiz/Project/Peer teaching/Report writing after watching any video on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

Co-curricular activities (Suggested)
- Model of animal cell
- Working model of mitochondria to encourage creativity among students
- Photo album of scientists of cell biology
- Charts on plasma membrane models/cell organelles
- Charts on central dogma/lac operon/genetic code
- Model of semi-conservative model of DNA replication
- Power point presentation of any of the above topics by students

SEMESTER-II

COURSE 4: CELL & MOLECULAR BIOLOGY

Practical | Credits: 1 | 2 hrs/week

LEARNING OBJECTIVES

- Acquainting and skill enhancement in the usage of laboratory microscope
- Hands-on experience of different phases of cell division by experimentation
- Develop skills on human karyotyping and identification of chromosomaldisorders
- To apply the basic concept of inheritance for applied research
- To get familiar with phylogeny ad geological history of origin & evolution ofanimals

SYLLABUS:

1. Preparation of temporary slides of Mitotic divisions with onion root tips
2. Observation of various stages of Mitosis with prepared slides
3. Observation of various stages of Meiosis with prepared slides
4. Mounting of salivary gland chromosomes of Chironomus
5. Test for carbohydrate in given biological sample (Benedicts test)
6. Test for Protein in given biological sample (Nitric acid test -white ring)
7. Test for lipid in the given biological sample (Saponification test)

RFERENCE WEB LINKS:

- https://cbi-au.vlabs.ac.in/
- https://www.youtube.com/watch?v=xhnUZAyNdQk
- https://www.youtube.com/watch?v=l8LXQq5_VL0
- https://www.labster.com/simulations
- https://www.sciencecourseware.org/BiologyLabsOnline/protected/TranslationLab/index.php
- https://virtual-labs.github.io/exp-analysis-of-carbohydrates-au/procedure.html
- https://www.labxchange.org/library/items/lb:LabXchange:f10fd7ad:lx_simulation:1
- http://www.zoologyresources.com/uploadfiles/books/dc64b77d8769325515d17c945e461b45.pdf

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3.3 Parasitic Adaptations in helminthes

Phylum Nemathelminthes

3.4 General characters and classification up to classes with suitable examples

3.5. Life cycle and pathogenecity of *Ascarislumbricoides*

Unit – IV

Phylum Annelida

4.1 General characters and classification up to classes with suitable examples

4.2 Evolution of Coelom and Coelomoducts

4.3 Vermiculture - Scope, significance, earthworm species, processing, Vermicompost, economic importance of vermicompost

Phylum Arthropoda

4.4 General characters and classification up to classes with suitable examples

4.5 Vision and respiration in Arthropoda

4.6 Metamorphosis in Insects

4.7 *Peripatus* - Structure and affinities

4.8 Economic Impotance of insects- Silkworms, Honey bee and Lac insect.

Unit – V

Phylum Mollusca

5.1 General characters and classification up to classes with suitable examples

5.2 Pearl formation in Pelecypoda

5.3 Sense organs in Mollusca

PhylumEchinodermata

5.4 General characters and classification up to classes with suitable examples

5.5 Water vascular system in star fish

5.6 Larval forms of Echinodermata

PhylumHemichordata

5.7 General characters and classification up to classes with suitable examples

5.8 *Balanoglossus* - Structure and affinities

Unit - IV

4.1 Aves General characters and classification (Ratitae and Carinatae)

4.2 *Columba livia*: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and function of Brain

4.3 Migration in Birds

4.4 Flight adaptation in birds

Unit - V

5.1 General characters of Mammalia

5.2 Classification of Mammalia upto sub - classes with examples

5.3 Comparison of Prototherians, Metatherians and Eutherians

5.4 Dentition in mammals

Co-curricular activities (suggested)

- Preparation of charts on Chordate classification (with representative animal photos) and retrogressive metamorphosis
- Thermocol or Clay models of Herdmania and Amphioxus
- Visit to local fish market and identification of local cartilaginous and bony fishes
- Maintaining of aquarium by students
- Thermocol model of fish heart and brain
- Preparation of slides of scales of fishes
- Visit to local/nearby river to identify migratory fishes and prepare study notes
- Preparation of Charts on above topics by students (Eg: comparative account of vertebrate heart/brain/lungs, identification of snakes etc.)
- Collecting and preparation of Museum specimens with dead frogs/snakes/lizards etc., and/or their skeletons
- Additional input on types of snake poisons and their antidotes (student activity).
- Collection of bird feathers and submission of report on Plumology

SEMESTER-I

COURSE 1: INTRODUCTION TO CLASSICAL BIOLOGY

Theory | Credits: 4 | 5 hrs/week

Learning objectives

The student will be able to learn the diversity and classification of living organisms and understand their chemical, cytological, evolutionary and genetic principles.

Learning Outcomes

1. Learn the principles of classification and preservation of biodiversity
2. Understand the plant anatomical, physiological and reproductive processes.
3. Knowledge on animal classification, physiology, embryonic development and their economic importance.
4. Outline the cell components, cell processes like cell division, heredity and molecular processes.
5. Comprehend the chemical principles in shaping and driving the macromolecules and life processes.

Unit 1: Introduction to systematics, taxonomy and ecology.

1.1. Systematics – Definition and concept, Taxonomy – Definition and hierarchy.

1.2. Nomenclature – ICBN and ICZN, Binomial and trinomial nomenclature.

1.3. Ecology – Concept of ecosystem, Biodiversity and conservation.

1.4. Pollution and climate change.

Unit 2: Essentials of Botany.

2.1. The classification of plant kingdom.

2.2. Plant physiological processes (Photosynthesis, Respiration, Transpiration, phytohormones).

2.3. Structure of flower – Micro and macro sporogenesis, pollination, fertilization and structure of mono and dicot embryos.

2.4 Mushroom cultivation, floriculture and landscaping.

Unit 3: Essentials of Zoology

3.1. The classification of Kingdom Animalia and Chordata.

3.2 Animal Physiology – Basics of Organ Systems & their functions, Hormones and Disorders

3.3 Developmental Biology – Basic process of development (Gametogenesis, Fertilization, Cleavage and Organogenesis)

3.4 Economic Zoology – Sericulture, Apiculture, Aquaculture

Unit 4: Cell biology, Genetics and Evolution

4.1. Cell theory, Ultrastructure of prokaryotic and eukaryotic cell, cell cycle.

4.2. Chromosomes and heredity – Structure of chromosomes, concept of gene.

ZOOLOGY SYLLABUS FOR III SEMESTER

PAPER – III: CELL BIOLOGY, GENETICS, MOLECULAR BIOLOGY AND EVOLUTION

HOURS: 60 (5X12) **Max. Marks: 100**

Unit – I Cell Biology

1.1 Definition, history, prokaryotic and eukaryotic cells, virus, viroids, mycoplasma

1.2 Electron microscopic structure of animal cell.

1.3 Plasma membrane –Models and transport functions of plasma membrane.

.4Structure and functions of Golgi complex, Endoplasmic Reticulum and Lysosomes

1.5 Structure and functions of Ribosomes, Mitochondria, Nucleus, Chromosomes

(Note: 1. General pattern of study of each cell organelle – Discovery, Occurrence, Number, Origin, Structure and Functions with suitable diagrams**)**

2. Need not study cellular respiration under mitochondrial functions)

Unit – II Genetics - I

2. 1 Mendel's work on transmission of traits

2. 2 Gene Interaction – Incomplete Dominance, Codominance, Lethal Genes

2. 3 Polygenes (General Characteristics & examples); Multiple Alleles (General Characteristics and Blood group inheritance

2. 4 Sex determination (Chromosomal, Genic Balance, Hormonal, Environmental and Haplo-diploidy types of sex determination)

2. 5 Sex linked inheritance (X-linked, Y-linked & XY-linked inheritance)

Unit – III Genetics - II

3.1 Mutations & Mutagenesis

3.2 Chromosomal Disorders (Autosomal and Allosomal)

3.3 Human Genetics – Karyotyping, Pedigree Analysis (basics)

3.4 Basics on Genomics and Proteomics

UNIT IV: Molecular Biology

4.1 Central Dogma of Molecular Biology

4.2 Basic concepts of -

a. DNA replication – Overview (Semi-conservative mechanism, Semi-discontinuous mode, Origin & Propagation of replication fork)
b. Transcription in prokaryotes – Initiation, Elongation and Termination, Post-transcriptional modifications (basics)
c. Translation – Initiation, Elongation and Termination

4.3 Gene Expression in prokaryotes (Lac Operon); Gene Expression in eukaryotes

Unit - V

5.1 Origin of life

5.2 Theories of Evolution: Lamarckism, Darwinism, Germ Plasm Theory, Mutation Theory

5.3 Neo-Darwinism: Modern Synthetic Theory of Evolution, Hardy-Weinberg Equilibrium

5.4 Forces of Evolution: Isolating mechanisms, Genetic Drift, Natural Selection, Speciation

Co-curricular activities (Suggested)

- Model of animal cell
- Working model of mitochondria to encourage creativity among students

ZOOLOGY SYLLABUS FOR IV SEMESTER

PAPER – IV: ANIMAL PHYSIOLOGY, CELLULAR METABOLISM AND EMBRYOLOGY

HOURS: 60 (5X12) **Max. Marks: 100**

UNIT I Animal Physiology - I

1.1 Process of digestion and assimilation

1.2 Respiration - Pulmonary ventilation, transport of oxygen and CO_2

(Note: Need not study cellular respiration here)

1.3 Circulation - Structure and functioning of heart, Cardiac cycle

1.4 Excretion - Structure and functions of kidney urine formation, counter current Mechanism

UN IT II Animal Physiology - II

2.1 Nerve impulse transmission - Resting membrane potential, origin and propagation of action potentials along myelinated and non-myelinated nerve fibers

2.2 Muscle contraction - Ultra structure of muscle, molecular and chemical basis of muscle contraction

2.3 Endocrine glands - Structure, functions of hormones of pituitary, thyroid, parathyroid, adrenal glands and pancreas

2.4 Hormonal control of reproduction in a mammal

UNIT III Cellular Metabolism – I (Biomolecules)

3.1 Carbohydrates - Classification of carbohydrates. Structure of glucose

3.2 Proteins - Classification of proteins. General properties of amino acids

3.3 Lipids - Classification of lipids

3.4 Enzymes: Classification and Mechanism of Action

UNITIV Cellular Metabolism – II

4.1 Carbohydrate Metabolism - Glycolysis, Krebs cycle, Electron Transport Chain, Glycogen metabolism, Gluconeogenesis

4.2 Lipid Metabolism – β-oxidation of palmitic acid

4.3 Protein metabolism - Transamination, Deamination and Urea Cycle

Unit – V **Embryology**

5.1 Gametogenesis

5.2 Fertilization

5.3 Types of eggs

5.4 Types of cleavages

5. 5 Development of Frog upto formation of primary germ layers

5.6 Types of Placenta

Co-curricular activities (Suggested)

- Chart on cardiac cycle, human lung, kidney/nephron structure etc.
- Working model of human / any mammalian heart.
- Chart of sarcomere/location of endocrine glands in human body
- Chart affixing of photos of people suffering from hormonal disorders
- Student study projects such as identification of incidence of hormonal disorders in the local primary health centre, studying the reasons thereof and measures to curb or any other as the lecturer feels good in nurturing health awareness among students
- Chart on structures of biomolecules/types of amino acids (essential and non-essential)Chart preparation by students on Glycolysis / kreb's cycle/urea cycle etc.
- Model of electron transport chain
- Preparation of models of different types of eggs in animals
- Chart on frog embryonic development, fate map of frog blastula, cleavage etc.

ZOOLOGY SYLLABUS FOR SEMESTER - IV

COURSE – 5: IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY

HOURS : 60 (5X12) **Max. Marks: 100**

Unit – I **Immunology – I (Overview of Immune system)**

1.1 Introduction to basic concepts in Immunology

1.2 Innate and adaptive immunity, Vaccines and Immunization programme

1.3 Cells of immune system

1.4 Organs of immune system

Unit – II Immunology – II (Antigens, Antibodies, MHC and Hypersensitivity)

2.1 Antigens: Basic properties of antigens, B and T cell epitopes, haptens and adjuvants; Factors influencing immunogenicity

2.2 Antibodies: Structure of antibody, Classes and functions of antibodies

2.3 Structure and functions of major histocompatibility complexes

2.4 Exogenous and Endogenous pathways of antigen presentation and processing

2.5 Hypersensitivity – Classification and Types

Unit – III Techniques

2.1 Animal Cell, Tissue and Organ culture media: Natural and Synthetic media,

2.2 Cell cultures: Establishment of cell culture (primary culture, secondary culture, types of cell lines; Protocols for Primary Cell Culture); Established Cell lines (common examples such as MRC, HeLa, CHO, BHK, Vero); Organ culture; Cryopreservation of cultures

2.3 Stem cells: Types of stem cells and applications

2.4 Hybridoma Technology: Production & applications of Monoclonal antibodies (mAb)

Unit – IV Applications of Animal Biotechnology

3.1 Genetic Engineering:Basic concept, Vectors, Restriction Endonucleases and Recombinant DNA technology

3.2 Gene delivery:Microinjection, electroporation, biolistic method (gene gun), liposome and viral-mediated gene delivery

3.3 Transgenic Animals:Strategies of Gene transfer; Transgenic - sheep, - fish; a pplications

3.4 Manipulation of reproduction in animals:Artificial Insemination, ***In vitro*** fertilization, super ovulation, Embryo transfer, Embryo cloning

Unit - V

1.1. PCR:Basics of PCR.

4.2 DNA Sequencing: Sanger's method of DNA sequencing- traditional and automated sequencing (2 hrs)

4.3 Hybridization techniques: Southern, Northern and Western blotting

4.4 DNA fingerprinting: Procedure and applications

4.5 Applications in Industry and Agriculture: Fermentation: Different types of Fermentation and Downstream processing; Agriculture: Monoculture in fishes, polyploidy in fishes

Co-curricular activities (suggested)

- Organizing awareness on immunization importance in local village in association with NCC and NSS teams
- Charts on types of cells and organs of immune system

Unit – V

Culture of shrimp (Penaeus monodon or Litopenaeus vannamei)
Culture of pearl oysters
Culture of ornamental fishes – Setting up and maintenance of aquarium.

REFERENCES BOOKS

1. Bardach, JE et al. 1972. Aquaculture – The farming and husbandry of freshwater and marine organisms, John Wiley & Sons, New York.
2. Bose AN et al.1991. Coastal aquaculture Engineering. Oxford & IBH Publ.Co.Pvt.Ltd.
3. Chakraborty C & Sadhu AK. 2000. Biology Hatchery and Culture Technology of Tiger Prawn and Giant Freshwater Prawn. Daya Publ. House.
4. FAO. 2007. Manual on Freshwater Prawn Farming.
5. Huet J. 1986. A text Book of Fish Culture. Fishing News Books Ltd.
6. ICAR. 2006. Hand Book of Fisheries and Aquaculture. ICAR.
7. Ivar LO. 2007. Aquaculture Engineering. Daya Publ. House.

Unit – V

Economics and Marketing

5.1.1 Principles of aquaculture economics – Capital costs, variable costs, cost-benefit analysis

5.1.2Fish marketing methods in India; Basic concepts in demand and price analysis

Fish Genetics

Genetic improvement of fish stocks – Hybridization of fish.

Cryopreservation of gametes, Production of monosex and sterile fishes and their significance in aquaculture.

REFERENCE BOOKS

1. Boyd CE. 1979. Water Quality in Warm Water Fish Ponds. Auburn University
2. Boyd, CE. 1982. Water Quality Management for Pond Fish Culture. Elsevier Sci. Publ. Co.

2022-23
Semester-wise Revised Syllabus under CBCS, 2020-21
Four – year B.Sc. (Hons)
Domain Subject: **ZOOLOGY**
Semester –V
Max. Marks: 100+50
Course6 A: **SUSTAINABLE AQUACULTURE MANAGEMENT**
(Skill Enhancement Course (Elective), -Credits: 05)

I. Learning Outcomes:

Students at the successful completion of this course will be able to

- Evaluate the present status of aquaculture at the Global level and National level
- Classify different types of ponds used in aquaculture
- Demonstrate induced breeding of carps
- Acquire critical knowledge on commercial importance of shrimps
- Identify fin and shell fish diseases

II. **Syllabus**: (*Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)*

Unit: 1
Present status of Aquaculture – Global and National scenario
Major cultivable species for aquaculture: freshwater, brackish water and marine.
Traditional, extensive, modified extensive, semi-intensive and intensive cultures of fishand shrimp.
Design and construction of fish and shrimp farms
Unit: 2
Functional classification of ponds – head pond, hatchery, nursery ponds
Functional classification of ponds -rearing, production, stocking and quarantine ponds
Need of fertilizer and manure application in culture ponds
Physio-chemical conditions of soil and water optimum for culture (Temperature, depth, turbidity, light, water, PH, BOD, CO2 and nutrients)
Unit: 3
Induced breeding in fishes
Culture of Indian major carps: Pre-stocking management (Dewatering, drying, ploughing/desilting; Predators, weeds and algal blooms and their control, Liming and fertilization)
Culture of Indian major carps - Stocking management
Culture of Indian major carps - post-stocking management
Unit: 4
Commercial importance of shrimp & prawn
Macrobrachiumrosenbergii- biology, seed production.
Culture of *L. vannamei*– hatchery technology and culture practices

Mixed culture of fish and prawns

Unit: 5

Viral diseases of Fin Fish & shell fish
Fungal diseases of Fin & Shell fish
Bacterial diseases of Finfish & Shell fish
Prophylaxis in aquaculture

III. References:

1. Pillay TVR &M.A.Dill, 1979. Advances in Aquaculture. Fishing News Books Ltd., London

2. Stickney RR 1979. Principles of Warm Water Aquaculture. John Wiley & Sons Inc.1981

3. Boyd CE 1982. Water Quality Management for Pond Fish Culture. Elsivier Scientific Publishing Company.

4. Bose AN et.al. 1991. Costal Aquaculture Engineering. Oxford & IBH Publishing Company Pvt. Ltd.

Web Links:

1.http://www.fao.org/fishery/docs/CDrom/FAO_Training/FAO_Training/General/x6708e/x6708e06.htm

2. http://aquaticcommons.org/1666/1/Better-Practice3_opt.pdf

3. https://www.notesonzoology.com/india/fishery/fish-diseases-symptoms-and-control-fishery/871

Course 6A: SUSTAINABLE AQUACULTURE MANAGEMENT PRACTICAL SYLLABUS

IV. Learning Outcomes:

On successful completion of this practical course, student shall be able to:

- Identify the characaters of Fresh water cultivable species
- Etimatephysico chemical characateristics of water used for aquaculture
- Examine the diseases of fin and shell fish
- Suggest measures to prevent diseases in aquaculture

V. Practical (Laboratory) Syllabus: (30hrs) (Max.50Marks)

1. Fresh water Cultivable species any (Fin & Shell Fish Specimens – Observation of morphological characters by observation and drawings)-5
2. Brackish water cultivable species (Fin &Shell fish- Specimens- Observation of Morphological Character by observing drawing) -5
3. Hands on training on the use of kits for determination of water quality in aquaculture (DO, Salinity, pH, Turbidity- Testing kits to be used for the estimation of various parameters/ Standard procedure can be demonstrated for the same)
4. Demonstration of Hypophysation (Procedure of hypophysation to be demonstrated in the practical lab with any edible fish as model)

5. Viral diseases of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of viral pathogens in fin/ shell fish – one edible specimen can be used for observation of same in the laboratory)
6. Bacterial diseases of Fin & Shell Fish (Observation of his to pathological slides / Charts/ Models of Bacterial pathogens in fin/ shell fish – One edible specimen can be used for observation of same in the laboratory)

SKR & SKR GOVT. COLLEGE FOR WOMEN, KADAPA.
(AUTONOMOUS)
Reaccredited with 'B' Grade by NAAC
Y.S.R. Kadapa District – 516001, Andhra Pradesh, India.
Affiliated to Yogi Vemana University

2023-24

Semester-wise Revised Syllabus under CBCS, 2020-21

Four – year B.Sc. (Hons)

Domain Subject: ZOOLOGY

IV Year B. Sc.(Hons)–Semester –V

Max Marks: 100+50

Course 7 A: **POSTHARVEST TECHNOLOGY OF FISH AND FISHERIES**

(Skill Enhancement Course (Elective), - Credits: 05)

I. Learning Outcomes**:**

Students at the successful completion of this course will be able to

- Identify the types of preservation methods employed in aquaculture
- Choose the suitable Processing methods in aquaculture
- Maintain the standard quality control protocols laid down in aqua industry
- Identify the best Seafood quality assurance system

II. **Syllabus:** *Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)*

Unit – I Handling and Principles of fish Preservation

1. 1 Handling of fresh fish, storage and transport of fresh fish, post mortem changes (rigor mortis and spoilage), spoilage in marine fish and freshwater fish.

1.2 Principles of preservation – cleaning, lowering of temperature, rising of temperature, denudation, use of salt, use of fish preservatives, exposure to low radiation of gamma rays.

Unit – II Methods of fish Preservation

2.1 Traditional methods - sun drying, salt curing, pickling and smoking.

2.2. Advanced methods – chilling or icing, refrigerated sea water, freezing, canning, irradiation and Accelerated Freeze drying (AFD).

Unit – III Processing and preservation of fish and fish by-products

Fish products – fish minced meat, fish meal, fish oil, fish liquid (ensilage), fish protein concentrate, fish chowder, fish cake, fish sauce, fish salads, fish powder, pet food from trash fish, fish manure.

Fish by-products – fish glue, Using glass, chitosan, pearl essence, shark fins, fish Leatherand fish maws.

Unit – IV Sanitation and Quality control

Sanitation in processing plants - Environmental hygiene and Personal hygiene in processing plants.

Quality Control of fish and fishery products – pre-processing control, control during processing and control after processing.

Unit – V Quality Assurance, Management and Certification

5.1. Seafood Quality Assurance and Systems: Good Manufacturing Practices (GMPs); Good Laboratory Practices (GLPs); Standard Operating Procedures (SOPs); Concept of Hazard Analysis and Critical Control Points (HACCP) in seafood safety.

5.2 National and International standards – ISO 9000: 2000 Series of Quality Assurance System, *Codex Aliment Arius*.

III. References:

1. Santharam R, N Sukumaran and P Natarajan 1987. A manual of aquaculture, Oxford- IBH, NewDelhi

2. Lakshmi Prasad's, Fish Processing Technology 2012, Arjun Publishing House

3. Dr Sunitha Rai, Fish Processing Technology, 2015, Random Publications

4. Safety and Quality Issues in Fish Processing (Woodhead Publishing Series in Food Science, Technology and Nutrition)by H A Bremner

5. K.A Mahanthy, Innovations in Fishing and Fish Processing Technologies, January 2021

Web Resources:

1. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=145743

2. https://ecourses.icar.gov.in/e-Leaarningdownload3_new.aspx?Degree_Id=03

Course 7 A: POSTHARVEST TECHNOLOGY OF FISH AND FISHERIES PRACICAL SYLLABUS

IV. Learning Outcomes: On successful completion of this practical course, student shall be able to:

- Identify the quality of aqua processed products.
- Determine the quality of fishery by products by observation
- Analyze the protocols of aqua processing methods

V. **Practical(Laboratory) Syllabus**:

1. Evaluation of fish/ fishery products for organoleptic, chemical and microbial quality.
2. Preparation of dried, cured and fermented fish products

For detailed procedure method visit sites:

3. Examination of salt, protein, moisture in dried / cured products
4. Examination of spoilage of dried / cured fish products, marinades, pickles, sauce.
5. Preparation of isinglass, collagen and chitosan from shrimp and crab shell.
6. Developing flow charts and exercises in identification of hazards – preparation of hazard analysis worksheet
7. Corrective action procedures in processing of fish- flow chart- work sheet preparation

(** Refer the following web sites for complete procedure method and estimations of above listed practicals)

VI. References:

1. Dr Sunitha Rai, Fish Processing Technology, 2015, Random Publications
2. https://ecourses.icar.gov.in/e-Leaarningdownload3_new.aspx?Degree_Id=03
3. https://vikaspedia.in/agriculture/fisheries/post-harvest-and-marketing/processing-in-fisheries/fermented-products
4.https://krishi.icar.gov.in/jspui/bitstream/123456789/20500/1/Fermentation%20technology%20for%20fish.pdf
5. http://jebas.org/00200620122014/Abujam%20et%20al%20JEBAS.pdf
6.https://krishi.icar.gov.in/jspui/bitstream/123456789/20770/1/Training%20Manual_Hygienic%20drying%20and%20packing%20of%20fish.pdf
7.https://krishi.icar.gov.in/jspui/bitstream/123456789/20770/1/Training%20Manual_Hygienic%20drying%20and%20packing%20of%20fish.pdf
8. https://agritech.tnau.ac.in/fishery/fish_byproducts.html
9. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5352841/
10. http://www.fao.org/3/i1136e/i1136e.pdf
11. http://www.fao.org/3/x5989e/X5989e01.htm#What%20is%20sensory%20assessment)

Web resources suggested by the teacher concerned and the college librarian including reading material

1. Pran Nath Seth (2006): Successful tourism Management, Sterling, New Delhi

(Vol. 1 & 2)

2. Mill and Morrison, (1992). The Tourism System: An Introductory Text, Prentice

Hall. London

3. Cooper. Fletcher et al. (1993). Tourism Principles and Practices. Pitman.

4. Bhatia, A.K. (2010): International Tourism Management, Sterling, New Delhi 5. Burkart and Medlik. (1981). Tourism: Past, Present and Future. Heinemann,

2023-24

Core papers

DEPARTMENTOFTOURISM&TRAVELMANAGEMENT

Semester-III

Syllabus

Paper – III TOURISMPRODUCTS

Module-1

Definitions – concept, types and characteristics of tourism products, elements of tourismproducts – geographical elements and other tourist attractions –different levels ofmodelsandlayers– productlifecycle.

Module-2

Geography of tourism – definition. scope and content of geography of tourism – major landforms – mountains, plains, plateaus; natural regions of the world – Impact of weather andclimateontourism, seasonalrhythm–geographicalcomponentsandtourismdevelopmentlinkages.

Module-3

Natural tourist resources – important national parks and wild life sanctuaries – examplesfromsouthINDIA.Beachesandislands, waterfalls: deserttourismdesertsafarisandfestivalsrecreation and adventure tourism (land, waterand air based)

Module-4Concept of tourism pilgrimage in India – select Hindu, Buddhist, Jain, Sikh, Islam andChristianpilgrimcentres andrelatedcircuits

Module-5Performing arts and Hany crafts of India –music and dance (tribal, folk, & classical) tourismfestivals –introduction to medical, health and wellness tourism – world heritage sites inIndia.

References: -

1. **RangaMukesh, tourismprotentionalinIndia.**
2. **SarkarH,museumsandprotectionsofmonumentsandantiquities inIndia.**
3. **VijayaLakshmik.shistorytourism.**
4. **WilliamsS(1998) Tourismgeography, Routledge,London.WWW.Unwto.org.**
5. **http://www.buzzle.com**

6. www.international.icomos.org
7. www.unesco.org
8. www.pondiuni.edu.in
9. www.globalpropertyguide.com
10. www.amazon

2022-23

Core papers

DEPARTMENTOFTOURISM&TRAVELMANAGEMENT

SemesterIV –Syllabus

PaperIV: -CULTURALTOURISMINANDHRA PRADESH

Module -1

Definition to History and culture (Tangible and Intangible) – Brief History of – SalientFeatures ofA.PCulture

Module - 2

Pre and Proto History – Art and Architecture of A.P as Tourism Products – MajorMuseumsandArtGalleries –MajorpilgrimCentres(Temple,ChurchandMosque) inA.P

Module -3

Performing Arts and Handicrafts – Andhra Paintings and Stone Crafts – Music and Dance(Tribal,FolkandClassical)

Module -4

Language and Literature – Dress and Ornaments – Food (cuisine) and Health (MedicalSystems)

Module-5

Tribal Culture of A.P – Tribes of A.P – Geographical spread – Identity – Society –Economy – Religion and Culture – Need for Conservation of Cultural heritage – UNESCOInitiatives–FieldVisits.

References:

APTDCPublications

Shivangi Reddy, E, - Andhra Pradesh Tourism Vana ulu – Akcakale (Telugu),Hyderabad,2003
www.aptdc.gov.in
www.aptourism.gov.in
www.tavell.in/Andhra

2022-23

Core papers

DEPARTMENTOFTOURISM&TRAVELMANAGEMENT

Paper-V: GUIDING AND INTERPRETATION SKILLS FOR TOURISM

SEMESTER – IV

Module 1
Introduction to Guiding and escorting- Meaning; concept and types of tour guide, duties and responsibilities of Guides and Escorts, various role of tour guide, the business of guiding, organizing a guiding business

Module 2
The guiding techniques- leadership and social skills, presentation and communication skills - The guide's personality - working with different age groups, working under difficult circumstances

Module 3
Guest Relationship Management- Handling emergency situations- medical, personal, official, VISA/passport, Death, handling guest with special needs/different abilities; Skills required for adventure tours; Knowledge of local security, route chart; Personal hygiene and grooming, tour responsibilities, checklist, leading a group, code of conduct

Module 4
Conducting tours: Pre tour planning, modes of transportation, conducting various types of tours, understanding client needs, security measures, relationship with fellow guides, Coordination with hospitality institutions; points to remember while guiding and escorting

Module 5
Professional development; Interpretative planning; training staff for interpretation; evaluation techniques; negotiation skills-types of negotiating techniques; negotiating a business deal in tourism.

References:
1. Jagmohan Negi (2006); Travel Agency and Tour Operations, Kanishka Publishers, New Delhi
2. Mohinder Chand (2009); Travel Agency and Tour Operations: An Introductory Text, Anmol Publications Pvt. Limited, New Delhi
3. Dennis L Foster - Introduction to Travel Agency Management 4. Pat Yale (1995); Business of Tour Operations, Longman Scientific & Technical, New Delhi
5. Pond K-L(1993); The professional guide: Dynamics of tour guiding
6. www.tourism.gov.in
7. www.qtic.com

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Core papers

DEPARTMENTOFTOURISMv&TRAVELMANAGEMENT

Semester V Syllabus

Paper - 6- TRAVEL AGENCY AND TOUR OPERATION BUSSINESS

Module - 1

Introduction to travel trade –origin and history of travel agencies–responsibilities and functions of travel agents–sources of income of a travel agent– setting up of travel agency.

Module - 2

Travel agency and tour operations –difference between travel agents and tour operator– linkages and arguments with hotel travel agencies and air lines– tour escorts and guides.

Module - 3

Organization structure of a travel agency – information counseling, ticketing document, lesioning. Staffing, directing, organizing and controlling.

Module - 4

Organization of tour operation– concept and nature of tour operation –functions –types of tour operations and of tour operators

Module - 5

Tourism practical (few examples are given above the faculty can include many more items

Travel agency management

1.Filling up of pass port applications from

2.Filling up of sample Visa forms

3.knowledge of visas various countries

4.Ticket booking using online travel seats

Tour operations

1. **preparation of tour Itinerary – In bound and out bound**
2. **model costing of tour packages**

3. preparation of special interest tours in your region

4.sample tour grocery steady and preparations

5.vochers preparation and filling

6.visit to travel / tour company.

References

1. Jag Negimohan (2006).,Travel agency and tour operations ,kanishka publishers ,New Delhi.

2. Mohandar chand (2009).,Travel agency and tour operations :and introduction text ,amol publication pvt .limited ,New Delhi.

3. Jane archer ,(2006).,Manule of travel agency practice – Butterworth Heinemann,pub,London

4.https://www.tichk.org

5. www.growourregion.

6. www.usaidg.gov.com

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Core papers

DEPARTMENTOFTOURISM&TRAVELMANAGEMENT

Semester V – Syllabus

PAPER –VII: TOURISM MARKETING & HOSPITALITY MANAGEMENT

Module - 1

Definition of Tourism marketing characteristics –philosophies of marketing management customer relationship management –relationship between hospitality and tourism industry –service culture

Module - 2

Micro environment –company, suppliers, marketing intermediaries, customers, public– environmental forces and trends–Marketing information system & research process –promotion

Module - 3

Introduction to hospitality industry –Nature, scope and components –Accommodation types and forms –Important departments of hotel –front office Housekeeping, Food and Beverage, maintenance and engineering –function and co-ordination with other departments –classification, categorization, registration and approval –handling emergencies

Module - 4

Guest cycle – Guest stays process in a hotel major processes and stages associated with it – Reservation, Registration, Guest complaints etc.–study of the working of selected hotels/motels/restaurants–Different types of catering establishments –Managerial issues

MODULE - 5

Tourism practical (few examples are given below – the faculty can include many more items)

Transportation management

1. **Ticket booking for Indian railways using IRCTC and bus services like red bus**

2. **Study and simple costing of vehicle rates for package tours –cars, medium, size vehicles and buses**

Hospitability Management

1.case study of important hotel properties

2.practical accepts of bed making

3.service etiquette

4. Venue card preparation

5.visit to hotels/resorts

References:

1. **Ravi Shankar (2002)., service marketing, excel books India. New Delhi**

2. **Phillips Kolter, Bowens and James makes (2010)., marketing for tourism and hospitality, Pearson, New Delhi.**

3. **Naresh Malhotra (2000); Marketingresearch, person prentice Hall, New Delhi**

4.Janet Macdonald (2000), Travel writing. RobberHale, London

5. **www.ilo.org**

6. **https://ringinstitute .com**

7. **https://alison.com**

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Core papers

III Semester /HorticultureCoreCourse - 3
Basics of Vegetable Science (Olericulture)
(Total hours of teaching – 60 @ 04 Hrs./Week)

Theory :

Learning Outcomes: On successful completion of this course, the students will be able to:

- Distinguish the growing of vegetables according to season and climate
- Get detailed knowledge on cultivation aspects of different vegetables
- Understand and explain the special intercultural operations done in vegetable crops
- Study of morphology and taxonomy of different vegetable crops
- Study of different varieties of vegetable crops
- Identify the diseases and pests of vegetable crops and their management

Unit – 1 : Introduction to Vegetable crops **12 Hrs.**

1. Importance of vegetablecultivation in India and Andhra Pradesh.
2. Classification and Nutritive value of vegetables.
3. Area and production of vegetables in India and Andhra Pradesh.
4. Export and import potential of vegetables in India.Constraints in vegetable production and remedies to overcome them.

Unit – 2 :Solanaceous andLeafy vegetables **12 Hrs.**

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring,irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

Cultivation of (a) Brinjal(b) Tomato(c) *Capsicum* (d) Spinach (c) Coriander and (d) *Mentha*

Unit – 3 : Root and Tuber crops **16 Hrs.**

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring,irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

Cultivation of (a) Carrot(b) Beet root(c) Tapioca and (d)*Colocasia*

Unit – 4 : Cole crops **08 Hrs.**

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring,irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

Cultivation of (a) Cabbage and (b) Cauliflower

Unit – 5 : Leguminous vegetables **12 Hrs.**

Importance, morphology and taxonomy, varieties, climate and soil, seeds and sowing, manuring, irrigation, intercultural operations, diseases and their control, harvesting and yield of following crops:

Cultivation of (a)Cluster bean (b) Cow pea and (d) *Dolichos*

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Core papers

IV Semester /HorticultureCore Course - 4
Basics of Fruit Science (Pomology)
(Total hours of teaching – 60 @ 04 Hrs./Week)

Theory :

Learning Outcomes: On successful completion of this course, the students will be able to:

- Realize the value of fruits in terms of human nutrition and economy of nation.
- Explain the potential fruit zones in various states of our country.
- Classify the fruiting plants based on temperature requirements.
- Acquire knowledge related to various cultivation practices for different fruit crops
- Demonstrate the special intercultural operations done in fruit crops
- Comprehend the knowledge on varieties of different fruit crops.
- Examinethe pests and diseases of fruit crops and develop skills to manage the same,
- Explain about Integrated Orchard Management
- Develop knowledge on various entrepreneurial skills related to fruit science.

Unit – 1 : Introduction to Fruit crops **12 Hrs.**

1. Importance of fruit growing in India and Andhra Pradesh.
2. Nutritive value of fruits.
3. Area and production of India and Andhra Pradesh.
4. Export and import potential of fruits in India.Constraints in fruit production and remedies to overcome them.

Unit – 2 : Tropical Fruit Crops **12 Hrs.**

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield, diseases and pests of the following tropical fruit crops:

(a) Mango (b) Guava and (c) Papaya

Unit – 3 : Sub-tropical and temperate fruit crops **12 Hrs.**

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, intercropping, harvesting and yield,

diseases and pests of the following sub-tropical and temperate fruit crops:

(a) Grapes (b) Pomegranate (c) Citrus and (d) Apple

Unit – 4 : Arid and minor fruit crops **12 Hrs.**

Origin, history, distribution, area and production, uses and composition, varieties, soil and climatic requirements, propagation, planting, training and pruning, manuring and fertilizer application, irrigation, inter cropping, harvesting and yield, diseases and pests of the following arid fruit crops:

(a) Amla (b) Dates and (c) Wood apple

Unit – 5 : Management practices for fruit crops **12 Hrs.**

1. Sustainable Production Practices for Local Fruit Production.
2. Integrated Orchard Management/Principles of IPM.
3. Harvesting and Labor Concerns
4. Grading, packing, storage and marketing of fruits.

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SEMESTER-I

COURSE 1: ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL ANDCHEMICAL SCIENCES

Theory Credits: 4 5 hrs/week

Course Objective:

The objective of this course is to provide students with a comprehensive understanding of theessential concepts and applications of mathematical, physical, and chemical sciences. The course aims to develop students' critical thinking, problem-solving, and analytical skills in these areas, enabling them to apply scientific principles to real-world situations.

Learning outcomes:

1. Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.

2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations

3. To Explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to Connect their knowledge of chemistry to daily life.

4. Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.

5 To explore the history and evolution of the Internet and to gain an understanding of networksecurity concepts, including threats, vulnerabilities, and countermeasures.

UNIT I: ESSENTIALS OF MATHEMATICS:

Complex Numbers: Introduction of the new symbol i – General form of a complex number – Modulus-Amplitude form and conversions

Trigonometric Ratios: Trigonometric Ratios and their relations – Problems on calculation of angles**Vectors:** Definition of vector addition – Cartesian form – Scalar and vector product and problems **Statistical Measures**: Mean, Median, Mode of a data and problems

UNIT II: ESSENTIALS OF PHYSICS:

Definition and Scope of Physics- Measurements and Units - Motion of objects: Newtonian Mechanics and relativistic mechanics perspective - Laws of Thermodynamics and Significance- Acoustic waves and electromagnetic waves- Electric and Magnetic fields and their interactions- Behaviour of atomic and nuclear particles- Wave-particle duality, the uncertainty principle- Theories and understanding of universe

UNIT III: ESSENTIALS OF CHEMISTRY: :

Definition and Scope of Chemistry- Importance of Chemistry in daily life -Branches of chemistry and significance- Periodic Table- Electronic Configuration, chemical changes, classification of matter, Biomolecules- carbohydrates, proteins, fats and vitamins.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY:

Applications of Mathematics in Physics & Chemistry: Calculus , Differential Equations & Complex Analysis

Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, Automotive and Aerospace Industries, Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies.

Application of Chemistry in Industry and Technology: Chemical Manufacturing, Pharmaceuticals and Drug Discovery, Materials Science, Food and Beverage Industry.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

Milestones of computer evolution - Internet, history, Internet Service Providers, Types of Networks, IP, Domain Name Services, applications.

Ethical and social implications: Network and security concepts- Information Assurance Fundamentals, Cryptography-Symmetric and Asymmetric, Malware, Firewalls, Fraud Techniques- Privacy and Data Protection

Recommended books:

1. Functions of one complex variable by John.B.Conway, Springer- Verlag.
2. Elementary Trigonometry by H.S.Hall and S.R.Knight
3. Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. Basic Statistics by B.L.Agarwal, New age international Publishers
5. University Physics with Modern Physics by Hugh D. Young and Roger A. Freedman
6. Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker
7. Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway and John W. Jewett Jr.
8. Physics for Technology and Engineering" by John Bird
9. Chemistry in daily life by Kirpal Singh
10. Chemistry of bio molecules by S. P. Bhutan
11. Fundamentals of Computers by V. Raja Raman
12. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

STUDENT ACTIVITIES

UNIT I: ESSENTIALS OF MATHEMATICS:

1: Complex Number Exploration

Provide students with a set of complex numbers in both rectangular and polar forms.

They will plot the complex numbers on the complex plane and identify their properties2:

Trigonometric Ratios Problem Solving

Give students a set of problems that require the calculation of trigonometric ratios and theirrelations.

Students will solve the problems using the appropriate trigonometric functions (sine, cosine,tangent, etc.) and trigonometric identities.

3: Vector Operations and Applications

Provide students with a set of vectors in Cartesian form.

Students will perform vector addition and subtraction operations to find the resultant vectors.They will also calculate the scalar and vector products of given vectors.

4: Statistical Measures and Data Analysis

Give students a dataset containing numerical values.

Students will calculate the mean, median, and mode of the data, as well as other statisticalmeasures if appropriate (e.g., range, standard deviation).
They will interpret the results and analyze the central tendencies and distribution of the data.

UNIT II: ESSENTIALS OF PHYSICS:

1. Concept Mapping

Divide students into groups and assign each group one of the topics.

Students will create a concept map illustrating the key concepts, relationships, and applications related to their assigned topic.

Encourage students to use visual elements, arrows, and labels to represent connections and interdependencies between concepts.

2. Laboratory Experiment

Select a laboratory experiment related to one of the topics, such as motion of objects orelectric and magnetic fields.
Provide the necessary materials, instructions, and safety guidelines for conducting the experiment.
Students will work in small groups to carry out the experiment, collect data, and analyze theresults.

After the experiment, students will write a lab report summarizing their findings, observations, and conclusions.

UNIT III: ESSENTIALS OF CHEMISTRY

1: Chemistry in Daily Life Presentation

Divide students into groups and assign each group a specific aspect of daily life where chemistry plays a significant role, such as food and nutrition, household products, medicine,or environmental issues.
Students will research and create a presentation (e.g., PowerPoint, poster, or video) thatshowcases the importance of chemistry in their assigned aspect.

2: Periodic Table Exploration

Provide students with a copy of the periodic table.

Students will explore the periodic table and its significance in organizing elements based ontheir properties.
They will identify and analyze trends in atomic structure, such as electronic configuration,atomic size, and ionization energy.

3: Chemical Changes and Classification of Matter

Provide students with various substances and chemical reactions, such as mixing acids andbases or observing a combustion reaction.
Students will observe and describe the chemical changes that occur, including changes incolor, temperature, or the formation of new substances.

4: Biomolecules Investigation

Assign each student or group a specific biomolecule category, such as carbohydrates,proteins, fats, or vitamins.
Students will research and gather information about their assigned biomolecule category,including its structure, functions, sources, and importance in the human body.

They can create informative posters or presentations to present their findings to the class.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

1: Interdisciplinary Case Studies

Divide students into small groups and provide them with interdisciplinary case studies thatinvolve the interdisciplinary application of mathematics, physics, and chemistry.

Each case study should present a real-world problem or scenario that requires the integrationof concepts from all three disciplines.

2: Design and Innovation Project

Challenge students to design and develop a practical solution or innovation that integrates mathematics, physics, and chemistry principles.

Students can choose a specific problem or area of interest, such as renewable energy,environmental conservation, or materials science.

3: Laboratory Experiments

Assign students laboratory experiments that demonstrate the practical applications of mathematics, physics, and chemistry.

Examples include investigating the relationship between concentration and reaction rate, analyzing the behavior of electrical circuits, or measuring the properties of materials.

.4: Mathematical Modeling

Present students with real-world problems that require mathematical modeling and analysis.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

1. Identifying the attributes of network (Topology, service provider, IP address and bandwidth of

2. your college network) and prepare a report covering network architecture.

3. Identify the types of malwares and required firewalls to provide security.

4. Latest Fraud techniques used by hackers**.**

SEMESTER-I

COURSE 2: ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Theory Credits: 4 5 hrs/week

Course Objective:

The objective of this course is to provide students with an in-depth understanding of the recentadvances and cutting-edge research in mathematical, physical, and chemical sciences. The course aims to broaden students' knowledge beyond the foundational concepts and expose them to the latest developments in these disciplines, fostering critical thinking, research skills, and the ability to contribute to scientific advancements.

Learning outcomes:

1. Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems.

2. To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations.

3. Understand the different sources of renewable energy and their generation processes and advances in nanomaterials and their properties, with a focus on quantum dots. To study the emerging field of quantum communication and its potential applications. To gain an understanding of the principles of biophysics in studying biological systems. Explore the properties and applications of shape memory materials.

3. Understand the principles and techniques used in computer-aided drug design and drug delivery systems, to understand the fabrication techniques and working principles of nanosensors. Explore the effects of chemical pollutants on ecosystems and human health.

4. Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.

5 Understand and convert between different number systems, such as binary, octal, decimal, and hexadecimal. Differentiate between analog and digital signals and understand their characteristics.Gain knowledge of different types of transmission media, such as wired (e.g., copper cables, fiber optics) and wireless (e.g., radio waves, microwave, satellite)..

UNIT I: ADVANCES IN BASICS MATHEMATICS

Straight Lines: Different forms – Reduction of general equation into various forms – Point ofintersection of two straight lines

Limits and Differentiation: Standard limits – Derivative of a function –Problems on product ruleand quotient rule

Integration: Integration as a reverse process of differentiation – Basic methods of integration

Matrices: Types of matrices – Scalar multiple of a matrix – Multiplication of matrices – Transpose ofa matrix and determinants

UNIT II: ADVANCES IN PHYSICS:

Renewable energy: Generation, energy storage, and energy-efficient materials and devices. **Recent advances in the field of nanotechnology**: Quantum dots, Quantum Communication- recent advances in biophysics- recent advances in medical physics- Shape Memory Materials.

UNIT III: ADVANCES IN CHEMISTRY:

Computer aided drug design and delivery, nano sensors, Chemical Biology, impact of chemicalpollutants on ecosystems and human health, Dye removal - Catalysis method

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS &CHEMISTRY

Mathematical Modelling applications in physics and chemistry

Application of Renewable energy: Grid Integration and Smart Grids,

Application of nanotechnology: Nanomedicine,

Application of biophysics: Biophysical Imaging, Biomechanics, Neurophysics,

Application of medical physics: Radiation Therapy, Nuclear medicine

Solid waste management, Environmental remediation- Green Technology, Water treatment.

UNIT V: Advanced Applications of computer Science

Number System-Binary, Octal, decimal, and Hexadecimal, Signals-Analog, Digital, Modem, Codec, Multiplexing, Transmission media, error detection and correction- Parity check and CRC, Networking devices- Repeater, hub, bridge, switch, router, gateway.

Recommended books:

1. Coordinate Geometry by S.L.Lony, Arihant Publications
2. Calculus by Thomas and Finny, Pearson Publications
3. Matrices by A.R.Vasishtha and A.K.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. "Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle
5. "Energy Storage: A Nontechnical Guide" by Richard Baxter
6. "Nanotechnology: Principles and Applications" by Sulabha K. Kulkarni and Raghvendra A. Bohara
7. "Biophysics: An Introduction" by Rodney Cotterill
8. "Medical Physics: Imaging" by James G. Webster
9. "Shape Memory Alloys: Properties and Applications" by Dimitris C. Lagoudas
10. Nano materials and applications by M.N.Borah

11. Environmental Chemistry by Anil.K.D.E.

12. Digital Logic Design by Morris Mano

13. Data Communication & Networking by Bahrouz Forouzan.

STUDENT ACTIVITIES

UNIT I: ADVANCES IN BASIC MATHEMATICS

1: Straight Lines Exploration

Provide students with a set of equations representing straight lines in different forms, suchas slope-intercept form, point-slope form, or general form.

Students will explore the properties and characteristics of straight lines, including theirslopes, intercepts, and point of intersection.

2: Limits and Differentiation Problem Solving

Students will apply the concept of limits to solve various problems using standard limits.

Encourage students to interpret the results and make connections to real-world applications,such as analyzing rates of change or optimizing functions.

3: Integration Exploration

Students will explore the concept of integration as a reverse process of differentiation andapply basic methods of integration, such as the product rule, substitution method, or integration by parts.

Students can discuss the significance of integration in various fields, such as physics andchemistry

4: Matrices Manipulation

Students will perform operations on matrices, including scalar multiplication, matrixmultiplication, and matrix transpose.

Students can apply their knowledge of matrices to real-world applications, such as solvingsystems of equations or representing transformations in geometry.

UNIT II: ADVANCES IN PHYSICS:

1: Case Studies

Provide students with real-world case studies related to renewable energy, nanotechnology,biophysics, medical physics, or shape memory materials.

Students will analyze the case studies, identify the challenges or problems presented, andpropose innovative solutions based on the recent advances in the respective field.

They will consider factors such as energy generation, energy storage, efficiency, sustainability, materials design, biomedical applications, or technological advancements.

2: Experimental Design

Assign students to design and conduct experiments related to one of the topics: renewableenergy, nanotechnology, biophysics, medical physics, or shape memory materials.

They will identify a specific research question or problem to investigate and design anexperiment accordingly.

Students will collect and analyze data, interpret the results, and draw conclusions based ontheir findings.

They will discuss the implications of their experimental results in the context of recentadvances in the field.

3: Group Discussion and Debate

Organize a group discussion or debate session where students will discuss the ethical, social, and environmental implications of the recent advances in renewable energy, nanotechnology, biophysics, medical physics, and shape memory materials.

Assign students specific roles, such as proponent, opponent, or moderator, and provide them with key points and arguments to support their positions.

UNIT III: ADVANCES IN CHEMISTRY:

1. Experimental Design and Simulation

In small groups, students will design experiments or simulations related to the assigned topic.

For example, in the context of computer-aided drug design, students could design a virtual screening experiment to identify potential drug candidates for a specific disease target.

For nano sensors, students could design an experiment to demonstrate the sensitivity and selectivity of nano sensors in detecting specific analytes.
Chemical biology-related activities could involve designing experiments to study enzyme-substrate interactions or molecular interactions in biological systems.
Students will perform their experiments or simulations, collect data, analyze the results, and draw conclusions based on their findings.

2. Case Studies and Discussion

Provide students with real-world case studies related to the impact of chemical pollutants on ecosystems and human health.
Students will analyze the case studies, identify the sources and effects of chemical pollutants, and propose mitigation strategies to minimize their impact.

Encourage discussions on the ethical and environmental considerations when dealing with chemical pollutants.
For the dye removal using the catalysis method, students can explore case studies where catalytic processes are used to degrade or remove dyes from wastewater.

Students will discuss the principles of catalysis, the advantages and limitations of thecatalysis method, and its applications in environmental remediation.
3: Group Project

Assign students to work in groups to develop a project related to one of the topics.

The project could involve designing a computer-aided drug delivery system, developing anano sensor for a specific application, or proposing strategies to mitigate the impact of chemical pollutants on ecosystems.
Students will develop a detailed project plan, conduct experiments or simulations, analyzedata, and present their findings and recommendations.
Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

1: Mathematical Modelling Experiment

Provide students with a mathematical modelling experiment related to one of the topics. For example, in the context of renewable energy, students can develop a mathematical model to optimize the placement and configuration of solar panels in a solar farm.
Students will work in teams to design and conduct the experiment, collect data, and analyzethe results using mathematical models and statistical techniques.
They will discuss the accuracy and limitations of their model, propose improvements, and interpret the implications of their findings in the context of renewable energy or the specific application area.
2: Case Studies and Group Discussions

Assign students to analyze case studies related to the applications of mathematical modellingin nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment.
Students will discuss the mathematical models and computational methods used in the case studies, analyze the outcomes, and evaluate the effectiveness of the modelling approach.
Encourage group discussions on the challenges, ethical considerations, and potential advancements in the field.

Students will present their findings and engage in critical discussions on the advantages and limitations of mathematical modelling in solving complex problems in these areas.

3. Group Project

Assign students to work in groups to develop a group project that integrates mathematical modelling with one of the application areas: renewable energy, nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment.

The project could involve developing a mathematical model to optimize the delivery of radiation therapy in medical physics or designing a mathematical model to optimize waste management practices.
Students will plan and execute their project, apply mathematical modelling techniques,analyze the results, and present their findings and recommendations.
Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT V: Advanced Applications of computer Science

Students must be able to convert numbers from other number system to binary number systems

1. Identify the networking media used for your college network
   Identify all the networking devices used in your college premises.

SEMESTER-II

COURSE 3: INORGANIC CHEMISTRY

Theory Credits: 3 3 hrs/week

Course outcomes:

At the end of the course , the students will be able to;

1. Understand the basic concepts of p-block elements

2. Understand the concept of d & f -

Block elements UNIT –I

CHEMISTRY P-BLOCK ELEMENTS-I

Group- 13: Synthesis and structure of diborane, boron-nitrogen compounds ($B_3N_3H_6$ and BN) Group - 14: Preparation and applications of silanes and silicones.
Group - 15: Preparation and reactions of hydrazine, hydroxylamine.

UNIT-II:

P-BLOCK ELEMENTS -II

Group - 16: Classifications of oxides of sulphur based on (i) Chemical behaviour and (ii) Oxygen content. (iii) oxyacids of sulphur(structures only) Group-17: Inter halogen compounds and pseudo halogens. **UNIT-III:**

ORGANOMETALLIC CHEMISTRY

Definition - classification of Organometallic compounds - nomenclature, preparation, properties and applications of alkyls of Li and Mg.

UNIT-IV:

CHEMISTRY OF d-BLOCK ELEMENTS:

Characteristics of d-block elements with special reference to electronic configuration, variable valence, magnetic properties, catalytic properties and ability to form complexes. Stability of various oxidation states, Colour formation.

UNIT-V:

CHEMISTRY OF f-BLOCK ELEMENTS:

Chemistry of lanthanides - electronic structure, oxidation states, lanthanide contraction, consequences of lanthanide contraction, magnetic properties. Chemistry of actinides - electronic configuration, oxidation states, actinide contraction, comparison of lanthanides and actinides, Comparsion of lanthanides and actinides .

List of Reference Books

1. Inorganic Chemistry by J.E.Huheey
2. Basic Inorganic Chemistry by Cotton and Wilkinson
3.A textbook of qualitative inorganic analysis by A.I. Vogel
4. Concise Inorganic Chemistry by J.D.Lee

SEMESTER-II
COURSE 3: INORGANIC CHEMISTRY

Practical | Credits: 1 | 2 hrs/week

Practical-II-Mixture Salt Analysis

(At the end of Semester-I)

Qualitative inorganic analysis

Analysis of Mixture salt containing Two anions and Two cations from the following

Anions: Carbonate, sulphate, chloride, bromide, acetate, nitrate, borate, phosphate.

cations: Lead, copper, iron, aluminum, zinc, manganese, nickel, calcium, strontium, barium, potassium and ammonium.

SEMESTER-II
COURSE 4: ORGANIC CHEMISTRY

Theory | Credits: 3 | 3 hrs/week

Course outcomes:

At the end of the course , the students will be able to

1.Understand the basic concepts of alkanes, alkenes and alkynes

2.Understand the concept of Benzene.

UNIT-I:

STRUCTURAL THEORY IN ORGANIC CHEMISTRY

Types of bond fission and organic reagents (Electrophilic, Nucleophilic, and free radical reagents including neutral molecules like H_2O,NH_3& $AlCl_3$).

Inductive effect. Application of inductive effect (a) Basicity of amines (b) Acidity of carboxylic acids (c) Stability of carbonium ions. Resonance or Mesomeric effect, application to (a) acidity of phenol, and (b) acidity of carboxylic acids. Hyper conjugation and its application to stability of carbonium ions, Free radicals and alkenes, carbanions..

Types of Organic reactions : Addition - electrophilic, nucleophilic and free radical. Substitution - electrophilic, nucleophilic and free radical. Elimination- Examples.

UNIT-II:

ACYCLIC HYDROCARBONS

Alkenes - Preparation of alkenes. Properties: Addition of hydrogen - heat of hydrogenation and stability of alkenes. Addition of halogen and its mechanism. Addition of HX, Markonikov's rule, addition of H_2O, HOX, H_2SO_4 with mechanism and addition of HBr in the presence of peroxide (anti - Markonikov's addition). Dienes - Types of dienes, reactions of conjugated dienes - 1,2 and 1,4 addition of HBr to 1,3 - butadiene and Diel's - Alder reaction.

UNIT-III:

Alkynes - Preparation by dehydrohalogenation of dihalides, dehalogenation of tetrahalides, Properties; Acidity of acetylenic hydrogen (formation of Metal acetylides). Preparation of higher acetylenes, Metal ammonia reductions, Physical properties. Chemical reactivity - electrophilic addition of X_2, HX, H_2O (Tautomerism), Oxidation with $KMnO_4$, OsO_4, reduction and Polymerisation reaction of acetylene.

UNIT-IV

ALICYCLIC HYDROCARBONS (CYCLOALKANES)

Nomenclature, Preparation by Freunds method, Wislicenus method. Properties - reactivity of cyclopropane and cyclobutane by comparing with alkanes, Stability of cycloalkanes - Baeyer's strain theory, Sachse and Mohr predictions and Pitzer's strain theory. Conformational structures of cyclobutane, cyclopentane, cyclohexane.

UNIT-V:

BENZENE AND ITS REACTIVITY

Concept of aromaticity - aromaticity (definition), Huckel's rule - application to Benzenoid (Benzene, Naphthalene) and Non - Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation)

Reactions - General mechanism of electrophilic substitution, mechanism of nitration, Friedel Craft's alkylation and acylation. Orientation of aromatic substitution - Definition of ortho, para and meta directing groups. Ring activating and deactivating groups with examples (Electronic interpretation of various groups like NO_2 and Phenolic). Orientation of (i) Amino, methoxy and methyl groups (ii) Carboxy, nitro, nitrile, carbonyl and sulphonic acid groups (iii) Halogens

SEMESTER-II
COURSE 4: ORGANIC CHEMISTRY

Practical | Credits: 1 | 2 hrs/week

Organic Functional Group Reactions

(At the end of Semester)

Reactions of the following functional groups present in organic compounds (at least **4**)
Alcohols ,phenols, aldehydes, ketones,c arboxylic Acids and Amines

2023-24

SEMESTER-IV

PAPER-V

V Semester /HorticultureCoreCourse - 5
Pests and Diseases of Horticulture Plants and their Management
(Total hours of teaching – 60 @ 04 Hrs./Week)

Theory :

Learning Outcomes: On successful completion of this course, the students will be ableto:

- Develop a critical understanding of insect pests and plant disease symptoms.
- Examine and identify the pests and diseases of vegetable crops and their management
- Examine and identify the pests and diseases of ornamental crops and their management
- Examine and identify the pests and diseases of fruit crops and their management
- Identify and classify various insect pests on horticulture plants.
- Justify the significance of Integrated Plant Disease Management for horticultural crops.
- Classify the pesticides based on use, chemical nature, formulation, toxicity and action.

Unit – 1 :Basics of Entomology and Plant Pathology

1. Classification of Insects upto orders and families of economic importance; Study of insect pests (Distribution, host range, biology, nature of damage and management) in horticultural crops.
2. Disease triangle and disease pyramid; Plant Pathology : Definition
3. A general account on symptoms of plant diseases caused by Viruses and Bacteria.
4. A general account on symptoms of plant diseases caused by Fungi.

Unit – 2 :Pests and diseases of Vegetables crops

1. Bhendi: Spotted boll worms, Red cotton bug, Yellow vein mosaic.
2. Cucurbits: Fruit flies, Pumpkin beetles; Downy and powdery mildews.
3. Potato: Potato tuber moth, Golden cyst nematode; Late blight.
4. Sweet Potato: Sweet potato weevil, Vine borer; Mottled necrosis.

Unit – 3 :Pests and diseases of Fruit crops

1. Coconut :.Rhinoceros beetle, Burrowing nematode; Ganoderma root rot, Grey blight
2. Banana :Banana weevil, banana aphids; Panama wilt. Bunchy top
3. Cashew : Tea mosquito bug. Cashew stem borer; Anthracnose, 2.Pink disease
4. Custard apple : Mealy bug, Fruit boring caterpillar; Anthracnose, Glomerella fruit rots.

Unit – 3 :Pests and diseases of Commercial Flower crops

1. Rose :Rose aphid,Dieback, and black spot
2. Marigold :Aphids, leaf spot, and bud rot
3. Gerbera :Thrips, white flies and Blossom blight
4. Gladiolus :Cut worms, leaf eating caterpillar and corm rot.

Unit – 4 :Management of Pests and Diseases

1. Principles and methods of plant disease management.
2. Integrated Plant disease management.
3. Fungicides classification based on chemical nature; commonly used insecticides, fungicides, bactericides and nematicides.
4. Preparation of fungicidal solutions, slurries, pastes and their application.

UG
Minor Syllabus
2023-24
BA/B.com/B.Sc

Computer Science Minor: II Semester
Course 1: Problem Solving using C
Credits -3

Course Objectives

1. To explore basic knowledge on computers
2. Learn how to solve common types of computing problems.
3. Learn to map problems to programming features of C.
4. Learn to write good portable C programs.

Course Outcomes

Upon successful completion of the course, a student will be able to:

1. Understand the working of a digital computer and Fundamental constructs of Programming
2. Analyze and develop a solution to a given problem with suitable control structures
3. Apply the derived data types in program solutions
4. Use the 'C' language constructs in the right way
5. Apply the Dynamic Memory Management for effective memory utilization

UNIT-I

Introduction to computer and programming: Introduction, Basic block diagram and functions of various components of computer, Concepts of Hardware and software, Types of software, Compiler and interpreter, Concepts of Machine level, Assembly level and high-levelprogramming, Flowcharts and Algorithms

Fundamentals of C: History of C, Features of C, C Tokens-variables and keywords and identifiers, constants and Data types, Rules for constructing variable names, Operators, Structure of C program, Input /output statements in C-Formatted and Unformatted I/O

UNIT-II

Control statements: Decision making statements: if, if else, else if ladder, switch statements. Loop control statements: while loop, for loop and do-while loop. Jump Control statements: break,continue and goto.

UNIT-III

Derived data types in C: Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays -Declaration, Initialization and Memory representation.

Strings: Declaring & Initializing string variables; String handling functions, Character handling functions

UNIT-IV

Functions: Function Prototype, definition and calling. Return statement. Nesting of functions. Categories of functions. Recursion, Parameter Passing by address & by value. Local and Global variables. **Storage classes**: automatic, external, static and register.

Pointers: Pointer data type, Pointer declaration, initialization, accessing values using pointers. Pointer arithmetic. Pointers and arrays, pointers and functions.

UNIT-V

Dynamic Memory Management: Introduction, Functions-malloc, calloc, realloc, free **Structures:** Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and functions, structures and pointers. **Unions** - Union definition; difference between Structures and Unions.

Text Books:

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edn, ISBN-13: 978-1-25- 90046-2
2. Herbert Schildt, —Complete Reference with C, Tata McGraw Hill, 4th Edn., ISBN- 13: 9780070411838, 2000
3. Computer fundamentals and programming in C, REEMA THAREJA, OXFORD UNIVERSITY PRESS

Reference Books

1. E Balagurusamy, COMPUTING FUNDAMENTALS & C PROGRAMMING – T McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.
2. Ashok N Kamthane, Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.
3. Henry Mullish&Huubert L.Cooper: The Spirit of C An Introduction to mod Programming, Jaico Pub. House,1996.
4. Y kanithkar, let us C BPB, 13 th edition-2013, ISBN:978-8183331630,656 pages.

SUGGESTED CO-CURRICULAR ACTIVITIES & EVALUATION METHODS:

Unit 1: Activity: Quiz on computer hardware and software concepts

Evaluation Method: Objective-based quiz assessing knowledge and understanding

Unit 2: Activity: Problem-solving using Decision-Making Statements

Evaluation Method: Correctness of decision-making logic

Unit 3: Activity: Array and String Program Debugging

Evaluation Method: Identification and correction of errors in code

Unit 4: Activity: Pair Programming Exercise on Functions

Evaluation Method: Collaboration and Code Quality

Unit 5: Activity: Structured Programming Assignment

Evaluation Method: Appropriate use of structures and nested structures

Computer Science Minor: II Semester
Course 1: Problem Solving using C
Credits -1

List of Experiments

1. A. Write a program to calculate simple & compound interest
   B. Write a C program to interchange two numbers.
2. Find the biggest of three numbers using C.
3. Write a c program to find the sum of individual digits of a positive integer.

4. A Fibonacci sequence is defined as follows: the first and second terms in the sequenceare 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence.
5. Write a c program to check whether a number is Armstrong or not.
6. Write a c program to generate all the prime numbers between 1 and n, where n is avalue supplied by the user.
7. Write a c program that implements searching of given item in given list
8. Write a c program that uses functions to perform the following: Addition of twomatrices. Multiplication of two matrices.
9. Write a program for concatenation of two strings.
10. Write a program for length of a string with and without String Handling functions
11. Write a program to demonstrate Call by Value and Call by Reference mechanism
12. Write a Program to find GCD of Two numbers using Recursion
13. Write a c program to perform various operations using pointers.
14. Write a c program to read data of 10 employees with a structure of 1.employee id2.aadar no, 3.title, 4.joined date, 5.salary, 6.date of birth, 7.gender, 8.department.
15. Write a Program to demonstrate dynamic arrays using Dynamic Memory Management functions

SEMESTER-II

COURSE 1: MECHANICS AND PROPERTIES OF MATTER

Theory | Credits: 3 | 3hrs/week

COURSE OBJECTIVE:

The course on Mechanics and Properties of Matter aims to provide students with a fundamental understanding of the behaviour of physical systems, both in terms of mechanical motion and in terms of the properties of matter

LEARNING OUTCOMES:

1. Students will be able to understand and apply the concepts of scalar and vector fields, calculate the gradient of a scalar field, determine the divergence and curl of a vector field.
2. Students will be able to apply the laws of motion, solve equations of motion for variable mass systems
3. Students will be able to define a rigid body and comprehend rotational kinematic relations, derive equations of motion for rotating bodies, analyze the precession of a top and gyroscope, understand the precession of the equinoxes
4. Students will be able to define central forces and provide examples, understand the characteristics and conservative nature of central forces, derive equations of motion under central forces.
5. Students will be able to differentiate between Galilean relativity and the concept of absolute frames, comprehend the postulates of the special theory of relativity, apply Lorentz transformations, understand and solve problems

UNIT-I VECTOR ANALYSIS 9hrs

Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field with derivations and physical interpretation. Vector integration (line, surface and volume), Statement and proof of Gauss and Stokes theorems.

UNIT-II MECHANICS OF PARTICLES 9hrs

Laws of motion, motion of variable mass system, Equation of motion of a rocket. Conservation of energy and momentum, Collisions in two and three dimensions, Concept of impact parameter, scattering cross-section, Rutherford scattering-derivation.

UNIT-III MECHANICS OF RIGID BODIES AND CONTINUOUS MEDIA 9hrs

Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body, Precession of a top, Gyroscope, Precession of the equinoxes. Elastic constants of isotropic solids and their relations, Poisson's ratio and expression for Poisson's ratio. Classification of beams, types of bending, point load, distributed load.

UNIT-IV CENTRAL FORCES **9hrs**

Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, conservative force as a negative gradient of potential energy, equations of motion under a . Derivation of Kepler's laws. Motion of satellites

UNIT-V SPECIAL THEORY OF RELATIVITY **9hrs**

Galilean relativity, Absolute frames. Michelson-Morley experiment, The negative result. Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation.

REFERENCE BOOKS:

1. BSc Physics -Telugu Akademy, Hyderabad
2. Mechanics - D.S. Mathur, Sulthan Chand & Co, New Delhi
3. Mechanics - J.C. Upadhyaya, Ramprasad & Co., Agra
4. Properties of Matter - D.S. Mathur, S.Chand & Co, New Delhi ,11th Edn., 2000
5. Physics Vol. I - Resnick-Halliday-Krane ,Wiley, 2001
6. Properties of Matter – Brijlal & Subrmanyam, S. Chand &Co. 1982
7. Dynamics of Particles and Rigid bodies– Anil Rao, Cambridge Univ Press, 2006
8. Mechanics-EM Purcell, Mc Graw Hill
9. University Physics-FW Sears, MW Zemansky & HD Young, Narosa Publications, Delhi
10. College Physics-I. T. Bhima sankaram and G. Prasad. Himalaya Publishing House.
11. Mechanics, S. G. Venkata chalapathy, Margham Publication, 2003.

SEMESTER-II

COURSE 1: MECHANICS AND PROPERTIES OF MATTER

Practical | Credits: 1 | 2hrs/week

COURSE OBJECTIVE:

To develop practical skills in the use of laboratory equipment and experimental techniques for measuring properties of matter and analyzing mechanical systems.

LEARNING OUTCOMES:

1. Mastery of experimental techniques: Students should become proficient in using laboratory equipment and experimental techniques to measure properties of matter and analyze mechanical systems.
2. Application of theory to practice: Students should be able to apply theoretical concepts learned in lectures to real-world situations, and understand the limitations of theoretical models.
3. Accurate recording and analysis of data: Students should be able to accurately record and analyze experimental data, including understanding the significance of error analysis and statistical methods.
4. Critical thinking and problem solving: Students should be able to identify sources of error, troubleshoot experimental problems, and develop critical thinking skills in experimental design and analysis.
5. Understanding of physical principles: Students should develop an understanding of the physical principles governing mechanical systems and the properties of matter, including elasticity, viscosity, and thermal expansion.

Minimum of 6 experiments to be done and recorded

1. Viscosity of liquid by the flow method (Poiseuille's method)
2. Young's modulus of the material of a bar (scale) by uniform bending
3. Young's modulus of the material a bar (scale) by non- uniform bending
4. Surface tension of a liquid by capillary rise method
5. Determination of radius of capillary tube by Hg thread method
6. Viscosity of liquid by Searle's viscometer method
7. Bifilar suspension –moment of inertia of a regular rectangular body.
8. Determination of moment of inertia using Fly-wheel
9. Determination of the height of a building using a sextant.
10. Rigidity modulus of material of a wire-dynamic method (torsional pendulum)

SEMESTER-II

COURSE 1: MECHANICS AND PROPERTIES OF MATTER

STUDENT ACTIVITIES

Unit I: Vector Analysis
Activity: Field Mapping

Students can choose a physical field (e.g., temperature, magnetic field) and create a field map by taking measurements at different points. They can then calculate the gradient of the field and analyse the variations. This activity helps them understand the concept of gradient in a scalar field.

Unit II: Mechanics of Particles
Activity: Collision Experiments

Students can set up simple collision experiments using marbles, carts, or other objects. They can measure the initial and final velocities, masses, and analyze the momentum conservation. By varying the conditions (e.g., masses, initial velocities), they can observe the effects on the collision outcomes.

Unit III: Mechanics of Rigid Bodies and Continuous Media
Activity: Balancing Act

Students can experiment with balancing various objects (e.g., rulers, books) on different points to understand the concept of center of mass and stability. They can analyse the equilibrium conditions and explore how the position of the center of mass affects the stability.

Unit IV: Central Forces
Activity: Pendulum Motion

Students can investigate the motion of a simple pendulum by varying its length and measuring the time period. They can analyze the relationship between the period and the length, and discuss the concept of centripetal force and its role in circular motion.

Unit V: Special Theory of Relativity
Activity: Time Measurement

Students can perform a time measurement experiment using simple devices like water clocks or sand timers. They can compare the measured time between two events at different relative speeds and discuss the concept of time dilation

SEMESTER-II

COURSE 1: ANIMAL DIVERSITY-I BIOLOGY OF NON-CHORDATES

Theory Credits: 3 3hrs/week

LEARNING OBJECTIVES:

- To understand the taxonomic position of protozoa to helminthes.
- To understand the general characteristics of animals belonging to protozoa to hemichordata.
- To understand the structural organization of animals phylum from protozoa to hemi chordata.
- To understand the origin and evolutionary relationship of different phyla from protozoa to hemi chordata.
- To understand the origin and evolutionary relationship of different phylum from annelids to hemichordates.

LEARNING OUTCOMES: By the completion of the course the graduate should able to –

- Describe concept of animal kingdom classification and general characters of Protozoa
- Classify Porifera and Coelenterata with taxonomic keys
- Classify Phylum Platy & Nemathelminthes using examples, parasitic adaptation
- Describe Phylum Annelida & Arthropoda using examples and economic importance of vermicomposting & economic importance of insects.
- Describe Mollusca, Echinodermata & Hemi chordata with suitable examples in relation to the phylogeny

SYLLABUS:

UNIT-I

1.1 Whittakers five kingdom concept and classification of Animal Kingdom.
1.2 Protozoa General Characters and classification up to classes with suitable examples
1.3 Protozoa Locomotion & nutrition
1.4 Protozoa reproduction

Activity: Assignment /Seminar on the above
Evaluation: Marks to be awarded for written and oral presentations

UNIT –II

2.1 Porifera General characters and classification up to classes with suitable examples
2.2 Canal system in sponges
2.3 Coelenterata General characters and classification up to classes with suitable examples
2.4 Polymorphism in coelenterates & Corals and coral reefs

Activity: Assignment /Seminar /Quiz/Project on the above

Evaluation: Evaluation of Written part + Evaluation of oral Presentation, Assessment of studentsin Quiz participation and Ranking - Evaluation of Project Report and oral presentation

UNIT – III

3.1 Platyhelminthes General characters and classification up to classes with suitable examples
3.2 Parasitic Adaptations in helminthes
3.3 Nemathelminthes General characters and classification up to classes with suitable examples
3.4 Life cycle and pathogenicity of *Ascaris lumbricoides*

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – IV

4.1 Annelida General characters and classification up to classes with suitable examples
4.2 Vermiculture - Scope, significance, earthworm species, processing, Vermicompost, economic importance of vermicompost
4.3 Arthropoda General characters and classification up to classes with suitable examples
4.4 *Peripatus* - Structure and affinities

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

UNIT – V

5.1 Mollusca General characters and classification up to classes with suitable examples
5.2 Pearl formation in Pelecypoda
5.3 Echinodermata General characters and classification up to classes with suitable examples
Water vascular system in star fish
5.4 Hemichordata General characters and classification up to classes with suitable examples
Balanoglossus - Structure and affinities

Activity: Assignment /Seminar /Quiz/Project/Peer teaching on the above
Evaluation: Instructor supposed to prepare a detailed Rubrics for the evaluation of the above activity

Co-curricular activities (suggested)

- Preparation of chart/model of phylogenic tree of life, 5-kingdom classification
- Visit to Zoology Museum or Coral Island as part of Zoological tour
- Charts on polymorphism
- Clay models of canal system in sponges
- Plaster-of-paris model of *Peripatus*
- Construction of a vermicompost in each college, manufacture of manure by students anddonating to local farmers
- Chart on pearl forming layers using clay
- Visit to a pearl culture rearing industry/institute
- Live model of water vascular system
- Observation of Balanoglossus for its tubicolous habit

SEMESTER-II

COURSE 1: ANIMAL DIVERSITY-I BIOLOGY OF NON-CHORDATES

Practical Credits: 1 2 hrs/week

LEARNING OBJECTIVES

- To understand the importance of preservation of museum specimens
- To identify animals based on special identifying characters
- To understand different organ systems through demo or virtual dissections
- To maintain a neat, labelled record of identified museum specimens

SYLLABUS:

Study of museum slides / specimens / models (Classification of animals up to orders)

- Protozoa: Amoeba, *Paramoecium, Paramoecium Binary fission and Conjugation, Vorticella, Entamoeba histolytica, Plasmodium vivax*
- Porifera: *Sycon, Spongilla, Euspongia, Sycon*- T.S & L.S, Spicules, Gemmule
- Coelenterata: *Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatula*
- Platyhelminthes: *Planaria, Fasciola hepatica, Fasciola* larval forms – Miracidium, Redia, Cercaria, *Echinococcus granulosus, Taenia solium, Schistosoma haematobium*
- Nemathelminths: *Ascaris (Male & Female), Drancunculus, Ancylostoma, Wuchereria*
- Annelida: *Nereis, Aphrodite, Chaetopteurs, Hirudinaria,* Trochophore larva
- Arthropoda: Cancer, *Palaemon*, Scorpion, *Scolopendra, Sacculina, Limulus, Peripatus,* Larvae - Nauplius, Mysis, Zoea, Mouth parts of male &female *Anopheles* and *Culex,* Mouthparts of Housefly and Butterfly.
- Mollusca:*Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus,* Glochidium larva
- Echinodermata: *Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon,* Bipinnaria larva
- Hemichordata: *Balanoglossus,* Tornaria larva

Dissections:

Computer - aided techniques should be adopted or show virtual dissections Dissection of edible (Prawn/Pila) invertebrate as per UGC guidelines

An "Animal album" containing photographs, cut outs, with appropriate write up about the above-mentioned taxa. Different taxa/ topics may be given to different setsof students for this purpose

RFERENCE WEB LINKS:

- https://virtualmicroscopy.peabody.yale.edu/
- https://tnhm.in/category/assorted-gallery-for-vertebrates-and-invetebrates/invertebrates/
- http://www.nhc.ed.ac.uk/index.php?page=24.25.312
- https://biologyjunction.com/invertebrate-notes/

II SEMESTER

COURSE 1: - INTRODUCTION TO MICROBIOLOGY

credits - _3

I. Course Outcomes:

On successful completion of the course, the students will be able to

1. Understand the historical significance of microbiology and the contributions of key scientists.
2. Recognize the classification of microorganisms and their place in the living world.
3. Comprehend the scope and applications of microbiology, including the origin of microbial life and the distinction between eukaryotic and prokaryotic cells.
4. Describe the characteristics of bacteria, archaea, fungi, algae, and protozoa.
5. Describe viruses, including their nature, composition, and diversity in structure.
6. Develop practical skills in aseptic techniques, growth media preparation, isolation methods, and the identification of bacteria and fungi.

Unit - 1: History of Microbiology **No. of Hours: 10**

1. Discovery of Microscope and microbial world by Anton von Leeuwenhoek; Aseptic techniques with reference to Charak Samhita, Sushruta Samhita and Ignaz Philipp Semmelweis
2. Golden era of Microbiology- Refutation of abiogenesis; Germ theory of Disease; Discovery of vaccination; Discovery of penicillin
3. Major contributions of Scientists: Edward Jenner, Louis Pasteur, Robert Koch, Joseph Lister, Ivanowsky, Martinus Beijerinck and Sergei Winogradsky

Unit - 2: Place of Microorganisms in the living world **No. of Hours:10**

1. Haeckel's three Kingdom concept, Whittaker's five kingdom concept, three domain concept of Carl Woese
2. Definition and scope of Microbiology; Applications of Microbiology; Diverse groups of Microorganisms
3. Origin of microbial life on earth- Timeline, Miller's Experiment, endosymbiosis (cyanobacteria), distinguishing features of eukaryotic and prokaryotic cell

Unit - 3: Prokaryotic microorganisms and Viruses **No. of Hours:10**

1. General characteristics of Bacteria (Morphology, metabolic diversity and reproduction)
2. General characteristics of Archaea differentiating them from Bacteria
3. General characteristics of viruses (Nature, composition, size, host specificity, diversity in structure)

Unit - 4: Eukaryotic microorganisms **No. of Hours: 10**

1. Fungi - Habitat, nutrition, vegetative structure and modes of reproduction;
2. Algae- Habitat, thallus organization, photosynthetic pigments, storage forms of food, reproduction.
3. Protozoa–Habitat, cell structure, nutrition, locomotion, excretion, reproduction, encystment.

Unit - 5: Growing Microbes in Lab: Five I's **No. of Hours:05**

1. Inoculation-Aseptic methods of introducing inoculum to growth media; Composition of basic growth media, solid and liquid
2. Incubation and Isolation- Ambient temperature for growth of microorganisms; Concept of Pure culture, mixed culture and contaminated culture
3. Inspection and Identification - Observation of colour, size and shape of colonies; Wet mount and simple staining of bacteria and fungi

III. Skill Outcomes:

1. Implement safety protocols, handling hazardous materials, and practicing personal protective measures.

2. Identify microscope parts, adjusting focus and diaphragm, and accurately observing and documenting microscopic images.

3. Prepare smears, identifying different microorganisms, and interpreting microscopic characteristics.

4. Analyze electron micrographs, identifying virus types, and describing their morphology and size.

5. Operate Autoclave, Hot Air Oven, and Laminar Air Flow Chamber for sterilization and decontamination purposes.

II SEMESTER

COURSE 1: - INTRODUCTION TO MICROBIOLOGY

credits -_1

1. Good Laboratory Practices and Biosafety
2. Compound Light microscope -Parts and its handling
3. Microscopic observation of bacteria, Algae and Fungi and protozoa
4. Observation of electron micrographs of viruses (Lambda, T4, TMV, HIV, SARS CoV-2, Polio)
5. Laboratory equipment -Working principles of Autoclave, Hot air oven, Laminar airflow chamber

IV. References:

1. Pelczar, M.J., Chan, E.C.S. and Kreig, N.R. (1993). Microbiology. 5th Edition, Tata McGraw Hill Publishing Co., Ltd., New Delhi.
2. ·Dube, R.C. and Maheswari, D.K. (2000) General Microbiology. S Chand, New Delhi. Edition), Himalaya Publishing House, Mumbai.
3. Prescott, M.J., Harley, J.P. and Klein, D.A. (2012). Microbiology. 5th Edition, WCB McGraw Hill, New York.
4. Reddy, S.M. and Reddy, S.R. (1998). Microbiology Practical Manual, 3 rd Edition, Sri Padmavathi Publications, Hyderabad.
5. Singh, R.P. (2007). General Microbiology. Kalyani Publishers, New Delhi.
6. Stanier, R.Y., Adelberg, E.A. and Ingram, J.L. (1991). General Microbiology, 5th Ed.,Prentice Hall of India Pvt. Ltd., New Delhi.
7. Jaya Babu (2006). Practical Manual on Microbial Metabolisms and General Microbiology. Kalyani Publishers, New Delhi.
8. Gopal Reddy et al., Laboratory Experiments in Microbiology

V. Co-Curricular Activities:

1. Establish a Microbiology Club where students can come together to discuss and explore various topics related to microbiology.

4. Organizing microbiology-themed events like microbiology day 3 Poster presentations, oral presentations, and Q&A sessions.Field Trips to Microbiology-related Sites

5. Establish a Microbiology Journal Club where students can review and discuss scientific articles related to microbiology.

SEMESTER-II

COURSE 1: BIOMOLECULES AND ANALYTICAL TECHNIQUES

Theory Credits: 3 3 hrs/week

I. LEARNING OUTCOMES

On successful completion of the course, the students will be able to

1. Learn about classification, structure and properties of Carbohydrates, Proteins and Lipids.
2. Learn about structure and function of DNA, RNA, Vitamins and Bioenergetics.
3. Learn about basic principles of Centrifugation, Chromatography and Electrophoresis.
4. Learn about principles of Spectroscopy, Microscopy and Techniques.
5. Learn about basics of Biostatistics.

II. Syllabus

Unit-I-Carbohydrates, Protein and Lipids

1. Classification, structure, properties of carbohydrates, amino acids, peptide bond and peptides.
2. Classification, structure (primary, secondary, tertiary, quaternary) and functions of proteins. Denaturation and renaturation of proteins.
3. Classification structure and properties of saturated and unsaturated fatty acids.

Unit-II- Nucleic acid, Vitamins, and Bioenergetics

1. Structure and functions of DNA and RNA.
2. Source, structure, biological role, and deficiency manifestation of vitamin A, B, C, D, E, and K. Free energy, entropy, enthalpy, and redox potential.
3. High energy compounds, Electron-Transport System and Oxidative Phosphorylation.

Unit-III-Centrifugation, Chromatography, and Electrophoresis

1. Basic principles of sedimentation and types of centrifugations.
2. Principle, instrumentation, and application of partition, absorption, paper, TLC, ion exchange, gel permeation, and affinity chromatography.
3. Basic principles and types of electrophoresis, factors affecting electrophoretic migration. PAGE (Native, SDS-PAGE). Introduction to 2D & Isoelectric Focusing.

Unit - IV-Spectroscopy, Microscopy and Laser Techniques

1. Beer-Lambert law, light absorption and transmission. Extinction coefficient, Design and application of photoelectric calorimeter and UV-visible spectrophotometer. Introduction to crystallography and application.
2. Types and design of microscopes - compound, phase contrast, fluorescent electron microscopy (TEM, SEM).
3. Introduction to radioisotopes, measurement of radioactivity (scintillation counter and autoradiography

Unit –V- Biostatistics

1. Mean, median, mode, standard deviation,
2. One-way ANOVA, Two-way Anova
3. t-test, F-test and chi-square.

III . Skills Outcome

On Successful Completion of this Course, Student shall be able to

1. learn about basic instruments and their operation
2. learn about Qualitative and Quantitaive analysis of carbohydrates
3. Learn about estimations nucleic acids and protein by various methods
4. learn about the separation of molecules by chromatography and electrophoresis
5. Learn about problems on mean median mode

SEMESTER-II

COURSE 1: BIOMOLECULES AND ANALYTICAL TECHNIQUES

Practical | Credits: 1 | 2 hrs/week

1. Introduction to basic instruments (Principle standard operation procedure) demonstration and record
2. Calculation of molarity, normality, and molecular weight of compounds.
3. Qualitative analysis of carbohydrates (sugars)
4. Quantitative analysis of carbohydrates
5. Quantitative estimation of protein - Lowery method
6. Estimation of DNA by diphenylamine reagent
7. Estimation of RNA by orcinol reagent
8. Assay of protease activity
9. Preparation of starch from potato and its hydrolyze by salivary amylase
10. Preparation of standard buffer and pH determination
11. Separation of amino acids by paper chromatography
12. Separation of lipids of TLC
13. Agarose gel electrophoresis
14. Calculation of mean, median and mode

V. REFERENCES

1. Outlines of Biochemistry, 5th Edition, (2009), Erice Conn & Paul Stumpf; John Wiley and Sons, USA
2. Principles of Biochemistry, 4th edition, (1997), Jeffory Zubey; McGraw-Hill College, USA
3. Principles of Biochemistry, 5th Edition (2008), Lehninger, David Nelson & Michael Cox; W.H. Freeman and Company, NY
4. Fundamentals of Biochemistry, 3rd Edition (2008), Donald Voet & Judith Voet; John Wiley and Sons, Inc. USA
5. Biochemistry, 7th Edition, (2012), Jeremy Berg & Lubert Stryer; W.H.Freeman and Company, NY
6. An Introduction to Practical Biochemistry, 3rd Edition, (2001), David Plummer; Tata McGraw Hill Edu. Pvt.Ltd. New Delhi, India
7. Biochemical Methods,1st Edition, (1995), S.Sadashivam, A.Manickam; New Age International Publishers, India
8. Textbook of Biochemistry with Clinical Correlations, 7th Edition, (2010), Thomas M. Devlin; John Wiley and Sons, USA
9. Proteins: biotechnology and biochemistry, 1st edition, (2001), Gary Walsch; Wiley, USA
10. Biochemical Calculations, 2nd Ed., (1997), Segel Irvin H; John Wiley and Sons, NY
11. Biophysical Chemistry Principles & Techniques Handbook, (2003), A. Upadhyay, K. Upadhyay, and N. Nath

12. Enzymes: Biochemistry, Biotechnology & Clinical chemistry, (2001), Palmer Trevor, Publisher: Horwood Pub. Co., England.
13. Analytical Biochemistry, 3rd edition, (1998), David Holmes, H.Peck, Prentice-Hall, UK
14. Introductory Biostatistics, 1st edition, (2003), Chap T. Le; John Wiley, USA.
15. Methods in Biostatistics, (2002), B. K. Mahajan –Jaypee Brothers.
16. Statistical methods in biology, (1995), Bailey, N. T.; Cambridge university press

VI. CO-Curricular Activities

a) **Suggested C0-Curricular Activities**

1. Assignments
2. Seminars, Group Discussions on related topics
3. Charts preparation on vitamins

II - SEMESTER
Course Code 1: GENERAL AND INORGANIC CHEMISTRY
Credits: 03

Course Outcomes: At the end of the course the student will be able to-

1. Understand the structure of atom and the arrangement of elements in the periodic table.
2. Understand the nature and properties of ionic compounds.
3. Identify the structure of a given inorganic compound.
4. Explain the existence of special types of compounds through weak chemical forces.
5. Define acids and bases and predict the nature of salts.

Syllabus:

Unit I: Atomic Structure and Periodic table (9 h)

Electronic configuration: Bohr theory, duel nature of electrons, Heisenberg uncertainty principle, the Schrodinger equation, significance of wave functions, normalization of wave function, radial and angular wave functions, Pauli's exclusion principle, Hund's rule, sequence of energy levels (Aufbau principle).

Periodicity: periodic law and arrangement of elements in the periodic table, IUPAC nomenclature and group number, horizontal, vertical, and diagonal relationships in the periodic table. 1.3 General properties of atoms: size of atoms and ions-atomic radii, ionic radii, covalent radii; trend in ionic radii, ionization potential, electron affinity; electronegativity - Pauling, Mulliken-Jaffe, Allred-Rochow definitions; oxidation states and variable valency; isoelectronic relationship; inert-pair effect;

UNIT 2: Ionic bond (9 h)

Properties of ionic compounds, factors favouring the formation of ionic compounds-ionization potential, electron affinity, and electronegativity. Lattice energy: definition, factors affecting lattice energy, Born-Haber cycle-enthalpy of formation of ionic compound and stability. Stability of ionic compounds in terms of $\Delta H_f$and U_o. Solubility and thermal stability of ionic compounds. Covalent character in ionic compounds-polarization and Fajan's rules; effects of polarization-solubility, melting points, and thermal stability of typical ionic compounds.

UNIT 3: The Covalent Bond (9 h)

Valance Bond theory-arrangement of electrons in molecules, hybridization of atomic orbitals and geometry of molecules-$BeCl_2$, BF_3, CH_4, PCl_5, SF_6– VSEPR model-effect of bonding and nonbonding electrons on the structure of molecules, effect of electronegativity,

isoelectronic principle, illustration of structures by VESPR model-NH_3, H_2O, SF_4, ICl^-_4 ICl^-_2 XeF_4, XeF_6

Molecular orbital theory -LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules (N_2, O_2, CO and NO)

UNIT 4: Metallic and Weak Bonds (9 h)

The Metallic bond: metallic properties, free electron theory, Valence Bond Theory, band theory of metals. Explanation of conductors, semiconductors and insulators.
Weak bonds: hydrogen bonding-intra- and intermolecular hydrogen bonding, influence on the physical properties of molecules, comparison of hydrogen bond strength and properties of hydrogen bonded N, O and F compounds; associated molecules-ethanol and acetic acid; Vanderwaals forces, ion dipole-dipole interactions.

UNIT 5: Acids and Bases (9 h)

Theories of acids and bases: Arrhenius theory, Bronsted-Lowry theory, Lewis theory, the solvent system, Nonaqueous solvents: classification-protonic and aprotic solvents, liquid ammonia as solvent-solutions of alkali and alkaline earth metals in ammonia.
Types of chemical reactions: acid-base, oxidation-reduction, calculation of oxidation number. Definition of pH, pK_a, pK_b. Types of salts, Salt hydrolysis. Pearson's concept, HSAB principle & its importance, bonding in Hard-Hard andSoft-Soft combinations.

List of Reference Books:

1. J. D. Lee, Concise Inorganic Chemistry, 5th ed., Blackwell Science, London, 1996.
2. . B. R. Puri, L. R. Sharma, K. C. Kalia, Principles of Inorganic Chemistry, Shoban Lal Nagin Chand and Co., 1996.
3. D. F. Shriver and P. W. Atkins, Inorganic Chemistry, 3rd ed., W. H. Freeman and Co, London,

II - SEMESTER
Course Code 3: GENERAL AND INORGANIC CHEMISTRY
Credits: 01

Practical- I Qualitative Analysis of SIMPLE SALT

Qualitative inorganic analysis (Minimum of Six simple salts should be analysed) 50 M

I. Course outcomes:

At the end of the course, the student will be able to;
1. Understand the basic concepts of qualitative analysis of inorganic simple salt.
2. Use glassware, equipment and chemicals and follow experimental procedures in the laboratory

3. Apply the concepts of common ion effect, solubility product and concepts related to qualitative analysis

II. Laboratory course syllabus:

Analysis of SIMPLE SALT 50 M

Analysis of simple salt containing ONE anion and ONE cation from the following:
Anions: Carbonate, Sulphate, Chloride, Bromide, Acetate, Nitrate, Borate, Phosphate.
Cations: Lead, Copper, Iron, Aluminium, Zinc, Nickel, Manganese, Calcium, Strontium, Barium, Magnesium and Ammonium.

Co-curricular activities and Assessment Methods

1. Continuous Evaluation: Monitoring the progress of student's learning.
2. Class Tests, Work sheets and Quizzes
3. Presentations, Projects and Assignments and Group Discussions: Enhances critical thinking skills and personality
4. SEMESTER -End Examination: critical indicator of student's learning and teaching methods adopted by teachers throughout the SEMESTER .

Reference books:

1. Vogel's Qualitative Inorganic Analysis, Seventh edition, Pearson.

SEMESTER-II

COURSE 1: MECHANICS AND PROPERTIES OF MATTER

Theory Credits: 3 3hrs/week

COURSE OBJECTIVE:

The course on Mechanics and Properties of Matter aims to provide students with a fundamental understanding of the behaviour of physical systems, both in terms of mechanical motion and in terms of the properties of matter

LEARNING OUTCOMES:

1. Students will be able to understand and apply the concepts of scalar and vector fields, calculate the gradient of a scalar field, determine the divergence and curl of a vector field.
2. Students will be able to apply the laws of motion, solve equations of motion for variable mass systems
3. Students will be able to define a rigid body and comprehend rotational kinematic relations, derive equations of motion for rotating bodies, analyze the precession of a top and gyroscope, understand the precession of the equinoxes
4. Students will be able to define central forces and provide examples, understand the characteristics and conservative nature of central forces, derive equations of motion under central forces.
5. Students will be able to differentiate between Galilean relativity and the concept of absolute frames, comprehend the postulates of the special theory of relativity, apply Lorentz transformations, understand and solve problems

UNIT-I VECTOR ANALYSIS 9hrs

Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field with derivations and physical interpretation. Vector integration (line, surface and volume), Statement and proof of Gauss and Stokes theorems.

UNIT-II MECHANICS OF PARTICLES 9hrs

Laws of motion, motion of variable mass system, Equation of motion of a rocket. Conservation of energy and momentum, Collisions in two and three dimensions, Concept of impact parameter, scattering cross-section, Rutherford scattering-derivation.

UNIT-III MECHANICS OF RIGID BODIES AND CONTINUOUS MEDIA 9hrs

Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body, Precession of a top, Gyroscope, Precession of the equinoxes. Elastic constants of isotropic solids and their relations, Poisson's ratio and expression for Poisson's ratio. Classification of beams, types of bending, point load, distributed load.

UNIT-IV CENTRAL FORCES **9hrs**

Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, conservative force as a negative gradient of potential energy, equations of motion under a . Derivation of Kepler's laws. Motion of satellites

UNIT-V SPECIAL THEORY OF RELATIVITY **9hrs**

Galilean relativity, Absolute frames. Michelson-Morley experiment, The negative result. Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation.

REFERENCE BOOKS:

1. BSc Physics -Telugu Akademy, Hyderabad
2. Mechanics - D.S. Mathur, Sulthan Chand & Co, New Delhi
3. Mechanics - J.C. Upadhyaya, Ramprasad & Co., Agra
4. Properties of Matter - D.S. Mathur, S.Chand & Co, New Delhi ,11th Edn., 2000
5. Physics Vol. I - Resnick-Halliday-Krane ,Wiley, 2001
6. Properties of Matter – Brijlal & Subrmanyam, S. Chand &Co. 1982
7. Dynamics of Particles and Rigid bodies– Anil Rao, Cambridge Univ Press, 2006
8. Mechanics-EM Purcell, Mc Graw Hill
9. University Physics-FW Sears, MW Zemansky & HD Young, Narosa Publications, Delhi
10. College Physics-I. T. Bhima sankaram and G. Prasad. Himalaya Publishing House.
11. Mechanics, S. G. Venkata chalapathy, Margham Publication, 2003.

SEMESTER-II

COURSE 1: MECHANICS AND PROPERTIES OF MATTER

Practical | Credits: 1 | 2hrs/week

COURSE OBJECTIVE:

To develop practical skills in the use of laboratory equipment and experimental techniques for measuring properties of matter and analyzing mechanical systems.

LEARNING OUTCOMES:

1. Mastery of experimental techniques: Students should become proficient in using laboratory equipment and experimental techniques to measure properties of matter and analyze mechanical systems.
2. Application of theory to practice: Students should be able to apply theoretical concepts learned in lectures to real-world situations, and understand the limitations of theoretical models.
3. Accurate recording and analysis of data: Students should be able to accurately record and analyze experimental data, including understanding the significance of error analysis and statistical methods.
4. Critical thinking and problem solving: Students should be able to identify sources of error, troubleshoot experimental problems, and develop critical thinking skills in experimental design and analysis.
5. Understanding of physical principles: Students should develop an understanding of the physical principles governing mechanical systems and the properties of matter, including elasticity, viscosity, and thermal expansion.

Minimum of 6 experiments to be done and recorded

1. Viscosity of liquid by the flow method (Poiseuille's method)
2. Young's modulus of the material of a bar (scale) by uniform bending
3. Young's modulus of the material a bar (scale) by non- uniform bending
4. Surface tension of a liquid by capillary rise method
5. Determination of radius of capillary tube by Hg thread method
6. Viscosity of liquid by Searle's viscometer method
7. Bifilar suspension –moment of inertia of a regular rectangular body.
8. Determination of moment of inertia using Fly-wheel
9. Determination of the height of a building using a sextant.
10. Rigidity modulus of material of a wire-dynamic method (torsional pendulum)

SEMESTER-II

COURSE 1: MECHANICS AND PROPERTIES OF MATTER

STUDENT ACTIVITIES

Unit I: Vector Analysis
Activity: Field Mapping

Students can choose a physical field (e.g., temperature, magnetic field) and create a field map by taking measurements at different points. They can then calculate the gradient of the field and analyse the variations. This activity helps them understand the concept of gradient in a scalar field.

Unit II: Mechanics of Particles
Activity: Collision Experiments

Students can set up simple collision experiments using marbles, carts, or other objects. They can measure the initial and final velocities, masses, and analyze the momentum conservation. By varying the conditions (e.g., masses, initial velocities), they can observe the effects on the collision outcomes.

Unit III: Mechanics of Rigid Bodies and Continuous Media
Activity: Balancing Act

Students can experiment with balancing various objects (e.g., rulers, books) on different points to understand the concept of center of mass and stability. They can analyse the equilibrium conditions and explore how the position of the center of mass affects the stability.

Unit IV: Central Forces
Activity: Pendulum Motion

Students can investigate the motion of a simple pendulum by varying its length and measuring the time period. They can analyze the relationship between the period and the length, and discuss the concept of centripetal force and its role in circular motion.

Unit V: Special Theory of Relativity
Activity: Time Measurement

Students can perform a time measurement experiment using simple devices like water clocks or sand timers. They can compare the measured time between two events at different relative speeds and discuss the concept of time dilation

II Semester

Course 1: Non-Vascular Plants (Algae, Fungi, Lichens and Bryophytes)

Credits -3

I. Learning Objectives: By the end of this course the learner has:

1. To realize the characteristics and diversity of non-vascular plants.
2. To recognize the ecological and economic value of algae, fungi, lichens and bryophytes.
3. To inquire the habit, habitat, morphological features and life cycles of selected genera of non-vascular plants.

II. Learning Outcomes: On completion of this course students will be able to:

1. Compile the general characteristics of algae and their significance in nature.
2. Compare and contrast the characteristics of different groups of algae.
3. Summarise the important features of fungi and their economic value.
4. Distinguish the characteristics of different groups of fungi.
5. Elaborate the features and significance of amphibians of plant kingdom
6. Explain the diversity among non-vascular plants.

III. Syllabus of Theory:

Unit-1: Introduction to Algae **8Hrs.**

1. General Characteristics of algae: Occurrence and distribution, cell structure, pigments, flagella and reserve food material.
2. Classification of algae: F.E.Fritsch (1935) and Lee (2008)
3. Thallus organization and life cycles in algae.
4. Ecological and economic importance of algae.

Unit-2: Biology of selected Algae **10Hrs.**

1. Occurrence, structure, reproduction and life cycle of:
   (a) Chlorophyceae: *Spirogyra* (b) Phaeophyceae: *Ectocarpus*
   (c) Xanthophyceae: *Vaucheria* (d) Rhodophyceae:*Polysiphonia*
2. A brief account of Bacillariophyceae
3. Culture and cultivation of *Chlorella*

Unit-3: Introduction to Fungi **8Hrs.**

1. General characteristics of fungi and Ainsworth (1973) classification.

2. Thallus organization and nutrition in fungi.
3. Reproduction in fungi (asexual and sexual); Heterothallism and parasexuality.
4. Ecological and economic importance of fungi.

Unit-4: Biology of selected Fungi **10Hrs.**

1. Occurrence, structure, reproduction and life cycle of:
   (a) Mastigomycotina: *Phytophthora* (b) Zygomycotina: *Rhizopus*
   (c) Ascomycotina: *Penicillium* (d) Basidiomycotina: *Puccinia*
2. Occurrence, structure and reproduction of lichens; ecological and economic importance of lichens.

Unit-5: Biology of Bryophytes **9Hrs.**

1. General characteristics of Bryophytes; Rothmaler (1951) classification.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life cycle of
   (a) Hepaticopsida: *Marchantia* (b) Anthoceratopsida: *Anthoceros*
   (c) Bryopsida: *Funaria*
3. General account on evolution of sporophytes in Bryophyta.

IV. Text Books:

1. Pandey, B.P. (2013) College Botany, Volume-I, S. Chand Publishing, New Delhi
2. Hait,G., K.Bhattacharya & A.K.Ghosh (2011) A Text Book of Botany, Volume-I, New Central Book Agency Pvt. Ltd., Kolkata

V. Reference Books:

1. Fritsch, F.E. (1945) The Structure¬& Reproduction of Algae (Vol. I & Vol. II) Cambridge University Press Cambridge, U.K.
2. Bold, H.C.& M. J. Wynne (1984) Introduction to the Algae, Prentice-Hall Inc., New Jersey
3. Robert Edward Lee (2008) Phycology. Cambridge University Press, New York
4. Van Den Hoek, C., D.G.Mann & H.M.Jahns (1996)Algae : An Introduction to Phycology. Cambridge University Press, New York.

II -SEMESTER

BIO MOLECULES - (Course No-1)

Credits -3

COURSE OBJECTIVES

1. Provides information about classification, physico-chemical properties of amino acids and structural organization of proteins.
2. To understand the structure, properties and biological importance of carbohydrates and lipids.
3. Explore the composition and structure of nucleic acids.

UNIT-I

Fundamentals of Biochemistry: History, scope and avenues of Biochemistry. Water as a biological solvent. Measurement of PH, Buffers, Biological relevance of Buffers. Outlines of surface tension, adsorption and osmosis and their biological relevance.

UNIT-II

Carbohydrates: Classification, monosaccharides, D and L designation, open chain and cyclic structures, epimers and anomers, mutarotation. Reactions of carbohydrates (due to functional groups - hydroxyl, aldehyde and ketone. Amino sugars, Glycosides. Structure and biological importance of disaccharides (sucrose, lactose, maltose, isomaltose, trehalose), trisaccharides (raffinose, melezitose). Structural polysaccharides (cellulose, chitin, pectin) and storage polysaccharides (starch, inulin, glycogen). Glycosaminoglycans.

UNIT – III

Lipids Classification, saturated and unsaturated fatty acids, structure and properties of fats and oils (acid, saponification and iodine values, rancidity). General properties and structures of phospholipids. Prostaglandins- structure, types and biological role. Lipoproteins- types and functions.

UNIT-IV

Amino Acids and Proteins Classification, structure, stereochemistry, chemical reactions of amino acids due to carbonyl and amino groups. 2. Titration curve of glycine and pK values. Essential and nonessential amino acids, non-protein amino acids. 3. Peptide bond - nature and conformation. Naturally occurring peptides - glutathione, enkephalin. 4. Proteins: Classification based on solubility, shape, and function. Determination of amino acid composition of proteins. 5. General properties of proteins, denaturation, and renaturation of proteins. 6. Structural organization of proteins- primary, secondary, tertiary, and quaternary structures (Eg. Hemoglobin and Myoglobin).

UNIT-V

Nucleic acids and porphyrins, Types of RNA and DNA. Structure of purines and pyrimidines, nucleosides, nucleotides. Stability and formation of phosphodiester linkages. 2. Effect of acids, alkali and nucleases on DNA and RNA. 3. Structure of Nucleic acids- Watson-Crick DNA double helix structure, denaturation and renaturation of nucleic acids, Tm-values and their significance, cot curves and their significance. 4. Structure and properties of porphyrins: Heme, cytochromes and chlorophylls.

COURSE OUTCOMES

After successful completion of the practical course student should be able to

1. prepare buffers and apply the knowedge to calculate the pH values of charged biomolecules.

2. Identify various carbohydrates, aminoacids and lipids present in the nature by performing qualitative analysis.

II -SEMESTER

BIO MOLECULES - (Course No-1)

Credits -1

1. Preparation of buffers (acidic, neutral, and alkaline) and determination of pH.
2. Qualitative identification of carbohydrates- glucose, fructose, ribose/xylose, maltose, sucrose, lactose, starch/glycogen.
3. Qualitative identification of amino acids- histidine, tyrosine, tryptophan, cysteine, arginine.
4. Qualitative identification of lipids- solubility, saponification, acrolein test, Salkowski test, Lieberman-Burchardtest.
5. Preparation of Osazones and their identification
6. Estimation of proteins in biological samples:
   a. Biuret method.
   b. Folin-Lowry method.
   c. UV method.
   d. Bradford's dye binding method
7. Estimation of amino acid by Ninhydrin method.
8. Estimation of tyrosine by Million's –reaction

Recommended Books

1. Fundamentals of Biochemistry –Jain, J.L., Jain, S., Jain, N. S. Chand & Co.

2. Biochemistry – Satyanarayana. U and Chakrapani. U, Books & Allied Pvt. Lt

3. Nelson.D.L. and Cox.M..M -Lehninger's Principles of Biochemistry- Freeman & Co.- 7 th Edition

SEMESTER-II
COURSE 1: DESCRIPTIVE STATISTICS

Theory Credits: 3 3 hrs/week

I. Learning Outcomes

After successful completion of the course students will be able to:

1. To acquaint with the role of statistics in different fields with special reference to business and economics.
2. To review good practice in presentation and the format most applicableto their own data.
3. To learn the measures of central tendency or averages reduce the data to a single value which is highly useful for making comparative studies.
4. To familiar with the measures of dispersion throw light on reliability of average and control of variability.
5. To deal with the situation where there is uncertainty and to measure that uncertainty by using the probability, which is essential in all research areas.

II. Syllabus

Unit – 1: Statistical Description of Data

Origin, history and definitions of Statistics. Importance, Scope and limitations Statistics. Function of Statistics – Collection, Presentation, Analysis and Interpretation. Collection of data - primary and secondary data and its methods. Classification of data – Quantitative, Qualitative, Temporal, Spatial. Presentation of data – Textual, Tabular – essential parts.

Unit – 2:

Measurement Scales – Nominal, Ordinal, Ratio and Interval. Frequency distribution and types of frequency distributions, forming a frequency distribution. Diagrammatic representation of data – Historiagram, Bar, Multiple bar and Pie with simple problems. Graphical representation of data: Histogram, frequencypolygon and Ogives with simple problems.

Unit – 3: Measures of Central Tendency (MCT)

Arithmetic Mean – properties, methods. Median, Mode, Geometric Mean (GM), Harmonic Mean (HM). Calculation of mean, median, mode, GM and HM for grouped and ungrouped data. Median and Mode through graph. Empirical relation between mean, media and mode. Features of good average.

Unit – 4: Measures of Dispersion

Concept and problems – Range, Quartile Deviation, Mean Deviation and Standard Deviation, Variance. Central and Non – Central moments and their interrelationship. Sheppard's correction for moments. Skewness and its methods, kurtosis.

Unit – 5: Elementary Probability

Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favourable outcomes. Mathematical, Statistical, axiomatic definitions of probability. Conditional Probability and independence of events, Addition and multiplication theorems of probability for 2 and for n events and simple problems. Boole's inequality, Bayes theorem and its applications in real life problems.

SEMESTER-II

COURSE 1: DESCRIPTIVE STATISTICS

Practical Credits: 1 2 hrs/week

Syllabus

1. Writing a Questionnaire in different situations.
2. Forming a grouped and ungrouped frequency distribution table.
3. Diagrammatic presentation of data – Bar, multiple Bar and Pie.
4. Graphical presentation of data – Histogram, frequency polygon, Ogives.
5. Computation of measures of central tendency – Mean, Median and Mode.
6. Computation of measures of dispersion – Q.D., M.D and S.D.
7. Computation of non-central, central moments, β_1 and β_2 for ungrouped data.
8. Computation of non-central, central moments, β_1 and β_2 and Sheppard's corrections for grouped data.
9. Computation of Karl Pearson's and Bowley's Coefficients of Skewness.

Note: Training shall be on establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS word for writing inference.

III. References

1. S. C. Gupta & V. K. Kapoor: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. O. P. Gupta: Mathematical Statistics, Kedar nath Ram nath & Co.
3. P. N. Arora & S. Arora: Quantitative Aptitude Statistics – Vol II, S. Chand & Company Ltd.
4. K. Rohatgi & Ehsanes Saleh: An Introduction to Probability and Statistics, John Wiley & Sons.

IV. Suggested Co-curricular Activities:

1. Training of students by related industrial experts
2. Assignments including technical assignments if any.
3. Seminars, Group Discussions, Quiz, Debates etc. on related topics.
4. Preparation of audio and videos on tools of diagrammatic and graphical representations.
5. Collection of material/figures/photos/author photoes of related topics.
6. Invited lectures and presentations of stalwarts to those topics.
7. Visits/field trips of firms, research organizations etc.

SEMESTER-II

COURSE 1: DIFFERENTIAL EQUATIONS

Theory Credits: 4 5 hrs/week

Course Outcomes

After successful completion of this course, the student will be able to

1. solve first order first degree linear differential equations.
2. convert a non-exact homogeneous equation to exact differential equation by using an integrating factor.
3. know the methods of finding solution of a differential equation of first order but not of first degree.
4. solve higher-order linear differential equations for both homogeneous and non-homogeneous, with constant coefficients.
5. understand and apply the appropriate methods for solving higher order differential equations.

Course Content

Unit – 1

Differential Equations of first order and first degree

Linear Differential Equations – Bernoulli's Equations - Exact Differential Equations –Integrating factors - Equations reducible to Exact Equations by Integrating Factors -

i) Inspection Method ii) $\frac{1}{Mx+Ny}$ iii) $\frac{1}{Mx-Ny}$

Unit – 2

Differential Equations of first order but not of first degree

Equations solvable for p, Equations solvable for y, Equations solvable for x – Clairaut's equation - Orthogonal Trajectories: Cartesian and Polar forms.

Unit – 3

Higher order linear differential equations

Solutions of homogeneous linear differential equations of order n with constant coefficients - Solutions of non-homogeneous linear differential equations with constant coefficients by means of polynomial operators

(i) $Q(x) = e^{ax}$ (ii) $Q(x) = Sin\ ax$ (or) $Cos\ ax$

Unit – 4

Higher order linear differential equations (continued.)

Solution to a non-homogeneous linear differential equation with constant coefficients

P.I. of $f(D)y = Q$ when $Q = bx^k$

P.I. of $f(D)y = Q$ when $Q = e^{ax}V$, where V is a function of x

P.I. of $f(D)y = Q$ when $Q = xV$, where V is a function of x

Unit – 5

Higher order linear differential equations with non-constant coefficients

Linear differential Equations with non-constant coefficients; Cauchy-Euler Equation; Legendre Equation; Method of variation of parameters

Activities

Seminar/ Quiz/ Assignments/ Applications of Differential Equations to Real life Problem /Problem Solving Sessions.

Text Book

Differential Equations and Their Applications by Zafar Ahsan, published by Prentice-Hall of India Pvt. Ltd, New Delhi-Second edition.

Reference Books

1. Ordinary and Partial Differential Equations by Dr. M.D. Raisinghania, published by S. Chand &Company, New Delhi.
2. Differential Equations with applications and programs – S. Balachandra Rao & HR Anuradha-Universities Press.
3. Differential Equations -Srinivas Vangala&Madhu Rajesh, published by Spectrum University Press.

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SEMESTER-II
COURSE 1: ORGANIC CHEMISTRY

Theory Credits: 3 3 hrs/week

Course outcomes:

At the end of the course , the students will be able to

1.Understand the basic concepts of alkanes, alkenes and alkynes

2.Understand the concept of Benzene.

UNIT-I:

STRUCTURAL THEORY IN ORGANIC CHEMISTRY **9h**

Types of bond fission and organic reagents (Electrophilic, Nucleophilic, and free radical reagents including neutral molecules like H_2O,NH_3& $AlCl_3$).

Inductive effect. Application of inductive effect (a) Basicity of amines (b) Acidity of carboxylic acids (c) Stability of carbonium ions. Resonance or Mesomeric effect, application to (a) acidity of phenol, and (b) acidity of carboxylic acids. Hyper conjugation and its application to stability of carbonium ions, Free radicals and alkenes, carbanions..

Types of Organic reactions : Addition - electrophilic, nucleophilic and free radical. Substitution - electrophilic, nucleophilic and free radical. Elimination- Examples.

UNIT-II:

ACYCLIC HYDROCARBONS **9h**

Alkenes - Preparation of alkenes. Properties: Addition of hydrogen - heat of hydrogenation and stability of alkenes. Addition of halogen and its mechanism. Addition of HX, Markonikov's rule, addition of H_2O, HOX, H_2SO_4 with mechanism and addition of HBr in the presence of peroxide (anti - Markonikov's addition). Dienes - Types of dienes, reactions of conjugated dienes - 1,2 and 1,4 addition of HBr to 1,3 - butadiene and Diel's - Alder reaction.

UNIT-III: **9h**

Alkynes - Preparation by dehydrohalogenation of dihalides, dehalogenation of tetrahalides, Properties; Acidity of acetylenic hydrogen (formation of Metal acetylides). Preparation of higher acetylenes, Metal ammonia reductions, Physical properties. Chemical reactivity - electrophilic addition of X_2, HX, H_2O (Tautomerism), Oxidation with $KMnO_4$, OsO_4, reduction and Polymerisation reaction of acetylene.

UNIT-IV

ALICYCLIC HYDROCARBONS (CYCLOALKANES) **9h**

Nomenclature, Preparation by Freunds method, Wislicenus method. Properties - reactivity of cyclopropane and cyclobutane by comparing with alkanes, Stability of cycloalkanes - Baeyer's strain theory, Sachse and Mohr predictions and Pitzer's strain theory. Conformational structures of cyclobutane, cyclopentane, cyclohexane.

UNIT-V:

BENZENE AND ITS REACTIVITY **9h**

Concept of aromaticity - aromaticity (definition), Huckel's rule - application to Benzenoid (Benzene, Naphthalene) and Non - Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation)

SEMESTER-II

COURSE 1: ORGANIC CHEMISTRY

Practical Credits: 1 2 hrs/week

Organic Functional Group Reactions

(At the end of Semester)

Reactions of the following functional groups present in organic compounds (at least **4**)
Alcohols ,phenols, aldehydes, ketones,c arboxylic Acids and Amines

Four Year B.Sc. (Hons) - Semester – V (from 2022-23)

Subject: **B. Sc - Horticulture**

Course-6A: **Ornamental Horticulture**

(Skill Enhancement Course (Elective), 5 credits, Max Marks: 100 + 50

Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Acquire a critical knowledge of ornamental gardening and its significance.
2. Identify and explain living and non-living components in an ornamental garden.
3. Acquire skills on propagation and planting of various ornamental plants.
4. Perform managerial skills related to ornamental gardening.
5. Demonstrate skills of designing and developing ornamental gardens in public places.

Syllabus: (Hours: Teaching: 50, Lab: 30, Training: 05, Others incl. unit tests: 05)
(*Syllabi of theory and practical together shall be completed in 80 hours*)

Unit -1: Introduction to Ornamental Horticulture (10h)

1. History, Definition, scope of gardening, aesthetic values; types of gardens in India.
2. Landscaping, basic principles and basic components.
3. Principles of gardening, garden components and adornments.
4. Lawn types, establishment and maintenance; methods of designing rockery and water garden.

Unit -2: Types of Ornamental gardens (10h)

1. Special types of gardens, trees, their design, their walk-paths, bridges, constructed features.
2. Garden structures – greenhouse, glass house, net house.
3. Values in landscaping; propagation-planting of shrubs and herbaceous perennials.

Unit-3: Plants in Ornamental gardens (10h)

1. Importance, design values, propagation, planting of following annuals, biennials and perennials:
   (a) Climbers (b) Creepers (c)Palms (d) Ferns (e) Grasses (f) Cacti (g) Succulents

Unit-4: Ornamental gardening – public utility (10h)

1. Cultural operations in ornamental gardens.
2. Bio-aesthetic planning, definition need; round country planning; urban planning and planting - avenues, educational institutions, and villages.
3. Beautifying railway stations, dam sites, hydroelectric stations, colonies, river banks, Planting material for play grounds.

Unit-5: Ornamental gardening in residences (10h)

1. Bottle garden, terrariums.
2. Vertical gardens, roof gardens.
3. Culture of bonsai, art of making bonsai.

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2022-24

Semester-wise Revised Syllabus under CBCS, 2020-21

Four Year B.Sc. (Hons) - Semester – V (from 2022-23)

Subject: **B. Sc - Horticulture**

Course-7A: **Commercial Floriculture**

(Skill Enhancement Course (Elective), 5 credits, Max Marks: 100 + 50

Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Understand the significance of flowers in human life.
2. Acquire skills related to production techniques in floriculture.
3. Explain the breeding techniques of some flowering plants.
4. Demonstrate skills on preparing various value added products.
5. Perform skills in relation to post-harvest operations in floriculture.

Syllabus: (Hours: Teaching: 50, Lab: 30, Training: 05, others incl. unit tests: 05)
(*Syllabi of theory and practical together shall be completed in 80 hours*)

Unit-1: Basic concepts of floriculture (10h)

1. Aesthetic, cultural and industrial importance of flowers; domestic and export marketing of flowers.
2. Floriculture - Importance, area and production in Andhra Pradesh and India.
3. Scope and importance of commercial floriculture in A.P., and India.

Unit-2: Production technology-1 (10h)

1. Production techniques of following flowering plants for domestic and export market:
   (a) Rose (b) *Chrysanthemum* (c) Marigold (d) Tuberose (e) *Crossandra* (f) Jasmine

Unit-3: Production technology-2 (10h)

1. Production techniques of following flowering plants for domestic and export market:
   (a) *Anthurium* (b) *Gerbera* (c) *Gladiolus* (d) *Dahlia* (e) *Heliconia* (f) Orchid

Unit-4: Plant breeding of flowering ornamentals (10h)

1. Objectives and techniques in ornamental plant breeding.
2. Introduction, selection, hybridization, mutation and biotechnological technique for improvement of following ornamental and flower crops.
   (a)Carnation (b) *Petunia* (c) *Geranium* (d) *Cosmos* (e) *Hibiscus* (f) Snapdragon

Unit-5: Post-harvest practices in floriculture (10h)

1. Importance of value addition in floriculture & types of value added products.
2. Importance of flower arrangement; Ikebana - techniques, types, suitable flowers and cut foliage.
3. Post-harvest technology of cut and loose flowers in respect of commercial flower crops.
4. Dehydration techniques for drying of flowers, scope importance and status.

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AUTONOMOUS SYLLABUS

PG

2023-2024

DEPARTMENT OF ENGLISH

FIRST SEMESTER

MA English

2023-2024

With effect from 2020 - 21 (Under CBCS Pattern)

ENG 101: POETRY-I

UNIT – 1

Background Study

Literary History – Genres – Movements – Ideas – Trends - Concepts

UNIT – 2

1. Chaucer : The Prologue to the Canterbury Tales (The Knight, The Square, The Wife of Bath, The Friar)

2. John Donne : The Flea,
The Canonization,
The Sunrising

UNIT – 3

3. Milton : Paradise Lost, Book II

4. Alexander Pope : The Rape of the Lock (canto I and II)

5. Thomas Gray : Elegy Written in a Country Church Yard

UNIT – 4

6. Wordsworth : Tintern Abbey, Ode on Intimations of Immortality

7. John Keats : Ode to a Nightingale, Ode on a Grecian Urn

8. P.B. Shelley : Ode to the West Wind,
The Cloud

DEPARTMENT OF ENGLISH

FIRST SEMESTER

MA English

2023-2024

With effect from 2020 - 21 (Under CBCS Pattern)

ENG 102: DRAMA-I

UNIT – 1

Background Study

Literary History – Genres – Movements – Ideas – Trends – Concepts

UNIT – 2

1. Christopher Marlowe : Edward-II

2. Ben Jonson : Volpone

UNIT – 3

3. William Shakespeare : Hamlet

4. William Shakespeare : The Merchant of Venice

UNIT – 4

5. Sheridan : The School for Scandal

6. Oscar Wilde : The Importance of Being Earnest

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DEPARTMENT OF ENGLISH

FIRST SEMESTER

MA English

2022-2023

With effect from 2020 - 21 (Under CBCS Pattern)

ENG 103: FICTION-I

UNIT – 1

Background Study

Literary History – Genres – Movements – Ideas – Trends – Concepts

UNIT – 2

1. Daniel Defoe : Robinson Crusoe

2. Henry Fielding : Tom Jones

UNIT – 3

3. Jane Austen : Pride and Prejudice

4. George Eliot : The Mill on the Floss

UNIT – 4

5. Charles Dickens : A Tale of Two Cities

6. Thomas Hardy : The Mayor of Casterbridge

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DEPARTMENT OF ENGLISH

FIRST SEMESTER

MA English

2022-2023

With effect from 2020 - 21 (Under CBCS Pattern)

ENG 104: PROSE-I

UNIT – 1

Background Study

Literary History – Genres – Movements – Ideas – Trends – Concepts

UNIT – 2

1. Francis Bacon : Of Studies, Of Truth, Of Youth and Age

2. Joseph Addison : The Coverley Papers (Selected Essays)

1. **The Mischief's of the Club**
2. **Labour and Exercise**
3. **Rural Manner**

UNIT – 3

1. Jonathan Swift : Gulliver's Travels Voyage I& II

2. Charles Lamb : 1. Dream Children

2. The South-Sea House

UNIT – 4

1. Milton : Of Education

2. Bertrand Russell: The Conquest of Happiness

DEPARTMENT OF ENGLISH

MA English

2023-2024

FIRST SEMESTER

ENG 105: ENGLISH LANGUAGE

UNIT – 1

Language – Definition – features – Human Language vs. Animal

Language - Definition and Scope of Linguistics - Dimensions of Study.

UNIT – 2

1. Origin and Growth of English Language – Influences (Latin, French, and

Indian) – Standard English – British and American English

UNIT – 3

Sounds – Speech Mechanism – Stress/ Rhythm – Intonation – Phones – Phonemes – Allophones.

UNIT – 4

Morphology – Morphs – Allomorphs – Word formation processes – Simple, Complex and Compound Words.

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DEPARTMENT OF ENGLISH

SECOND SEMESTER

MA English

2023-2024

With effect from 2020 - 21 (Under CBCS Pattern)

ENGLISH 201: POETRY – II

UNIT – I

Background Study

Literary History – Genres – Movements – Ideas – Trends - Concepts

UNIT – 2

1. **Robert Browning : My Last Duchess**
2. **G.M. Hopkins : Wind Hover, Pied Beauty**
3. **Matthew Arnold : Dover Beach**

UNIT – 3

3. **W.B. Yeats : The Second Coming, Byzantium, A Prayer for my daughter**
4. **T.S. Eliot : The Waste Land**

UNIT – 4

5. **W.H. Auden : The Unknown Citizen, The Shield of Achilles**
6. **Alexander Pope : The Happy Man**
7. **John Milton : On His Having arrived at the Age of Twenty Three.**

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DEPARTMENT OF ENGLISH

SECOND SEMESTER

MA English

2023-2024

With effect from 2020 - 21 (Under CBCS Pattern)

PAPER II: DRAMA – II

ENGLISH 202

UNIT - I

Background Study

Literary History – Genres – Movements – Idea – Trends – Concepts

UNIT – 2

1. **G.B. Shaw : St. Joan**
2. **T S Eliot : The Murder in the Cathedral**

UNIT – 3

3. **John Osborne : Look Back in Anger**
4. **Harold Pinter : The Birthday Party**

UNIT – 4

5. **Samuel Beckett : Waiting for Godot**
6. **J.M. Synge : Riders to the Sea**

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DEPARTMENT OF ENGLISH

SECOND SEMESTER
MA English

2023-2024

With effect from 2020 - 21 (Under CBCS Pattern)

ENGLISH 203: FICTION – II

UNIT – I

Background Study

Literary History – Genres – Movements – Ideas – Trends – Concepts

UNIT – 2

1. **Virginia Woolf : Mrs. Dalloway**
2. **James Joyce : The Portrait of the Artist as a Youngman**

UNIT – 3

3. **D.H. Lawrence : Son and Lovers**
4. **William Golding : Lord of the Flies**

UNIT – 4

5. **Graham Greene : The Power and the Glory**
6. **Thomas Hardy : Tess of the D'Urbervilles**

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DEPARTMENT OF ENGLISH

SECOND SEMESTER
MA English

2023-2024

With effect from 2020 - 21 (Under CBCS Pattern)

ENGLISH 204: Prose-II

UNIT – I

Background Study

Literary History – Genres – Movements – Ideas – Trends – Concepts

UNIT – 2

1. Bertrand Russell : Knowledge and wisdom

2. John Ruskin : Sesame and Lilies

UNIT – 3

3. Virginia Woolf : A Room of One's own

4. George Orwell : Politics and English Language

UNIT – 4

5. Winston Churchill : Blood, Toil, Tears and Sweat

6. G.K. Chesterton : The Fallacy of Success.

DEPARTMENT OF ENGLISH

SECOND SEMESTER
MA English

2022-2023

With effect from 2020 - 21 (Under CBCS Pattern)

ENGLISH 205: ENGLISH LANGUAGE TEACHING

UNIT – 1

1. **Language Acquisition and Language Learning**

2. **Problems of Teaching / Learning English as a Second Language in the Indian Context**
3. **Current Trends of Teaching English in India.**

UNIT – 2

Teaching of English Language – Theories, - Concepts- Methods – Direct, Grammar Translation – Bilingual – Audio lingual – Desuggestopedia.

UNIT – 3

Teaching poetry & Prose from Language Perspective
Teaching LSRW Skills

UNIT – 4

Materials and tools – Development of Sources for Teaching – News Papers- Advertisements – Magazines – Utility of Language lab for teaching English.

as a part of practical work.

M.Sc. Zoology

2023-2024

Revised Syllabus Effective from the Academic Year 2021-22
Based on New Education Policy (NEP) 2020 and
Choice based credit system (CBCS)

Program Educational Objectives (PEOs)	
PEO1	The programme has been designed to have a mix of both classical and modern aspects of Zoology for better understanding of animal world.
PEO2	Make students understand the importance of biodiversity for sustainable development
PEO3	Appearing for NET, SET, GATE, ASRB and other competitive examinations of APPSC and UPSC
PEO4	To develop trained and knowledgeable human resources for academic research labs and industry
PEO5	To develop self-employability in animal produce related ventures like pearl, honey, silk, wax etc.,

Program Specific Outcomes (PSOs); The Students at the Completion of programme will have	
PSO1	Can understand and appreciate life environment interaction
PSO2	The ability to understand the intricacies of the subject at advanced level and hone up skills to opt for research programme
PSO3	Students can Venture into industry as various animals and their produce such as Coral, pearl ,honey ,wax ,silk ,lac, shell of turtles ,bones feather tusk and fur have high demand now a days
PSO4	Equip them to disseminate the knowledge at different levels of education.
PSO5	As students have hands on training in biochemical and molecular biology techniques, helping them to get employment opportunities in R&D of pharmaceutical industry.
PSO6	Know the applications of biotechnology in various fields like agriculture ,industry and human health.
PSO7	Understand the basic principle of computational biology to extract information from large databases and to construct computer modeling, Get employment in healthcare industry
	Understand the role of environmental conservation process in pollution control and biodiversity and protection of endangered species.

Program Outcomes (POs)	
PO1	At the end of the programme students should understand and appreciate the importance of animals for sustainable development.
PO2	The students also understand basic concepts of life sciences and their relevance in their day to day life.
PO3	Learn, how to exploit animals of economic importance for betterment of human life such as aquaculture, sericulture, verminculture, poultry etc.
PO4	With gained skill set in molecular biology techniques, can have scope to start diagnostic labs, besides getting opportunities in pharma industries.

M.Sc. Zoology

2023-24

ZOO15102: GENETICS & EVOLUTION

Course outcome: Students will learn about Mendelian and non-Mendelian inheritance. Understand the concepts multiples alleles, genetic disorders and karyotyping etc. Students acquire knowledge regarding different evolutionary theories and speciation.

UNIT – I

1.1 Principles of Mendelian Inheritance- Identification of DNA as a genetic material, Gene asa unit of expression.
1.2 Interaction of genes: Multiple alleles, ABO groups & Rh factor, Epistasis; Incompletedominance, codominance; Complementary genes, duplicate genes, lethal genes
1.3 Linkage, Recombination and gene mapping
1.4 Mutations: a) spontaneous and b) induced mutations; c) Molecular basis of mutations

UNIT – II

2.1 a) Numerical and Structural abnormalities of human chromosomes and syndromes
b) Human karyotype and human genome
2.2 Sex linked inheritance
2.3 Pedigree analysis
2.4 Eugenics: a) Positive eugenics, Artificial insemination, sperm banks
b) Negative eugenics, Amniocentesis, consanguinity, Genetic counseling

UNIT – III

3.1 Theories of organic evolution- Emphasis on Darwinism and Lamarckism
3.2 Neo-Darwinism
3.3 Role of isolating mechanisms
3.4 Models of speciation (Allopatric, sympatric and parapatric)

UNIT – IV

4.1 A detailed account on destabilizing forces (i) Natural selection (ii) Mutation (iii)Genetic drift
4.2 Phylogenetic gradualism & punctuated equilibrium
4.3 Micro & Macro evolution
4.4 Gene Evolution and Amino acid sequence and phylogeny

List of Practical:

1. Blood grouping
2. Rh factor demonstration
3. Mendelian ratios and its related Problems
4. Karyotyping
5. Syndrome charts – demonstration
6. Demonstration of Barr bodies
7. Problems on Hardy Weinberg's law

SUGGESTED READING MATERIAL

1. Genetics – Monrve W. Strickberger. 3rd Ed., May, 2000.
2. Genetics – K.B. Ahluwallia – 1985.
3. Principles of Genetics – E.J. Gardner. M.J. Simmons & D.P. Snustad.
4. Molecular Biology of genes – Watson, J.D., N.H. Hopkins, J.W. Roberts, J.A. Steitz&A.M.
5. Weiner. The Benjamin Cummings publishing company. Inc. Tokyo.
6. Basic Human Genetics – E.J. Mange, Arthur P. Mange. Indian Print, 1997.
7. Genetic disorders of Man by M.R. Goodman.
8. An introduction to modern genetics by Ch. Waddinsgton.
9. Dobzhansky, Th. Genetics and origin of species, Columbia University press.
10. Dobzhansky, Th., F.J. Ayala, G.L. Stebbins and J.M. Valentine EVOLUTION:Surjeet publications, New Delhi latest edition.
11. P.A. Moody Introduction to Evolution II ed/latest: Kalyani publishers, New Delhi.
12. Hartl, D.L. A primer of population genetics, Sinauer Associatesm Inc., Massachusetts.
13. Peter Volpe E. Understanding Evolution, University Book stall, New Delhi.
14. An introduction to genetic analysis. Griffiths, A.J.F., J.H. Miller, D.T. Suzuki, R.C.Lewontin & W.M. Gelbark. W.H. Freeman and Company, New York.

ZOO15103: CELL BIOLOGY & MICROBIOLOGY

Course outcome: Students learn and gain knowledge on cellular structure and functional organization of prokaryotes and eukaryotes. It gives scope to understand types of cell divisions and appreciate the mechanisms underlying cell death and proliferation. Students would learn about modes of cell signaling besides understanding cell surface receptor and intracellular signal transduction pathways. Students gain knowledge on the basics of microbiology, microbial diseases, growth and their control. Gain knowledge on applications of microbes in industry and learn the methods of production of some industrially important products.

UNIT – I

1.1 Cell organelles- Ultrastructure and functions: Cell Membrane, ER and Golgi complex,

1.2 Cell organelles- Ultrastructure and functions: Nucleus, Mitochondria, Ribosomes and Lysosomes

1.3 Cell Division and Regulation- Mitosis, Meiosis, Cell Cycle and its regulation

1.4 Cell death and proliferation – Apoptosis: definition, morphological and biochemical differences between apoptosis and necrosis, mechanism (internal and external signals) and significance.

UNIT – II

2.1 Cell signaling: Models of cell-cell signaling (steroid receptors, nitric oxide and carbon monoxide)

2.2 Functions of cell surface receptors (G-protein coupled receptors, Tyrosine kinases, cytokine receptors, receptors linked to other enzymatic activities).

2.3 Pathways of intracellular signal transduction (cAMP pathways, cyclic cGMP, phospholipids and Ca^{2+}, Ras, Raf and MAP kinases)

2.4 Brief account of biology of cancer.

UNIT-III

3.1 History and Scope of Microbiology

3.2 Microbial nutrition, growth and their control

3.3 Normal microbial flora of human body-skin, nose, respiratory tract, stomach,intestine, urinogenital tract.

3.4 Microbial diseases and their control

a) Bacterial diseases - Tuberculosis, Plague, Anthrax,

b) Viral diseases - AIDS, Rabies, Hepatitis

c) Fungal diseases - Cutaneous mycoses, Sub-cutaneous mycoses and Systemic mycoses, d) Protozoan diseases - Amoebiasis and Malaria

UNIT-IV

4.1 Microbiology of fermented food (Diary Products, Meat and Fish, Microorganisms as sources of food

4.2 Industrial Microbiology (Types of fermentation process, Alcoholic beverages)

4.3 Industrial productions - Lactic acid and Glutamate

4.4 Therapeutic compounds – Antibiotics (Penicillin), Steroids and Industrial enzymes(Amylase and Protease).

List of Practicals

1. Mitosis – Onion root tips
2. Meiosis in flower buds/ Grasshopper testis
3. Giant chromosome in Chironomus Larva
4. Effect of colchicine on mitosis
5. Staining techniques–simple, Gram's staining
6. Isolation of microorganisms
7. Wet mount preparations
8. Antibiotic sensitivity tests

SUGGESTED READING MATERIAL

1. Cell Biology (Fundamentals and Applications) By Gupta / Jangir, 2001; Agrobios, India.
2. Cell and Molecular Biology by EDR De Robertis and EMR De Robertis Jr, IndianEdition, B.I. Publications, Pvt. Ltd.
3. The Cell (A Molecular Approach) by Geoffrey M. Cooper, 2nd Edn. 2000, ISBN.
4. Text Book of Microbiology, by R. Aananthnarayan &C.K. Jayaram Panikar, 4th Edition,Orient Longmen, Hyderabad, 1990.
5. General Microbiology by C.B. Powar & H.F. Daginawala 1st Edition, Himalaya PublishingHouse, Bombay, 1982.
6. Elements of Microbiology, by M.J. Pelzar, Jr & E.C.S Chan International students Edition,1981, MCGRAW-Hill international Book Company, New Delhi.
7. Microbiology C.M. Presscots, J.P. Harley & D.A Klein Mc Graw Hill. WCB

ZOO15104A : TOOLS AND TECHNIQUES IN BIOLOGY (Internal Elective)

Course outcome: Students gain knowledge about various tools and techniques used in biological systems and gives them insights about their usage in research and various diagnostics. Students will gain knowledge on animal cell culture techniques.

UNIT-I

1.1 Microscopy: Types of microscopes – Phase contrast microscope, Fluorescence microscope; Electron microscope – TEM and SEM
1.2 Centrifugation – basic principles, Types of rotors, high speed and ultracentrifuge
1.3 Principles of spectroscopy, Laws of Light absorption, applications of Colorimetry, Spectrophotometry
1.4 Measurement of pH and biological Buffers

UNIT-II

2.1 Chromotography – paper chromatography – thin layer chromatography
2.2 Ion exchange chromatography and affinity chromatography
2.3 Introduction to FPLC and HPLC
2.4 Radio isotope techniques – types of radio isotopes, detection and measurement of radioactivity. Applications of radio isotopes in biological sciences and safety measures

UNIT-III

3.1 Microtomy and staining procedures– types of microtomes, types of stains, staining procedures of biological materials
3.2 Electrophoresis: SDS-PAGE, Agarose gel electrophoresis
3.3 Blotting techniques
3.4 ELISA

UNIT-IV

4.1 Design and functioning of tissue culture laboratory methodology
4.2 Culture media preparation
4.3 Cell proliferation measurements
4.4 Cell viability testing and cell harvesting methods

List of Practicals

1. Separation of biological compounds by paper chromatography
2. Preparation of Buffers and measurement of pH
3. Separation of biological compounds by TLC
4. Absorption spectra of proteins and nucleotides
5. Separation of mitochondria and differential centrifugation
6. Separation of biomolecules using HPLC
7. Preparation of cell culture media
8. Separation of proteins by SDS-PAGE

SUGGESTED READING MATERIAL (ALL LATEST EDITIONS)

1. Animal Cell Culture – A practical approach, Ed John. R.W.Masters. IRL Press.
2. Introduction To Instrumental analysis, Ronert Braun. McGraw Hill International
3. A Biologists Guide to Principles and Techniques of Practical Biochemistry, K. Wilson & K.W. Goulding, ELBS Edn.
4. Advanced Micripipette Techniques for cell physiology. K.T. Brown and D.G. Flamming IBRO, Hand Book Series. A Wiley Interscience publications, John

Semester- III ZTH 301: ENVIRONMENTAL BIOLOGY

UNIT – I 1.1 A general account on Biomes and their environments 1.2 Fresh water: Classification and Characteristics, eutrophication, seasonal changes 1.3 Marine: Classification and Characteristics 1.4 Terrestrial: Characterization of Forests- Grass lands – Tundra –Desert UNIT – II 2.1 Dynamic view of ecosystem and Energy Flow patterns in different ecosystems 2.2 Estimation of Energy Budget, Biomass and Productivity 2.3 Biogeochemical cycles- hydrological (water), oxygen, nitrogen, phosphorus and sulphur cycles. 2.4 Natural calamities and Disaster management in India

UNIT – III 3.1 Air Pollution: Criteria and Standards in India, Health hazards and Toxicology – Green House gases and Green House effect 3.2 Water Pollution: Criteria and Standards in India, Health hazards and Toxicology 3.3 Environmental epidemiological studies- Community environmental epidemiology and Occupational environmental epidemiology. Environmental health hazardsepidemiological episodes in India and abroad. 3.4 Environmental Laws: Environmental Laws in India- Legislation and Execution

UNIT-IV 4.1Biomonitoring; Scope and biological monitoring programmes; Mussel Watch Program 4.2 Bio-indicators and environmental monitoring, Environmental impact assessment 4.3 Bioremediation; Need and scope of bioremediation. 4.4 Environmental applications of bioremediation

List of Practicals:

1. Estimation of dissolved oxygen content in different water samples
2. Effect of Photoperiodism on CO2 levels in different water samples
3. Estimation of Organic matter in water and soil samples
4. Estimation of BOD in different water samples
5. Calculation of energy budget of an ecosystem
6. Analysis of OP compounds in water samples through TLC

7. Estimation of inorganic phosphate levels and biomass in surface and sediment waters 8. Determination of Calcium in a sedimentary bed and surface waters of freshwater pond

SUGGESTED READING MATERIAL

1. Practical methods in Ecology & Environmental Science, R.K. Trivedy, Goel, Trisal, 1997.

2. Environmental Physiology of desert organism. Ed.by N.F. Hadley – Dowden Huchinson and Ross, Inc.Penn.USA. 3. The Ecology of waste water treatment – H.A. Hawkes pergoman press, 1963. 4. Biochemical ecology and water pollution – P.R. Dugan, plenum press, London, 1972. 5. Pesticides in the environment – R. White Stevenns, Marcel-Dekker Inc. New York, 1971. 6. Environmental Science Research Volumes: Vol.1. Indicators of environmental quality – W.A. Thomas, 1972. Vol.

3. Environmental pollution by pesticides – C.A. Edwards, 1974. Vol.

5 Environmental dynamics of pesticides – R. Hague and V.H. Preed, 1975.

7. Ecology & Environment – P.D. Sharma, 1991.

8. Field Biology & Ecology – Allen H Benton & E. Werner, JR, 1980.

9. Encyclopedia of environmental pollution and control, enviromedia, Karad, Vol.1&2, R.K Trivedi.

10. Ecotechnology for pollution control and environmental management, enviromedia, Karad, R.K. Trivedi.

11. Health hazards and human environment, World Health Organization (WHO)1972.

12. Current pollution researches in India – R.K. Trivedy and P.K. Goel. Karad. 13. Chemical and biological methods for water pollution studies – R.K. Trivedy and P.K. Goel, 1984.

ZTH 302: MOLECULAR BIOLOGY

UNIT-I 1.1 Central dogma of Molecular biology; Chromosomal Organization 1.2 Nuclear and mitochondrial genome 1.3 Structure of gene (Cistron, Muton, Recon) 1.4 Watson and Crick Model; Types of DNA; Properties of DNA

UNIT-II 2.1 Replication in Prokaryotes and Eukaryotes; General principles, enzymology, various modes (conservative, semi conservative and dispersive) and models of replication (rolling circle, θ-mode replication - uni and bidirectional), 2.2 DNA synthesis by reverse transcription 2.3 Post replicational modifications and Inhibitors of replication 2.4 DNA damage and repair mechanisms: Photo reactivation, excision repair, recombination & SOS repair

UNIT III 3.1 Transcription: Types of RNA, enzymes and molecular mechanisms involved in Transcription (RNA Polymerases, promoters, initiation, elongation and termination of RNA synthesis) Post transcriptional modification (Cap, Poly A formation and splicing), Ribozymes 3.3 Translation: General features (Genetic code, codon, degeneracy and universality) molecular mechanism of translation3.4 Post translational modification; Role of antibiotics in protein synthesis

UNIT IV 4.1 General principles of gene regulation with reference to Lac and trp 4.2 Tryptophan Operon, Britten and Davidson model for Eukaryotic regulation 4.3 DNA sequencing, DNA finger printing, Polymerase chain reaction 4.4 Polymerase chain reaction (PCR)

List of Practicals:

1. Estimation of DNA by diphenylamine method
2. Determination of purity and quantity of DNA
3. Determination of melting temperature (Tm) of DNA
4. Estimation of RNA by orcinol method
5. PAGE electrophoresis of proteins
6. Problems related to molecular biology
7. Southern and Western blotting 8. Electro-elution of DNA
9. Polymerase chain reaction

SUGGESTED READING MATERIAL

1. Molecular Biology by David Freifelder, 1993
2. Molecular Biology of Gene-by J.D.Watson, 1988
3. Harper's review of Biochemistry by D.W. Martin et al 1990
4. Biochemistry by A.L. Lehninger
5. Cell and Molecular Biology-E.D.P. De Robertis and E.M.F. De Robertis
6. Concepts in Molecular Biology-S.C. Rastogi, V.N. Sharma and AnandaTandon (1993)

ZTH 303: ENDOCRINOLOGY

UNIT-I 1.1 Introduction to Endocrinology- Historical back ground, characteristic features of hormones 1.2 Classification and chemical nature of hormones 1.3 Mechanism of hormone action (Peptide and Steroid hormones) 1.4 General account of Pheromones

UNIT-II 2.1 Structure and functions of hormones of Pineal, Pituitary, thyroid and Parathyroid 2.2 Structure and functions of hormones of Adrenals, Pancreas and Gastrointestinal tract 2.3 Hormones in female sexual cycle, Pregnancy and lactation 2.4 Hormones of Testis and regulation of spermatogenesis

UNIT-III 3.1 Biosynthesis and secretion of hormones corticosterioid hormones-peptide hormones- catecholamines 3.2 Hormone receptors; receptor structure and signal transduction mechanism-G-protein family 3.3 Hormones in crustaceans - growth, development and reproduction. 3.4 Hormones in insects - growth, development and reproduction.

UNIT-IV 4.1 Growth hormones and growth factors 4.2 Hormones and homeostasis (Calcium, glucose, Phosphate, water) 4.3 Hormonal regulation of carbohydrate, nitrogen and lipid metabolism 4.4 Hormones as pharmaceuticals

List of Practicals:

1. Observation of the histological section of the pituitary, adrenals, pancreas and gonads

2. Isolation and extraction of pituitary gland from fish

3. Estimation of glucose levels in the blood of frog/rat exposed to adrenaline and insulin

4. Estimation proteins in the reproductive tissues of a fish injected with pituitary extract

5. Estimation of SDH activity in the heamolymph of eyestalk ablated crab

6. Estimation of oxygen consumption in eyestalk ablated crab

7. Demonstration on the effect of ligature on the development of larvae of insects

8. Estimation of glucose in alloxon-induced diabetes

9. Effect of adrenalectomy on total proteins in the liver of albino rats

SUGGESTED READING MATERIAL

1. Barrington. E.J.W. General and comparative Endocrinology Cambridge Press, Oxford.

2. Bentley, P.J. Comparative Vertebrate Endocrinology, Cambridge Press, Oxford

3. Williams, R.H. Text Book of Endocrinology, W.B. Saunders Co., Philadelphia

. 4. Martin, C.R. Endocrine Physiology. OxfordUniv. Press, Oxford.

4. Prakash S. Lohar. Endocrionology-Hormones and human health-2005. MJP Publishers-Chennai

ZTH 304: ENZYMOLOGY

UNIT – I 1.1 Classification of enzymes and nomenclature 1.2 Enzyme specificity (optical specificity, group specificity) 1.3 Quantitative measurement of enzyme activity 1.4 Isolation of enzymes, Intracellular distribution of enzymes
UNIT – II 2.1 Bioenergetics- Kinetic theory and collision theory 2.2 Mechanism of enzyme action (Lock and key; Induced fit model), catalytic site, Role of metal ions. 2.3. Effect of reactant concentration (Rate constant, First order, Second order and Zero Order reactions) 2.4 Effect of enzyme concentration, pH and temperature YVU – MSc Zoology Syllabus, 2018-2019 Page 18
UNIT – III 3.1 Effect of substrate concentration, Determination of kinetic constants (Km and Vmax) 3.2. Inhibition of enzyme activity (competitive, non-competitive, uncompetitive, mixed inhibition and inhibitor constant Ki) 3.3 Kinetics of Allosteric enzymes 3.4 Regulation of enzyme activity (Metabolic regulation), Catalytic efficiency of enzymes (Feedback inhibition, covalent modification)
UNIT – IV 4.1 Enzymes in clinical diagnosis 4.2 Immobilized enzymes and their applications 4.3 Isozymes 4.4 Enzyme engineering List of Practicals: 1. Effect of pH on SDH activity and determination of ionizable groups 2. Effect of temperature on SDH activity and determination of activation energy using Arrhenius equation 3. Determination of kinetic constants such as Km and Vmax 4. Inhibitor sensitivity (determination of IC50) 1. Effect of inhibitors on SDH activity and determination of inhibitors constant
2. Estimation of GOT and GPT in the serum samples
3. Isolation and purification of arginase
4. Isolation of LDH isozymes using electrophoresis
5. Determination of Ks (substrate constant) for any allosteric enzyme using Hill equation
6. Characterization of any selected enzyme using bioinformatic tools (sequence determination, homology search, structure, genomic sequence, cDNA sequence, dendrogram, metabolic function.

SUGGESTED READING MATERIAL
1. Harper's Biochemistry by Robert K. Murray, Peter A. Mayer, D.K. Granner, V.W. Rodwell, Lange Medical Book.
2. Enzyme kinetics by D.V. Roberts, Cambridge University Press.
3. Enzyme Kinetics by I.W. Segel.
4. Biochemical calculations by I.H. Segel 2nd Ed. John Wiley & Sons.
5. Biochemistry by D. Voet and J.G. Voet, J.Wiley& Sons. PRACTICALS ZPR 305:

Practicals related to theory papers ZTH 301 and ZTH 302 ZPR 306: Practicals related to theory papers ZTH 303 and ZTH 304

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Semester -IV
ZTH 401: ANIMAL BIOTECHNOLOGY

UNIT-I 1.1 General Introduction and Achievements of Biotechnology 1.2 Enzymes used in gene cloning - Restriction endonucleases, DNA ligases, Kinase, Phosphatase, Nucleases, Polymerases, Reverse transciptase 1.3 Cloning vectors (Plasmids, Phages, cosmids, yeasts Shuttle vectors), viral vectors (SV40, Adenovirus and Baculovirus) used in Gene cloning. 1.4 Cloning and selection strategies of recombinants (antibiotic selection, blue white screening, colony hybridization, Fluorescence in-Situ Hybridization (FISH) and immunological test.

UNIT-II 2.1 Preparation of cell lines, types of cell lines. Types of Stem Cells, Stem Cell Therapy 2.2 Applications of cell culture in Veterinary– Disease diagnosis, virus vaccines, hormones 2.3 Application of Biotechnology in Medicine- Production of monoclonal antibodies (Hybridoma technology), Production of vaccines and Production of Growth Hormone 2.4 Gene therapy: Introduction, principle of gene transfer and examples (Adenosine deaminase deficiency disease, Duchenne Muscular dystrophy disease and Cystic fibrosis)

UNIT-III 3.1 Livestock improvement: Manipulation of reproduction in animals (Artificial insemination, multiple ovulations, in vitro fertilization, Embryo transfer technology) 3.2 Methods of gene transfer – Microinjection, electroporation, lipofection and viral mediated gene transfer techniques 3.3 Generation of chimeric, transgenic and knockout mice and other animals and their characterization. Gene editing- Gene silencing-CRISPR-associated protein-9 nuclease (Cas9) technology 3.4 Potential application of transgenic animals: models for various diseases/disorders, production of peptides and proteins of biopharmaceutical interest (molecular farming)

UNIT-IV 4.1 Growth hormone transgenics and stem cell technology for betterment of aquaculture. Sex reversal in fishes and their applications, Production of monosex populations. Aquaculture and fish seed production: Hypophysiation, hCG injections 4.2. Marine bio/fish resources and its applications in pharmaceutical and Nutraceutical Industries 4.3. Fresh water and marine (oyster) pearl culture technology, pearl culture in India, uses of pearl culture 4.4. Intellectual Property Rights: Introduction; Types of IP; Patents and its types, Trademarks, Copyright & Related Rights, Protection of GMOs; ethical and legal issues in Biotechnology.

List of Practicals:
1. Instrumentation in animal biotechnology laboratory
2. Preparation of different types of culture media
3. Isolation of genomic DNA
4. Bacterial Plasmid DNA Isolation
5. Restriction digestion and ligation of vector and insert gene
6. Bacterial transformation using plasmid
7. Cell counting using hemocytometer
. Staining and viability testing of animal cells
9. Media preparation and membrane filtration
10. Preparation of single cell suspensions from spleen and thymus
11. Sterilization techniques (Physical and chemical)

SUGGESTED READING MATERIAL
1. Animal Biotechnology-M.M. Ranga, Agrobios (India)-2000
2. Biotechnology-Fundamentals & Applications-S.S.Purohit& S.K. Mathur, Agro

Botonics-1999
3. A text book on Biotechnology-(II Ed.) H.D. Kumar. EWP-Private Ltd., New Delhi1998
4. A text book of Biotechnology-R.C. Dubey.S.Chand& Company Ltd., New Delhi-1996 Biotechnology-V. Kumaresan. Saras Publication-1994
5. Animal Biotechnology – Recent concepts and developments. P. Ramadass, MJP Publications, Chennai, 2009
6. Venkitaraman: Economic Zoology (Sudarsana Publishers, 1983)
7. Srivastava: A text book of Applied Entomology, Vol. II and III (Kalyani Publishers, 1988, 1991) 8. Shukla & Upadhyaya: Economic Zoology (Rastogi Publishers, 1999-2000) 9. Dunham R.A. Aquaculture and Fisheries Biotechnology and Genetic Approaches.CABIPublishing,UK. 10. Animal Transgenisis and Cloning. Edited by L. M. Houdebine, Wiley, USA.

ZTH 402: TOXICOLOGY AND PHARMACOLOGY

UNIT-I 1.1 Origin and scope of Toxicology and Principles of Toxicology 1.2 Distribution, Excretion and Absorption of toxicants 1.3 Bio accumulation, bio-magnifications and Biotransformation of Toxicants 1.4 Teratogens and their effects on mammalian development

UNIT-II 2.1 Classification of pesticides, mechanisms of pesticide toxicity and detoxification mechanisms. 2.2 Toxicity Evaluation (LC50 & LD50) and factors affecting the Toxicity 2.3 Toxic effects of metals (Cadmium, Lead and Mercury) 2.4 Sources of radiation, types of radiation and physiological hazards of radiation.

UNIT-III 3.1 Scope and Importance of Pharmacology – dosage forms and routes of drug administration. 3.2 Pharmacokinetics – absorption, distribution, metabolism and excretion. 3.3 Pharmacodynamics – mechanisms of drug action, combined effect of drugs and factors modifying drug action. 3.4 Response of cells to drugs

UNIT- IV 4.1 Response of central nervous system to depressants: alcohols and Opium 4.2 General anaesthetics – Properties of anaesthetics (Ether and Barbiturates) 4.3 Effects of analgesics and antipyretics 4.4 Pharmacologic agents in allergic diseases- Histamines and antihistamines

List of Practicals:
1. Determination of LC50 and LD50 of selected toxicants in different animals
. 2. Effect of temperature on the ciliary activity in the normal and pesticide/ metal exposed fresh water muscles
3. SDH activity in activity in different tissues of frog/fish with reference to malathion/mercury/cadmium
4. Effects of toxicants on the rate of oxygen consumption of aquatic animals 5. Effects of toxicants on total proteins of fish/ frog
6. Teratogenic effects of pesticides on mice
7. Pesticidal effect on morphology of tissue
8. Routes of drug administration
9. Assay of paracetamol and ibuprofen by using UV-Vis spectroscopy by linear curve method.
10. Detection of calcium levels in calcical-300 by atomic absorption spectroscopy
11. Simultaneous determination of ibuprofen and paracetamol by UV spectrophotometry
12. Qualitative and quantitative determination of vitamin c in citrus limon by high performance liquid chromatography
13. Identification of drugs using TLC.

SUGGESTED READING MATERIAL

1 Toxic interactions-R.S.Goldstein, W.R. Hewitt and J.B.Hook. Academic Press-1990
2 Pesticides and human Welfare-D.L.Gunn and J.G.R. Stevens. OxfordUniversity Press1978 3 Pesticides action and Metabolism-O' Brien
4 Environmental toxicology of Pesticides-F. Mastimura, G.M.Boush and T. Misato
5 The Encyclopedia of Americana-Vol.15
6 Introduction to Biochemical Toxicology-E. Hodgson & F.E. Gutherie
7 Casarett&Doul's –Toxicology-The basic science of poisons-C.D.Klassen, Mary, O.A & John Doull 8 Pharmacologic principles of Medical practice John C. Krantz Jr C. Jellaffcarr.
9 An introduction to pharmacology and therapeutics James Andrew Gunn 10 Crash

course: Pharmacology Darson
11 Pharmacology, Brenner stevans
12 Text book of Pharmacology- Laurence Bennett
13 Pharmacology-H.P. Rang, M.M Dale,J.M.Relter, P. Moore, Cherchill Livingston
14 Text book of Pharmacology- Satoskar
15 The Pharmacological basis of therapeutics Good man & Grisons

ZTH 403: NEUROBIOLOGY AND ANIMAL BEHAVIOUR

UNIT-I 1.1 Micro anatomy of neurons and types of nerve cells. 1.2 Autonomic nervous system – Sympathetic Division, Parasympathetic Division. 1.3 Bioelectrical properties of neurons (Resting membrane potential- Nearnst equation; Sodium and potassium pump; Propagation of nerve impulse. 1.4 Synapses: Structure and Integration (Types of synapses; Ultra structure of synapse Chemical transmission; Electrical transmission)

UNIT-II 2.1 Chemical composition of the nervous system-cerebrospinal fluid-CNS barriers 2.2 Synthesis –storage-release and inactivation mechanisms and functions of the following neurotransmitters; Acetylcholine & Catecholamines (Norepinephrine, Epinephrine, Dopamine) 2.3. Amino acid Neurotransmitters-Glutamate and GABA 2.4 Neuropeptides (Oxytocin and Vasopressin)

UNIT – III 3.1 General introduction: An over view of concept of Animal behaviour 3.2 Visual Perception, Auditory perceptionand Olfactory Perception 3.3 Animal aggression and Homing territoriality 3.4 Social organization, Advantages, Social organization in insects, primates

UNIT-IV 4.1 Conditioning Learning (Classical and Operant conditioning and, Multiple-response learning) 4.2 Cognitive Learning (Insight Learning, Sign Learning, Latent Learning) 4.3 Kinds of remembering (Redintegrative memory –Recall – Recognition-RelearningRetrieval process-Theories of Memory). 4.4 The nature of forgetting (Decay through disuse- Interference effects, motivated forgetting, improving memory)

Practicals in Neurobiology
1. Heteropolar and multipolar neuron
2. Sensory neurons
3. Coelentarata nerve net
4. Pyramidal cell from cortex
5. Motor neuron from spinal cord
6. C.S. of spinal cord
7. Bipolar cell from olfactory bulb
8. Neuromuscular junction
9. Stretch receptors in cray fish
10. Organization of sepia central nervous system
11. Synapse enlarge
12. Stellate ganglion in sepia
13. Isolation and identification of different regions of mice brain
14. Spinal reflexes in decerebrated frog

Practicals in Animal Behavior

1. Habituation learning in snails
2. Spacial learning in albino rats
3. Locomotor activity in albino rats

4. Spotters 5. Insight learning in chimpanzee
6. Insight learning in raccoon
7. A chimpanzee using a stick to obtain an apple
8. Thorndike puzzle box
9. Instrumental conditioning
10. Imprinting
11. Feeding behaviour
12. Bee language
13. Courtship behaviour
14. Classical conditioning
15. Social behaviour
16. Pheromones in ants
17. Round and waggle dance of scout honey bee
18. Spatial leaning in bee wolf
19. Symbiosis adaptation
20. Aggressive mimicry

SUGGESTED READING MATERIAL

1. Neurobiology. Shepherd, G.M.OxfordUniversity press, London.
2. Basic Neurochemistry-G.J. Siegal, R.W. Albers, B.W. Agranoff, R. Katzman (1981) Little, Brown and company. Boston.
3. Introduction to Nervous system-T.H. Bullock, R. Cork, A. Granner (1977); W.H Freeman&Co.
4. Principles of Neural Science –E.R. Kandel and J.H. Schwertz. (1981); Elsevier/North Holland. NY. Oxford.
5. Mechanism of Drug Action on the Nervous System- M.A.B. Brazil, R.W. Ryall. (1979); cambridge University Press. Cambridge, London and New York.
6. The Bio Chemical basis of Neuropharmacology-J.R. Cooper, F.E. Bloom, &R.H. Roth. (1982); Oxford University Press, NY and London.
7. Principles of Neuro Phychopharmacology- Robert S. Feldman, Jerrold S. Meyer and Lind F. Quenzer. Sinauer Associates, Inc. Publishers. Sunderland. Massachusetts.
8. Alcock, J. Animal behaviour: An evolutionary approach. Sinauer Assoc., Sunderland, Mass.USA.
9. Bradbury, J.W. and S.L.Vehrencamp. Principles of animal communication. Sinauer Assoc. Sunderland, Mass. USA.
10. Clutton-Brock, T.H. the evolution of parental care. PrincetonUniv. Press, Princeton, NJ, USA.
11. Eibl-Eibesfeldt, I. Ethology. The biology of behaviour. Holt, Rinehart and Winston, New York. 12. Gould, J.L. The mechanisms and evolution of behaviour.

ZTH 404: IMMUNOLOGY

UNIT – I 1.1 Immunity – Types of Immunity, Innate and Acquired Immunity 1.2 Cells of the immune system: Lymphoid cells, Mononuclear cells, granulocytic cells, Mast cells 1.3 Organs of the immune system – primary and secondary lymphoid organs, lymphatic system 1.4 Antigens: Antigenic determinants or epitopes, immunogenicity, Haptens

UNIT – II 2.1 Innate (Non-specific immunity): Anatomical barriers, phagocytosis, NK cells, Interferons 2.2 Humoral immunity: Immunoglobulins (fine structure of immunoglobulins and immunoglobulin classes); the complement system- Classical and alternate pathway. Inflammation 2.3 Cell mediated immunity: Mechanism of cell mediated immunity 2.4 Brief account on Antigen presentation, Major histocompatability complex

UNIT – III 3.1 Antigen – Antibody interactions: Affinity, Avidity, Cross – reactivity, precipitation reactions, and Agglutination reactions. 3.2 Hypersensitivity – Coombs classification, types of hypersensitivity 3.3 Tolerance 3.4 Transplantation

UNIT – IV 4.1 Autoimmune disorders: Single organ autoimmune disease (Thyroiditis, Pernicious Anaemia), Systemic autoimmune diseases (Rheumatiod arthritis, Systemic Lupus Erythematosus (SLE). 4.2 Primary immune disorders (SCID, Digeorge's syndrome) 4.3 Immunodeficiency diseases (AIDS), HIV's mechanism of Immunosupression 4.4 Immunization (Active and passive immunity), types of vaccines

List of Practicals:

1. Preparation of differential cell types (Macrophages, live cells, astrocytes) 2. Double diffusion technique 3. Radio immunodiffusion 4. ELISA Test Demonstration (Tridot) 5. Agglutination test 6. Rocket immuno electrophoresis 7. Immuno electrophoresis demonstration

Reference books:

1. Kuby, J. (1998) Immunology, W.H. Freeman and Company, New York.
2. Roitt, I.,Brostoff, J. Male, D. (1999/2000) Immunology, 4th Edition. Harcourt Brace and Company Asia, Pte. Ltd., Singapore.
3. Harpers Review of Biochemistry, Murray, Granier, Mayes and Rodwell, Lange Medical Publicaitons,25th Ed.
4.. Human Physiology by Stuart Era Fox, W.M.C. Brown Publishers, USA 1984 or Recent Edition.
5. An introduction to Immunology by C.V. Rao, Narosa publishing house, 2002.
6. Immunology introductory textbook by Nandini Shetty, Wiley Eastern Ltd.

PRACTICALS ZPR 405: Practicals related to theory papers

ZTH 401 and ZTH 402 ZPR 406: Practicals related to theory papers ZTH 403 and ZTH 404 For 2nd Semester (Non-core) (CBCS) with effect from 2018-19

ZTH 205: Animal diversity and Economic Zoology

Unit I: Characterisation of Invertebrate phyla from Protozoa to Echinodermata

Unit II: Characterisation of Vertebrate phyla from Fishes to Mammals

Unit III: Beneficial animals: Corals - Earthworm - Vermiculture - Beneficial Insects (Apiculture, Lac culture). Aquaculture – Prawns - Lobsters - Crabs - Pearl oysters – Fishes)

Unit IV: Harmful animals: Disease causing organisms - Vectors – Poisonous organisms – Fouling organisms –

Pests. Books: 1. Hyman, L.H. The Invertebrates. Vol.8. Mc Graw Hall Co., New York and London 2. Hyman, L.H. The Invertebrates. Vol.
2 Mc Graw Hall Co., New York and London
3. Kingsley, J.S.Outlines of Comparative Autonomy of Vertebrates. Central Book Depot, Allahabad
4. Economic Zoology, Dr. G. S. Sukla and Dr.V.B. Upadhyay, Rastogi Publications, 5th Edition, 2013
5. Economic Zoology by Venkitaraman PR, Publication: Kottayam V. Publishers 1989
6. Text Book Of Economic Zoology by Venkitaraman,P R, 1983 For 3rd semester (Non-core)

ZTH 405: Biodiversity and Wild Life Management

Unit: I 1. Introduction: Definition, History of Biodiversity 2. Importance of Biodiversity 3. Biodiversity resources of India

Unit: II 1. Biodiversity documentation and Nomenclature 2. Biodiversity laws 3. Biodiversity hotspots in India

Unit: III 1. Importance of wild life management and wild life sanctuaries in India 2. Management of rare and endangered species 3. Deforestation and effects on wild life

Unit: IV 1. Special management programme of wild animals in India 2. Wild life trade: assessment and documentation: preventive measures 3. Wild life legislation

Reference Books:
1. IUCN (1994), Guidelines for protected area management categories. Cambridge, UK and Gland, Switzerland: IUCN
2. IUCN-UNEP-WWF (1980), World conservation strategy, living Resources, conservation for sustainable development, international union for conservation of nature and natural resources.
3. Sharma, B.D. (1994), high altitude wild life of India, Oxford and IBH publication, New Delhi, 289.
4. Red data list of threaten animals, list part 1. Vertebrates, Govt. of India, Z. S. I. publ.
5. Gaston, K.J. and spicer, J.I.(1988),Biodiversity: An introduction, Blackwell science, Oxford.
6. Ghosh, A.K. (1986), India and world conservation strategy,Z.S.I.,Govt.ofIndia,Kolkata.
7. Ghosh, A.K. (2008), Biodiversity conservation: Issues on concern,In:Zool.Res.in Human welfare, Ramkrishna and chatterjee(Eds.),Z.S.I.,Govt.of India,Kolkata,19-22
8. Jeffries, M.J. (2006), Biodiversity and conservation, 2nd ed., Rouledge, London and New York.
