



**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**

**2022-2023**



**UG Syllabus**

**2022-23**



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2022-23

ENGLISH  
SEMESTER – I

**English Syllabus-Semester-I (modified)**

English Praxis Course-I

**A Course in Communication and Soft Skills**

**Learning Outcomes**

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

- Use grammar effectively in writing and speaking.
- Demonstrate the use of good vocabulary
- Demonstrate an understating of writing skills
- Acquire ability to use Soft Skills in professional and daily life.
- Confidently use the tools of communication skills

**I. UNIT: Listening Skills**

- i. Importance of Listening
- ii. Types of Listening
- iii. Barriers to Listening
- iv. Effective Listening

**II. UNIT: Speaking Skills**

- a. Sounds of English: Vowels and Consonants
- b. Word Accent
- c. Intonation

**III. UNIT: Grammar**

- a) **Parts of Speech**
- b) Concord
- c) Tenses (Present/Past/Future)
- d) Articles
- e) Prepositions
- f) Question Tags
- g) Sentence Transformation (Voice, Reported Speech & Degrees of Comparison)
- h) Error Correction

**IV. UNIT: Writing**

- i. Punctuation
- ii. Spelling
- iii. Paragraph Writing

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2022-23

ENGLISH

**English Syllabus-Semester-II (modified)**

English Praxis Course-II

**A Course in Reading & Writing Skills**

**Learning Outcomes**

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

- Use reading skills effectively
- Comprehend different texts
- Interpret different types of texts
- Analyse what is being read
- Build up a repository of active vocabulary
- Use good writing strategies
- Write well for any purpose
- Improve writing skills independently for future needs

**I. UNIT**

Prose : **1. Knowledge and Wisdom Bertrand Russell**  
Skills : 2. Vocabulary: Conversion of Words  
: 3. One Word Substitutes  
: 4. Collocations

**II. UNIT**

Prose : 1. The Doll's House Katherine Mansfield  
Poetry : **2. Ozymandias** P B Shelley  
Non-Detailed Text : 3. Florence Nightingale Abrar Mohsin  
Skills : 4. Skimming and Scanning

**III. UNIT**

Prose : 1. The Night Train at Deoli Ruskin Bond  
Poetry : **2. Where the Mind is Without Fear** Rabindranath Tagore  
Skills : 3. Reading Comprehension  
: 4. Note Making/Taking

**IV. UNIT**

Poetry : 1. Coromandel Fishers Sarojini Naidu  
Skills : 2. Expansion of Ideas  
: 3. Notices, Agendas and Minutes

**V. UNIT**

Non-Detailed Text : 1. An Astrologer's Day R K Narayan  
Skills : 2. Curriculum Vitae and Resume  
: 3. Letters  
: 4. E-Correspondence



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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



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DEPARTMENT OF TELUGU

SYLLABUS 2022-23

GENERAL TELUGU

COMMON FOR BA/B.COM/B.SC

SEMESTER - I

SEM:1 COURSE – 1 PRACHINA TELUGU KAVITWAM  
PATYA PRANALIKA

UNIT – I- Rajneesh - Nannaya (MahaBharatham - Sabha ParvamPradhamaswasam

(26 nundi 57 padyamvaraku)

UNIT II-DakshaYagnamNannechodudu kumara sambhavamdviteeyaaswasam

(49nundi 86 padyamvaraku)

UNIT -III- DoumyadharmopadeshamThikkanaMahaBharathamvirataparvamPradhamaswasam

(116 nundi146 padyamvaraku)

UNIT- IV- PalanatiBebbuliSreenadhudu (Palanativeeracharitra -dvipadaKavyam (puta 108nundi 112 varaku)

UNIT -V- Seetha RavanaSamvadam -MollaRaamayanamSundaraKhanda (40 nundi 87 varaku)

1. VYAKARANAM
  2. SANDHULU: utwa, trika, druthaprakruthika,nugagama, Dviruktatakaaradesha,Yanadesha ,Vruddi,chutwa, Jastwa, Anunasika, Savarnaderga, Gunasandhimodalagunavi
  3. SAMASALU: Avyayibhava, Tatpurusha karmadharaya,dwandwa,dvigu, Bahuvreehi, modalagunavi
  4. ALANKARALU:Arthalaakaralu,:Upama,Utpreksha, Rupaka,Swabhavokthi, arthantaranyasalankaramodalagunavi.
  5. Sabdhalankaralu: Vrutyannuprasa, chekanuprasa,latanuprasa,antyanuprasa.
  6. CHANDASSU: Vruthalu:champakamala, utpmalama,Shardulam,mathebbham
  7. Jathipadyalu :kandam , Dvipada.
  8. Upajatulu: Ataveladi ,Tetageethi,Seesam, MutyalaSaraalu.
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DEPARTMENT OF TELUGU



**SYLLABUS 2022-23  
GENERAL TELUGU  
COMMON FOR BA/B.COM/B.SC  
SEMESTER – II  
SEM:2 COURSE – 2 ADHUNIKA TELUGU SAAHITYAM  
PATYA PRANALIKA**

**UNIT: I - ADHUNIKA KAVITWAM**

1. Adhunikakavitwam -parichayam
2. Kondaveedu -Kavi kokilaDuvvuriraamireddy  
(Grmdaavali-khandakaavyaalu-nakshatramaalasamputi)
3. Maatrusangeetham -Anisetty Subbarao  
(Agniveena Kavitha samputinundi)
4. ShivataandavamPuttaparthi Narayana charyulu  
(modatikhandikaemaandamubhumitalamuna-ilatalambuna)

**UNIT II - KATHANIKA**

5. Telugu Kathanika-parichayam
6. Bhayam(katha) KaalipatnamRamarao
7. SwedamkareduRental Nageswara Rao

**UNIT III - NAVALA**

8. Telugu Navala - Parichayam
9. Radhachakralu (Navala) MaheedararamohanRao(Samkshiptaithivrutham)
10. Radha chakralu( Samekshavyasam) Dr.Yallapragadamallikarjuna Rao

**UNIT -IV -NATAKAM**

11. Telugu Natakamparichayam
12. Yakshaganam (Natika) M.V.S. Haranadha Rao
13. ApurupaKalarupalavidwamsadrusyam ``Yakshagaanam`` ( Samekshavyasam) Dr.KandimallaSambashiva Rao

**UNIT – V - VIMARSHA**

14. Telugu sahitya vimarsha - parichayam
- 15-Vimarsha - SwarupaSwabhavalu, Uttamavimarshakudu–Lakshanalu

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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,Telugunundiaglamunakuokapeerananuvadimchatam.

UNIT- IV: MADYALAKU RACHANA -1

1.Mudranaa maadyamam(achumaadyamam) :Parichayam,paridhivikaasam.

2.Vividha rakaalapatrikalupariseelana :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,  
prasaarasamaacharam.

3. Drusyamadyamaalu – rachana: vyakyaanam(anchoring) television rachana



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DEPARTMENT OF HINDI  
SYLLABUS 2022-23  
GENERAL HINDI  
COMMON FOR BA/B.COM/B.SC  
Semester -I



**I- Gadya Sandesh (Prose)**

1. Sahitya Ki Mahatta - Mahaveer Prasad dwivedi
2. Sachiveevath – Sardar Poornasingh
3. Mitratha- Acharya Ramachandra Shukla

**II- Kathalok(Short Story)**

1. Mukthidhan- Munshi Premchand
2. Purraskar- Jaya shankara Prasad
3. UsneKhatha- Chandradhar Sharma Guleri

**III- Vyakaran (Grammar)**

1. Ling, Vachan, Shabdh, Kal ,Vachya, Vakyonkishuddi, Shabdh-Vilome, English- Hindi  
ParibhashikShabdhSoochi

**IV- Karyalayeen Hindi (Official Language)**

1. Karyalayeen Hindi
2. Shadhavali

**V- Patralekhan( Letter Writing)**



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DEPARTMENT OF HINDI

SYLLABUS 2022-23

GENERAL HINDI

COMMON FOR BA/B.COM/B.SC

Semester -II



**I- Gadhya sandesh (Prose)**

1. Sahitya aur Sanskruthi ka Praaspar Sanbandh - Dr. G. Sundar Reddy
2. Bharath ek Hai - Ramdharee Sing Dinakar
3. HIV/AIDS - Prakash Bathal Khandeevan Dr. Ramana Ganga Khadekar  
( Anuvad-Sreenathi Sadhana Monrya)

**II- Katha Lok (Short Story)**

1. Vapasee - Usha Priyanvada
2. Bhook Hadthal- Balashouri Reddy
3. Paramtma ka Kutta – Mohan Rakesh

**III- Vyakaran (Grammar)**

1. Karyalayeen Hindi Shabdavali English – Hindi
2. Karyalyoomei Prayag Honevale Hindi – English Shabd.
3. Vakyansh English – Hindi Shabdooka Vakyamei Prayog

**IV- Sandhi – Vichedh**

**V- Patra Lekhan**



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GENERAL HINDI  
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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 Litratue)**

1. Bhaktikal
- 2.Gnanasrayi Sakha- Khaeer
- 3.Pramasrayi Sakha- Jyasee

**III- SadharanNibandh (General Essays)**

- 1.Samachar Patra
- 2.Bekari kiSamasya
- 3.Computer
- 4.Paryavaran AurPradhooshan
- 5.Sahitya aur Samaj

**IV- Anuvaad (Translation)**

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

**V- PrayojanMoolak Hindi (Funtional Hindi)**

- 1.Paripatra
2. KaryalayGnapan 3. Adhisoochana



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2022-23

URDU

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**



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URDU

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Second Language – Urdu  
First Year Degree Course Second Language Part - 1(b)

Paper – II: URDU POETRY

SEMESTER - II

- UNIT – I           MASNAWI  
MEER HASAN – *Aaghaaz-e-Dastaan* (Sehrul Bayan)
- UNIT – II           MARSIYA  
MEER ANEES – *Jab Qataa Ki Masafat-e-Shab Aaftaab ne*  
(Ibtedayi 6 Bandh)
- UNIT – III          QASEEDA  
GHALIB – *Dar Madh-e- Bahadur Shah Zafar*  
(*Haan Mahe Nau Sunen Hum Uska Naam*)
- UNIT – IV          RUBAIYAAT
- AMJAD HYDERABADI  
1. *Rutba Jise Duniya me Khuda Deta hai*  
2. *Har Cheez Mussabab-e-Sabab se Maangoo*
- SAGHAR JAYYEDI  
1. *Tareef ki Meezan pe Tul jate hain*  
2. *Zulmat ka Toofan Utha deta hai*
- UNIT – V          TA'ARUF  
Muthtasar Ta'aruf aur Sawanehi Haalat  
1. *Amjad Hyderabad*  
2. *Saghar Jayyedi*

**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



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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 Zahirkaar 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



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2022-23

Life Skill course

B.Sc./B. Com/B. A

**LIFE SKILL COURSE**  
**BASIC COMPUTER APPLICATIONS**

Semester	Course Code	Course Title	Hours	Credits
I	Life skill course	BASIC COMPUTER APPLICATIONS	30	2

**Objectives:**

This course aims at providing exposure to students in skill development towards basic office applications.

**Course Learning Outcomes:**

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

1. Demonstrate basic understanding of computer hardware and software.
2. Apply skills and concepts for basic use of a computer.
3. Identify appropriate tool of MS office to prepare basic documents, charts, spreadsheets and presentations.
4. Create personal, academic and business documents using MS office.
5. Create spreadsheets, charts and presentations.
6. Analyze data using charts and spread sheets.

**Unit-I: (08 hrs)**

**Basics of Computers:** Definition of a Computer - Characteristics of computers, Applications of Computers – Block Diagram of a Digital Computer – I/O Devices, hardware, software human ware, application software, system software, Memories - Primary, Auxiliary and Cache Memory.

**MS Windows** – Desktop, Recycle bin, My Computer, Documents, Pictures, Music, Videos,

Task Bar, Control Panel.

**Unit-II:** (08 hrs)

**MS-Word :** Features of MS-Word - MS-Word Window Components - Creating, Editing, Formatting and Printing of Documents – Headers and Footers – Insert/Draw Tables, Table Auto format – Page Borders and Shading – Inserting Symbols, Shapes, Word Art, Page Numbers, Mail Merge.

**Unit-III:** (10 hrs)

**MS-Excel :** Overview of Excel features – Creating a new worksheet, Selecting cells, Entering and editing Text, Numbers, Inserting Rows/Columns –Changing column widths and row heights, Formulae, Referencing cells , Changing font sizes and colors, Insertion of Charts, Auto fill, Sort.

**MS-PowerPoint:** Features of PowerPoint – Creating a Presentation - Inserting and Deleting Slides in a Presentation – Adding Clip Art/Pictures -Inserting Other Objects, Audio, Video - Resizing and scaling of an Object – Slide Transition – Custom Animation.

**RECOMMENDED CO-CURRICULAR ACTIVITIES:** (04 hrs)

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

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside
  - a. the syllabus content. Shall be individual and challenging))
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz, Group Discussion
4. Solving MCQ's available online.
5. Suggested student hands on activities:
  - Create two folders, Rename the folder, create two files each using notepad and paint, move the files from one folder to another folder, delete a file you have created, copy and paste text within notepad.
  - Create a letter head for your college with watermark, your resume, visiting card, brochure for your college activity, organization chart for your college, any advertisement, Prepare your Class time table.



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2022-23

Life Skill course

**HUMAN VALUES AND PROFESSIONAL ETHICS (HVPE)  
(SYLLABUS)**

**Learning Outcome:**

On completion of this course, the UG students will be able to

- ✓ Understand the significance of value inputs in a classroom and start applying them in their life and profession
- ✓ Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
- ✓ Understand the value of harmonious relationship based on trust and respect in their life and profession
- ✓ Understand the role of a human being in ensuring harmony in society and nature.
- ✓ Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

**UNIT: 1 Introduction – Definition, Importance, Process & Classifications of Value Education**

- ❖ Understanding the need, basic guidelines, content and process for Value Education
- ❖ Understanding the thought provoking issues; need for Values in our daily life
- ❖ Choices making – Choosing, Cherishing & Acting
- ❖ Classification of Value Education: understanding Personal Values, Social Values, Moral Values & Spiritual Values.

**UNIT: 2 Harmony in the Family – Understanding Values in Human Relationships**

- ✓ Understanding harmony in the Family- the basic unit of human interaction
- ✓ Understanding the set of proposals to verify the Harmony in the Family;
- ✓ Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship
- ✓ Present Scenario: Differentiation (Disrespect) in relationships on the basis of body, physical facilities, or beliefs.
- ✓ Understanding the Problems faced due to differentiation in Relationships
- ✓ Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva* as comprehensive Human Goals
- ✓ Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj*), Universal Order (*SarvabhaumVyavastha*)- from family to world family.

**UNIT: 3 Professional Ethics in Education**

- ✓ Understanding about Professional Integrity, Respect & Equality, Privacy, Building Trusting Relationships.
- ✓ Understanding the concepts; Positive co-operation, Respecting the competence of other professions.
- ✓ Understanding about Taking initiative and Promoting the culture of openness.
- ✓ Depicting Loyalty towards Goals and objectives.



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2022-23

**Life Skill course**

**LIFE SKILL COURSE**  
**ENTREPRENEURSHIP DEVELOPMENT**  
(With Learning Outcomes, Unit-wise Syllabus, References, Co-curricular Activities & Model Question Paper)  
(To be Implemented from 2020-21 Academic Year)

Sl. No	Code	Sem	Course	Name of Life Skill Course ( Course consists 3 Units)	Hours/ Week	Credits	Marks (Sem-End)
1		I		Entrepreneurship Development	2	2	50

**Syllabus**

**ENTREPRENEURSHIP DEVELOPMENT**

(Total 30Hrs)

**Course Objective:** A Generic Course that is intended to inculcate an integrated personal Life Skill to the student.

**Learning Outcomes:**

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

- Understand the concept of Entrepreneurship, its applications and scope.
- Know various types of financial institutions that help the business at Central, State and Local Level
- Understand Central and State Government policies, Aware of various tax incentives, concessions
- Applies the knowledge for generating a broad idea for a starting an enterprise/start up
- Understand the content for preparing a Project Report for a start up and differentiate between financial, technical analysis and business feasibility.

**Syllabus:**

**Unit-I: Entrepreneurship:** Definition and Concept of entrepreneurship - Entrepreneur Characteristics - Classification of Entrepreneurs - Role of Entrepreneurship in Economic Development - Start-ups.

**Unit-II: Idea Generation and Project Formulation:** Ideas in Entrepreneurships - Sources of New Ideas - Techniques for Generating Ideas - Preparation of Project Report - Contents; Guidelines for

Report preparation - Project Appraisal Techniques - Economic Analysis - Financial Analysis - Market Analysis.

**Unit-III: Institutions Supporting and Taxation Benefits:** Central level Institutions: NABARD; SIDBI, - State Level Institutions - DICs - SFC - Government Policy for MSMEs - Tax Incentives and Concessions.

**Reference Books:**

1. Arya Kumar, Entrepreneurship, Pearson, Delhi
2. Poornima MCH, Entrepreneurship Development - Small Business Enterprises, Pearson, Delhi
3. Sangeetha Sharma, Entrepreneurship Development, PHI Learning
4. Kanishka Bedi, Management and Entrepreneurship, Oxford University Press, Delhi



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2022-23



Life Skill course

B.Sc.

B.Sc./B.Com/B.A

Syllabus under CBCS w.e.f.2020-21

**INFORMATION & COMMUNICATION TECHNOLOGY**

Semester	Course Code	Course Title	Hours	Credits
II	Life skill Course	INFORMATION & COMMUNICATION TECHNOLOGY	30	2

**Objectives:**

This course aims at acquainting the students with basic ICT tools which help them in their day to day and life as well as in office and research.

**Course outcomes:**After completion of the course, student will be able to;

1. Understand the literature of social networks and their properties.
2. Explain which network is suitable for whom.
3. Develop skills to use various social networking sites like twitter, flickr, etc.
4. Learn few GOI digital initiatives in higher education.
5. Apply skills to use online forums, docs, spreadsheets, etc for communication, collaboration and research.
6. Get acquainted with internet threats and security mechanisms.

**SYLLABUS:**

**UNIT-I: (08 hrs)**

Fundamentals of Internet: What is Internet?, Internet applications, Internet Addressing – Entering a Web Site Address, URL–Components of URL, Searching the Internet, Browser –Types of Browsers, Introduction to Social Networking: Twitter, Tumblr, LinkedIn, Facebook, flickr, Skype, yahoo, YouTube, WhatsApp .

**UNIT-II:(08 hrs)**

E-mail: Definition of E-mail -Advantages and Disadvantages –User Ids, Passwords, Email Addresses, Domain Names, Mailers, Message Components, MessageComposition, Mail Management.

**UNIT-III:(10 hrs)**

Overview of Internet security, E-mail threats and secure E-mail, Viruses and antivirus software, Firewalls, Cryptography, Digital signatures, Copyright issues.

What are GOI digital initiatives in higher education? (SWAYAM, SwayamPrabha, National Academic Depository, National Digital Library of India, E-Sodh-Sindhu, Virtual labs, e-acharya, e-Yantra and NPTEL).

**RECOMMENDED CO-CURRICULAR ACTIVITIES: (04 hrs)**

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



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2021-22

**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 GurrarnJashua (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



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2022-23

Life Skill course

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## 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 scatterness 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. Familiarization of the concepts relating to Correlation and Linear Regression line. (8hrs)



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2022-23

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); Adolescent Health- 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 (Water, Sanitation and Hygiene) 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 Mantrivta Abhiyan (PM Suman Yojana), My Hospital (Mera asptaal), 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:

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2022-23

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



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2022-23

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.



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2022-23

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 and Natural 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.



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2022-23

**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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2022-23

**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 advancements in Public Relations
3. Comprehend tools of Public Relations in order 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	Public Relations-Meaning, Definition, Nature and Scope, Historical Background,
06 Hrs	Technological and Media Revolution and Role in Business, Government, Politics, NGOs and Industry.
Unit II	Concepts of Public Relations-Press, Publicity, Lobbying, Propaganda, Advertising,
10 Hrs	Sales Promotion and Corporate Marketing Services, Tools of Public Relations- Press Conferences, Meets, Press Releases, Announcements, Webcasts
Unit III	Public Relations and Mass Media, Present and future of Public Relations in India,
10 Hrs	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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2022-23

**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/organisation – 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



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2022-23

**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 its 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 - Its 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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2022-23

**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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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 to establish 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 structures in 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 and routine 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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2021-22

**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 and Meets and taking notes
5. Assignments, Group discussion, Quiz etc.

**Reference Books:**

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.



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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 in Preparing 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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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 internet about 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 Pragathi pranganam 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.



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**Skill Development Courses**

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**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. Dasaropakaas; Nritha, 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, their nature and significance – Brief introduction to Pagaveshalu, Bommalaatalu, Veedhinaatakalu, Yakshagaanaalu, Harikathalu, Burrakathalu, Oggukathalu, Chindu, Yakshaganam, Kolaatamand Pulivesham.

**Co-curricular Activities Suggested: (4 hrs)**



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**Skill Development Courses**

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**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:**

*After successful 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 – Organisational Hierarchy - 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-curricular Activities (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.



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**Skill Development Courses**

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 AAI (Advertising Agencies Association of India), ASCI (Advertising Standard Council of India)

**UNIT III: 10hrs**

Types of advertising – Basic characteristics of a typical advertisement – 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 books and Websites:**

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



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**Skill Development Courses**

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**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-I: 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**

**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 on solar radiation 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. Designing and constructing photovoltaic system for a domestic house requiring 5kVA power
8. Assignments/Model Exam.



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**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 temperature 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.



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**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:**

After successful 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 an 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 Constraints of Present Dairy Farming and 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 Processing – Ananthakrishnan, C.P., Khan, A.Q. and Padmanabhan, P.N. – Shri Lakshmi Publications.
8. Dairy India 2007, Sixth edition
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>



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**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 Adulteration Methods 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 such as, Agmark, I.S.I. Quality control laboratories of companies, Private testing laboratories, Quality control laboratories of consumer co-operatives.  
Consumer education, Consumer's problems, rights and responsibilities, COPRA 2019 - Offences 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



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2021-22

**Skill Development Courses**

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. Introducing Online classes from NSE
4. Field visit to 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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2022-23

**Skill Development Courses**

B.A., B.COM & B.BA 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, recovery remedial 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, famine and 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 livestock and 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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2022-23

**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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2022-23

**Skill Development Courses**

B.A, B.Com & B.Sc Programmes  
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**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 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-curricular Activities (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. Swarna pradhan.R.M - Retail Management - Tata McGraw Hill



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2022-23

**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.



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2022-23

**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

**POULTRY 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 of layers 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 and rearing. Sexing of chicks.
- 3.3 Farm and Water Hygiene, Recycling of poultry waste.



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2022-23

Core papers

Advance Urdu

PAPER – 1

URDU PROSE

*Afsanavi Adab aur Drama*

UNIT – I	Novel	Taaruf aur Irteqa
UNIT – II	Novel 'Nirmala' by Premchand	
UNIT – III	Afsana	Taaruf aur Irteqa
UNIT – IV	Urdu Afsane edited by Raziya Sajjad Zaheer. The following four short stories only:	
	1. 'Woh' by Balraj Menra 2. 'Computer Ishq' by Joginder Pal 3. 'Lal aur Peela' by K.A.Abbas 4. 'Mom ki Mariyam' by Jeelani Banu	
UNIT – V	Drama 'Darwaze Khol Do' by Krishan Chander	

SUGGESTED READING:

FANNE AFSANA NIGARI – WAQAR AZEEM  
BEESWIN SADI MEIN URDU NOVEL – YOUSUF SARMAST  
URDU DRAMA – ISHRAT RAHMANI



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2022-23

Core papers

Advance Urdu

Core Course Under CBCS  
PAPER – II

URDU PROSE

*Ghair Afsanavi Adab*

UNIT – I SAFARNAMA

*'Bullet Train mein kabhi na baitho'*  
by Mujtaba Hussain

UNIT – II KHAKA – Taaruf aur Irteqa

UNIT – III Khaka – *'Dr. Abdul Haq Marhoom'*  
by Rasheed Ahmed Siddiqui.

UNIT – IV INSHAIYA - Taaruf aur Irteqa

UNIT – V Inshaiya – *'Jheengar ka Janaza'*  
by Khwaja Hasan Nizami

SUGGESTED READING:

URDU MEIN KHAKA NIGARI – SABIRA SAYEED  
URDU SAFARNAMOUN KA TANQEEDI MUTALA – KHALID MAHMOOD  
INSHAIYA AUR INSHAIYE – SYED MOHAMMED HASNAIN



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2022-23

Core papers

Advance 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 isteqlbal 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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2022-23

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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2022-23

Core papers

Advance Urdu

Semester-IV Paper -V

**UNIT –I**

1-Urdu Zuban Ka Agaz-O-Irtakha:

1-1 MiktalifNazriyat-ShokatThanavi-

1-2 Mahamood Khan Shirani

**UNIT– II.**

2- DakniDouar-Ke-Ousivat-Mahammad Quli Qutub Sha

2-1 Mulawajahi

2-2 Nusrathi

**UNIT – III**

3- DabistanaDilhi–Ke-Ousivat-

3-1 Dard

3-2 Zagak

**UNIT – IV**

4-DabistanaLaknow–Ke-Ousivat-

4-1 Attish

4-2 Nasiq

**UNIT –V**

5- SirSayedTaharikKe-Ousivat-

5-1 RumaniTaharik

5-2 TarakhiPasandTaharik

**Prescribed book- TariqeAdabe Urdu by Noorulhasn Naqvi**



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**2022-23**  
**Core papers**  
**Advance Urdu**  
**Semester-V Paper-VI**

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

Domain Subject: SPECIAL URDU  
 IV Year B. A. (Hons) – Semester – V  
 Course6A: اردو میں ذرائع ابلاغ

**Course**

**Code:**

**UrdumeinZarayaIblagh**  
 Mass 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 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)

<b>Unit: 1</b>	ماس میڈیا کی تعریف	
<b>Unit: 2</b>	ماس میڈیا کے اجزائے ترکیبی	
<b>Unit: 3</b>	ماس میڈیا کے اقسام	
<b>Unit: 4</b>	ماس میڈیا کی آزادی کے مثبت اور منفی اثرات	
<b>Unit: 5</b>	ہندوستانی معاشرے میں پرنٹ میڈیا اور الیکٹرانک میڈیا کا رول اور ذمہ داریاں	
<b>III. References:</b>	معاون کتابیں	
اشفاق محمدخان	عوامی ذرائع ترسیل و ابلاغ	1
دیوندراسر	عوامی ترسیل	2
محمدشابد حسین	اپلاغیات	3
مہدی حس	جدید ابلاغ	4



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2022-23

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 بعد 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	اپلاغیاں	3
محمد عتیق صدیقی	ہندستانی اخبار نویسی	4
مسکین علی حجازی	فن ادارت	5
شافع قدوائی	خبر نگاری	6
امداد صابری	تاریخ صحافت	7



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2022-23

Core papers  
Political Science

**SYLLABUS**  
**B.A. POLITICAL SCIENCE**  
**FIRST YEAR**  
**FIRST SEMESTER**  
(Under CBCS w.e.f. 2020-21)

**Course-1: INTRODUCTION TO POLITICAL SCIENCE**

**Learning Outcomes:**

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

- Recall the previous knowledge about Political Science and understand the nature and scope, traditional and modern approaches of Political Science.
- Understand concepts intrinsic to the study of Political Science.
- Have solid theoretical understanding of Rights and its theories along with the basic aspects of certain political ideologies.
- Apply the knowledge to observe the field level phenomena

<b>UNIT-I :</b>	<b>INTRODUCTION</b>
	1. Definition, Nature, Scope and Importance of Political Science – Relations with allied disciplines (History, Economics, Philosophy and Sociology)
	2. Approaches to the study of Political Science: Traditional Approaches-Philosophical, Historical. Modern Approaches-Behavioral and System Approach.

<b>UNIT-II :</b>	<b>STATE</b>
	1. Definition of the State, Elements of the State, Theories of Origin of the State-(Divine Origin, Force, Evolutionary and Social Contract).
	2. Concepts of Modern State and Welfare State.

<b>UNIT-III :</b>	<b>CONCEPTS OF POLITICAL SCIENCE</b>
	1. Law, Liberty, Equality.
	2. Power, Authority and Legitimacy.

<b>UNIT-IV :</b>	<b>THEORIES OF RIGHTS</b>
	1. Meaning, Nature and Classification of Rights
	2. Theories of Rights.

<b>UNIT-V :</b>	<b>POLITICAL IDEOLOGIES</b>
	1. Liberalism, Individualism, Anarchism.
	2. Socialism, Marxism and Multiculturalism.



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2022-23

apers

Political Science

B.A. POLITICAL SCIENCE

FIRST YEAR

SECOND SEMESTER

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

**Course-2: BASIC ORGANS OF THE GOVERNMENT**

**Learning Outcomes:**

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

- Understand the Origin and Evolution of the concept of Constitutionalism and classification of Constitutions.
- Acquaint themselves with different theories of origin of State.
- Understand and analyses organs and forms of Governments along with a deep insight into the various agents involved in the political process.
- Apply the knowledge to analyse and evaluate the existing systems

<b>UNIT-I :</b>	<b>CONSTITUTION</b>
	1. Meaning, Definition, Origin and Evolution of Constitution.
	2. Classification of the Constitutions-Written and Unwritten; Rigid and Flexible.

<b>UNIT-II :</b>	<b>ORGANS OF THE GOVERNMENT</b>
	1. Theory of Separation of Powers-B.D.Montesquieu.
	2. Legislature-Unicameral and Bicameral-Power and Functions, Executive-Types,Powers and Functions.
	Judiciary-Powers and Functions.

<b>UNIT-III :</b>	<b>FORMS OF GOVERNMENT</b>
	1. Unitary and Federal forms of Governments-Merits and Demerits.
	2. Parliamentary and Presidential forms of Governments- Merits and Demerits.

<b>UNIT-IV :</b>	<b>DEMOCRACY</b>
	1. Meaning, Definition, Significance, Theories and Principles of Democracy.
	2. Types of Democracy: Direct and Indirect Democracy-Methods, Merits and Demerits-Essential Conditions for Success of Democracy.

<b>UNIT-V :</b>	<b>POLITICAL PARTIES, PRESSURE GROUPS AND PUBLIC OPINION</b>
	1. Meaning, Definition and Classification of Political Parties: National and Regional-Functions of Political Parties.
	2. Pressure Groups (Interest Groups)- Meaning, Definition, Types, Functions and Significance of Public Opinion.



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Affiliated to Yogi Vemana University



2022-23

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 in terms 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.

<b>UNIT-I :</b>	<b>SOCIAL AND IDEOLOGICAL BASE OF THE INDIAN CONSTITUTION</b>
	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.

<b>UNIT-II :</b>	<b>INDIVIDUAL AND STATE</b>
	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.

<b>UNIT-III :</b>	<b>UNION EXECUTIVE</b>
	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

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

<b>UNIT-V :</b>	<b>THE INDIAN JUDICIARY</b>
	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.



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2022-23

Core papers  
Political Science

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

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

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



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2022-23

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

<b>UNIT-I :</b>	<b>ANCIENT GREEK POLITICAL THOUGHT</b>
	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.

<b>UNIT-II :</b>	<b>MEDIEVAL AND MODERN POLITICAL THOUGHT</b>
	1. St. Augustine-Theory of Two Cities.
	2. Niccolò Machiavelli-State and Statecraft.

<b>UNIT-III :</b>	<b>CONTRACTUAL POLITICAL THOUGHT</b>
	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
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<b>UNIT-IV :</b>	<b>UTILITARIAN POLITICAL THOUGHT</b>
	1. Jermy Bentham-Theory of Utility, Law and Reforms.
	2. J.S.Mill-Theory of Liberty and Representative Government.

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



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2022-23

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.



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2022-23

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.



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2022-23

Core papers

Economics

**SEMESTER – I :: COURSE - I**  
**MICRO ECONOMIC ANALYSIS**

**Module-1: Economic Analysis and Methodology**

Scarcity and Choice as fundamental problems of economics - Production Possibilities Curve - Micro and Macro Analysis - Micro economic analysis – Scope and Importance – inductive and deductive methods- Principles of Microeconomics : Allocation of Resources - Optimization, Equilibrium and Marginal analysis -Rationality Principle the concept of Welfare.

**Module -2: Theory of Consumption**

Concept of Demand -Factors determining demand - Law of Demand - reasons and exceptions - Elasticity of Demand -Cardinal and Ordinal utility - Indifference Curve analysis : Properties of Indifference curves, Indifference Curve Map -Marginal Rate of Substitution - Budget Line - Changes -Consumer Equilibrium under Indifference Curve Analysis – Consumers' Surplus.

**Module -3: Theory of Production**

Concept and Objectives of Firm - Production Function: Cobb- Douglas Production Function -Law of Variable Proportions -Laws of Returns to Scale - Economies of large scale - Concepts of Cost - Total, Average and Marginal Costs - Law of Supply - Concept of Revenue : Total, Average and Marginal Revenues - Relation between Average and Marginal Revenues and elasticity of Supply

**Module-4: Theory of Exchange**

Concepts of Market: Criteria for Classification of Markets - Perfect Competition– Conditions, Price and Output determination ; Monopoly : Conditions, Price and Output Determination - Price Discrimination; Monopolistic Competition - Assumptions - Price and output determination - Selling Costs ; Oligopoly -Types- Kinky demand curve and Price rigidity.

**Module - 5:**

**Theory of Distribution The concepts of Functional and Personal Distribution of Income - Marginal Productivity Theory of Distribution - Modern Theory of Distribution -Concept of Rent - Ricardian Theory of Rent – Marshall's concepts of Economic Rent and Quasi Rent; Theories of Wage Determination: Subsistence Theory and Standard of Living Theory - Modern Theory of Wages; Classical Theory of Interest - Loanable Funds Theory of Interest -Liquidity Preference Theory of Interest; Theories of Profit: Risk and Uncertainty, Dynamic and Innovations Theories**



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2022-23

Core papers

Economics

SEMESTER – 2:: COURSE –2

**MACROECONOMIC ANALYSIS**

**Module - 1: National Income**

Macroeconomics - Definition, Scope and Importance - Difference between Micro economic and Macro economic Analyses – Circular Flow of Income -National Income: Definitions, Concepts, Measurement of National Income - Difficulties - Importance - Concept of Green Accounting

**Module -2: Theory of Employment**

Classical Theory of Employment - Say's Law of Markets - Criticism -Keynesian Theory of Employment - Applicability to Developing countries- Consumption Function - Keynes' Psychological Law of Consumption - Average and Marginal Propensity to Consume - Factors determining Consumption Function - Brief Review of Relative, Life Cycle and Permanent Income Hypotheses- Investment Function: Marginal Efficiency of Capital -Multiplier and Accelerator.

**Module – 3: Money and Banking**

Definitions of Money - Concepts of Money, Liquidity and Finance - Money Illusion - Gresham's Law - RBI classification of Money - Theories of Money: Fisher and Cambridge (Marshall, Pigou, Robertson and Keynes equations) - Banking - Definition and types of Banking - Commercial Banks - Functions -Recent Trends in Banking - Mergers and Acquisitions - Central Bank - Functions - Control of Credit by Central Bank - NBFCs- Factors contributing to their Growth and their Role

#### **Module – 4: Inflation and Trade Cycles**

Inflation: Concepts of Inflation, deflation, reflation and stagflation - Phillip's Curve - Measurement of Inflation - CPI and WPI -Types of Inflation - Causes and Consequences of Inflation -Measures to Control Inflation. Trade Cycles: Phases of a Trade Cycle -Causes and Measures to control Trade Cycles

#### **Module -5: Finance and Insurance**

Financial Assets and Financial Instruments - Financial Markets - Functions of Money Market - Functions of Capital Market - Stock Market - Exchanges – Indices: Sensex and Nifty - Concept of Insurance -Types and Importance of Insurance.

#### **Reference Books:**

1. Dillard. D., *The Economics of John Maynard Keynes*, Cross by Lockwood and sons, London
2. M. C. Vaish - *Macroeconomic Theory*, Vikas Publishing House, New Delhi.
3. S. B Guptha - *Monetary Economics*, S. Chand & Co, Delhi
4. P. N. Chopra, *Macroeconomics*, Kalyani Publishers, Ludhiana, 2014
5. D. M. Mithani, *Macro Economic Analysis and Policy*, Oxford and IBH,



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2022-23

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



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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/NITI Ayog 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 –4 Indian Public Finance**

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

**Module- 5 Andhra 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.



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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 – Laspeyres's, Paasche's and Fisher's Ideal Index Numbers – Uses  
and Limitations of Index Numbers.



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2022-23

Core papers

B. A. ECONOMICS

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

Semester – V

**Paper-VI: Syllabus**

## Rural Entrepreneurship

Unit -1: Entrepreneurship: Concept and Theories

Concept and Importance of Entrepreneurship-

Theories of Entrepreneurship: Innovations, Risk Bearing-

Qualities and Functions of an Entrepreneur – Women Entrepreneurship.

Unit -2: Rural Entrepreneurship, Business Planning and Agribusiness

Rural Entrepreneurial Ecosystem – Factors, Problems and Challenges of Rural Entrepreneurship

Unit-3: New Rural Entrepreneurship Opportunities

New Entrepreneurship Opportunities in Farm sector: Organic Farm Products, Nutri-

Cereals, Horticultural Products, Forest Produce, Medicinal Plant Products - New

Entrepreneurship Opportunities in Rural Non-

farm sector: Poultry, Aquaculture, Sericulture, Honeybee, Mushrooms Cultivation, Handicrafts.

Unit -4: Financing and Marketing for Rural Entrepreneurship

Financing the Rural Entrepreneurship: Procedures to obtain formal loans from banks

and other institutions - Preparation of Detailed Project Report for Loan-

New avenues of Finance: Crowd Funding and Venture Capital-

Marketing of Rural Products: Market Survey, Demand Forecasting, Marketing Strategies, Branding, Planning and Promotion, Digital and Social Media Marketing.

**Unit - 5: Institutional Support and Case Studies of Rural**

**Entrepreneurship** Institutional Support for Rural Entrepreneurship-

Special Role of NABARD in promoting and supporting the Rural Entrepreneurship-

Government Schemes for promotion of Rural

Entrepreneurship– Rules and Procedures to start a Rural Entrepreneurship Firm –  
Discussion of two different types of Case Studies related to Rural Entrepreneurship with  
local relevance.

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WOMEN(A),KADAPADEPARTMENTOF

ECONOMICS

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

**FarmerProducerOrganizations(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,DigitalandSocialMediaMar  
keting.

Unit5: InstitutionalSupport andCaseStudiesofFPOs

InstitutionalSupportandResourceSupportingAgenciesforFPOs-  
SpecialRolesofNABARDandSFAC–Government SchemesforpromotionofFPOs-  
DiscussionoftwoimportantCaseStudiesrelatedtoFPOswithdifferentproductorprocesstypesofloc  
alrelevance.



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2022-23

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 Year B. A. –Semester – I

**Course1: ANCIENT INDIAN HISTORY & CULTURE (from Indus Valley Civilization to 13<sup>th</sup> Cen A.D)**

**Learning Outcomes:**

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

- Identify and define various kinds of sources and understand how history books are shaped
- Compare and contrast various stages of progress from IVC to Vedic age and analyze the Jain, Buddhist and Vedic faiths
- Increase the awareness and appreciation of Transition from Territorial States to Emergence of Empires
- Analyze the emergence of the Mauryan and Gupta empires during the “classical age” in India
- Evaluate the key facets of ancient society, polity and culture in South India—the feudalism, and the rise of technology and commerce.
- Critically examine the nature of monarchic rule and develop an comprehensive

**Syllabus:**

- Unit - 1 Ancient Indian Civilization (from Circa 3000 BC to 6<sup>th</sup> BC): Indus Valley Civilization - Salient Features; Vedic Age - Society, Polity, Economy, Culture during early and later Vedic period
- Unit - II Ancient Indian History & Culture (6<sup>th</sup> Century BC to 2<sup>nd</sup> Century AD): Doctrines and Impact of Jainism and Buddhism; Mauryan Administration, Society, Economy & Culture - Ashoka's Dhamma; Kanishka's Contribution to Indian Culture
- Unit - III History & Culture of South India (2<sup>nd</sup> Century BC to 8<sup>th</sup> Century AD): Sangam Literature; Administration, Society, Economy and Culture under Satavahanas; Cultural contribution of Pallavas
- Unit - IV India from 3<sup>rd</sup> century AD to 8<sup>th</sup> century AD: Administration, Society, Economy, Religion, Art, Literature and Science & Technology under Guptas – Samudragupta; Cultural contribution of Harsha: Arab Conquest of Sind and its Impact
- Unit - V History and Culture of South India (9<sup>th</sup> century AD to 13<sup>th</sup> century AD): Local Self Government of Cholas; Administration, Society, Economy and Culture under Kakatiyas – Rudram Devi



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2022-23

## Core papers

### History

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#### **PROGRAMME: THREE-YEAR B.A.**

(With History, Economics and Political Science Disciplines)

**Course Code:**

#### **Domain Subject: History**

Semester-wise Syllabus under CBCS

I Year B. A. – Semester – II

#### **Course 2: MEDIEVAL INDIAN HISTORY & CULTURE (1206 A.D to 1757 A.D)**

#### **Learning Outcomes:**

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

- Understand the socio, economic and cultural conditions of medieval India
- Describe the advent of Islam in India and study the traces of political and cultural expansion of Turks & Afghans
- Explain the Administration and art and architecture of Vijayanagar Rulers, Mughals and also analyse the rise of the Marathas and the contribution of Shivaji
- Evaluate the establishment of the British rule in India and understand the dangerous consequences disunity at all levels
- Analyze the emergence of composite culture in Indian
- Visualize where places are in relation to one another through map pointing

#### **Syllabus:**

Unit - 1 Impact of Turkish Invasions – Balban, Allauddhin Khilji, Md. Bin Tughlaq - Administration, Society, Economy, Religion and Cultural developments under Delhi Sultanate (from 1206 to 1526 AD)

Unit - II Impact of Islam on Indian Society and Culture – Bhakti Movement;  
Administration, Society, Economy, Religion and Cultural developments under

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Unit - III Emergence of Mughal Empire – Babur – Sur Interregnum - Expansion &  
Consolidation of Mughal Empire – Akbar, Jahangir, Shah Jahan, Aurangzeb

Unit - IV Administration, Economy, Society and Cultural Developments under the Mughals  
– Disintegration of Mughal Empire - Rise of Marathas under Shivaji

Unit - V Beginning of European Settlements - Anglo- French Struggle.



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Affiliated to Yogi Vemana University

2022-23

Core papers

History

II Year BA -Semester-III



1. Unit 1: A – Overview – III

**Course 3: MODERN INDIAN 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 - I 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

Unit - II Social, Religious & Self-Respect Movements – Raja Rammohan Roy, Dayananda Saraswathi, Swami Vivekananda, Jyotiba Phule, Narayana Guru,

Unit - III Causes for the growth of Nationalism - Freedom Struggle from 1885 to 1920:

III Moderate Phase — Militant Phase: Vande Mataram 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 – Sardar Vallabhai Patel



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2022-23

Core papers

History

**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 16<sup>th</sup> & 19<sup>th</sup> 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 Ceded 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: KandukuriVeerasingam, RaghupathiVenkataRathnam Naidu, GuruzadaApparao, KomarrajuVenkataLaxmana Rao; New Literary Movements: RayaproluSubbarao, ViswanathaSathyanarayana, GurrarnJashua, 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



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2022-23

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 15<sup>th</sup> 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 - I 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



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2022-23

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

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.



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2022-23

Core papers

Computer Application

**B.Sc Computer Applications & B. A. Computer Applications  
w.e.f. 2020-21**

**COMPUTER FUNDAMENTALS AND OFFICE TOOLS**

Semester	CourseCode	CourseTitle	Hours	Credits
I	C1	COMPUTER FUNDAMENTALS AND OFFICE TOOLS	60	3

**Course Objectives:**

To introduce the fundamental concepts of Computers, Hardware, Software and able to interact with documentation, Powerpoint, and Spreadsheet.

**Course Outcomes:**

1. To learn about Basics of Computers
2. To learn about basics of Hardware Components
3. To learn about basics of Operating System Software
4. To learn about basics of Application System Software
5. To practice handful exercises on Documentation, Spreadsheet, Presentation

**Unit-I: Basics of Computers :**Definition of a Computer - Characteristics and Applications of Computers – Block Diagram of a Digital Computer – Classification of Computers based on size and working – Central Processing Unit – I/O Devices.

**Unit-II:** Primary, Auxiliary and Cache Memory – Memory Devices. Software, Hardware, Firmware and People ware – Definition and Types of Operating System – Functions of an Operating System – MS-DOS – MS Windows – Desktop, Computer, Documents, Pictures, Music, Videos, Recycle Bin, Task Bar – Control Panel.

**Unit-III: MS-Word:** Features of MS-Word – MS-Word Window Components – Creating, Editing, Formatting and Printing of Documents – Headers and Footers – Insert/Draw Tables, Table Auto format –Page Borders and Shading – Inserting Symbols, Shapes, Word Art, Page Numbers, Equations – Spelling and Grammar – Thesaurus – Mail Merge.

**Unit-IV: MS-PowerPoint:** Features of PowerPoint – Creating a Blank Presentation - Creating a Presentation using a Template - Inserting and Deleting Slides in a Presentation – Adding Clip Art/Pictures -Inserting Other Objects, Audio, Video - Resizing and Scaling of an Object – Slide Transition – Custom Animation.

**Unit-V: MS-Excel:** Overview of Excel features – Creating a new worksheet, Selecting cells, Entering and editing Text, Numbers, Formulae, Referencing cells – Inserting Rows/Columns –Changing column widths and row heights, auto format, changing font sizes, colors, shading.



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2022-23  
Core papers  
Computer Application

Programming in C

Semester	CourseCode	CourseTitle	Hours	Credits
II	C2	Programming in C	60	3

**CourseObjective:**

This course aims to provide exposure to problem-solving through programming. It introduces the concepts of the C Programming language.

**CourseLearningOutcomes:**

On completing the subject, students will be able to:

1. Analyze a given problem and develop an algorithm to solve the problem.
2. Understand tokens and control structures in C.
3. Understand arrays and strings and implement them.
4. Understand the right way of using functions, pointers, structures and unions in C
5. Develop and test programs written in C.

**UNIT - I:**

**12 Hrs**

**Introduction to Algorithms** :Algorithm - Key features of Algorithms - examples of Algorithms , Flow Charts.

**Introduction to C** : Structure of C Program , Writing the first C Program , Files 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 , Type Conversion and Type Casting.

**UNIT - II:**

**16 Hrs**

**Decision Control and Looping Statements:** Introduction to Decision Control Statements , Conditional Branching Statements, Iterative Statements , Nested Loops , Break and Continue Statement, Goto Statement.

**Functions** : Introduction, using functions – Function declaration/ prototype – Function definition function call – return statement – Passing parameters , Recursive functions .

**UNIT - III:**

**16 Hrs**

**Arrays:** Introduction, Declaration of Arrays , Accessing elements of the Array – Storing Values in Array, One dimensional array -declaration,initialization,Accessing one dimensional array,Passing one dimensional array to function, Two dimensional Arrays-

declaration, initialization, Accessing two dimensional arrays, passing two dimensional arrays to functions.

**Strings:** Introduction , String and Character functions, String Operations using String functions- strcat() , strcmp() , strcpy() , strlen().

#### UNIT - IV:

8 Hrs

**Pointers:** declaring Pointer Variable, Pointer Expressions and Pointer Arithmetic , Passing Arguments to Functions using Pointers, Memory Allocation in C Programs, Drawbacks of Pointers.

#### UNIT - V:

8 Hrs

**Structures:** Introduction to structures, Arrays of Structures, Nested Structures .

**Union, and Enumerated Data Types:** Introduction to Union – accessing union elements , Enumerated Data Types.

#### TEXT BOOKS:

1. Computer Fundamentals and Programming in C by REEMA THAREJA from OXFORD UNIVERSITY PRESS



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**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 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 database using ER Diagrams and design database schemas based on the model.
5. Create a small database using SQL.

**UNIT I**

**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,

**UNIT II**

**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.

### UNIT III

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

### UNIT IV

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

### UNIT V

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" AtulKahate PEARSON 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. "Principles 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



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2022-23

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 completing the 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)



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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:**

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

**Unit-I: Introduction to HTML:**

10

hours

Introduction to HTML, Basic html, Document bodytext, Hyperlinks, Adding more 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

MySQL Versus 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.

**Prescribed Books:**

1. Chris Bates, Web Programming Building Internet Application, Second Edition, Wiley (2007)
2. HeadFirst Servlets and JSP 2<sup>nd</sup> Edition, Bryan Basham, Kathy Sierra
3. Uttam Kumar Roy, Web Technologies from Oxford University Press
3. Julie C. Meloni, PHP MySQL and Apache, SAMSTeachyourself, Pearson Education (2007).
4. Xue Bai Michael Ekedahl, The web warrior guide to Web Programming, 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



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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



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2022-23

Core papers

Computer Application

BCOMCA/BA HECA & BA HUCA 5<sup>th</sup> 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>



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Core papers  
Special English

Semester-1

Paper I – Language and Literature I

Unit 1

1. Brief Survey of the English Language, word Formation, Influences (Latin, French & Scandinavian)
2. Understanding Comprehension
  - A. Of a Literary Prose Passage
  - B. Of a Poem

Unit 2

1. Forms of Poetry
2. Sonnet: On His having arrived at the age of twenty three – John Milton
3. Ode: Ode to the west wind – P. B. Shelley
4. Elegy: Elegy written in a country churchyard – Thomas Gray
5. Ballad: The Solitary Reaper – William Wordsworth

Unit 3

1. Knowledge and Wisdom – Bertrand Russell
2. Florence Nightingale – Lytton Strachey

Unit 4 – Elements / Fiction

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Core papers  
Special English  
Semester-II

Paper II - Language and Literature II

Unit 1

1. Methods of word Formation
2. Semantics

Unit 2

1. Allegory
2. Masque
3. Metaphor
4. Hyperbole
5. Personification
6. Irony
7. Farce
8. Simile

Unit 3

Drama: Macbeth - William Shakespeare

Unit 4

1. Paradise Lost Book II - John Milton
2. The Canonization - John Donne



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2022-23

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 (17<sup>th</sup> and 18<sup>th</sup> 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



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2022-23

Core papers  
Special English  
Semester IV

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



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2022-23

Core papers

Special English

Semester IV



Paper V - An Outline of 20<sup>th</sup> Century Literature

Unit 1

1. History of English Literature
2. Literature in English in 20<sup>th</sup> 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



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2022-23

Core papers  
Special English  
Semester V

REVISOR (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)



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2022-23

Core papers  
Special English  
Semester-V

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>



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2022-23

Core papers

**Computer Application**

Semester-wise Syllabus under CBCS(w.e.f. 2020-21 Admitted Batch)

**I Year B Com (CA), Semester- I**

**Discipline: COMPUTER APPLICATIONS**

**Course 1C: Information Technology**

Semester	CourseCode	CourseTitle	Hours	Credits
<b>I</b>	<b>1C</b>	<b>Information Technology</b>	<b>60</b>	<b>3</b>

**Course 1C :Information Technology**

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

Unit	Details
<b>I Introduction:</b>	Computer Definition - Characteristics and Limitations of Computer— Generations of Computer, Classification of Computers, Applications of Computer, Basic Components of PC, Computer Architecture - Primary and Secondary Memories- Input and Output Devices- Operating System- Function of Operating System- Types of Operating System- Languages and its Types
<b>II MS word:</b>	Word Processing – Features-Advantages and Applications- Parts of Word Window- Toolbar-Creating, Saving, Closing, Opening and Editing of a Document-Moving and Copying a Text-Formatting of Text and Paragraph- Bullets and Numbering-Find and Replace - Insertion of objects-Headers and Footers- Page Formatting- Auto Correct- Spelling and Grammar- Mail Merge- Macros
<b>III MS Excel:</b>	Features – Spread Sheet-Workbook – Cell-Parts of a window-Saving, Closing, Opening of a Work Book – Editing – Advantages – Formulas- Types of Function- Templates – Macros – Sorting- Charts – Filtering.
<b>IV MS Power point:</b>	Introduction – Starting – Parts-Creating of Tables- Create Presentation – Templates- Auto Content Wizard-Slide Show-Editing of Presentation-Inserting Objects and charts
<b>V MS Access:</b>	Orientation to Microsoft Access - Create a Simple Access Database - Working with Table Data - Modify Table Data - Sort and Filter Records - Querying a Database -  Create Basic Queries - Sort and Filter Data in a Query - Perform Calculations in a Query - Create Basic Access Forms - Work with Data on Access Forms - Create a Report - Add Controls to a Report - Format Reports



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2022-23  
Core papers  
Computer Application

**Course 2C: E- Commerce & Web Designing**

Semester	CourseCode	CourseTitle	Hours	Credits
II	2C	E-Commerce & Web Designing	60	3

Unit	Details
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- I Unit I: Introduction:**  
Meaning, Nature, Concepts, Advantages, Disadvantages and reasons for Transacting Online, Types of E-Commerce, e-commerce Business Models (Introduction , Key Elements of a Business Model And Categorizing Major E-Commerce Business Models), Forces Behind e-commerce.  
**Technology used in E-commerce:** The dynamics of World Wide Web and Internet (Meaning, EvolutionAnd Features); Designing, Building and Launching e-commerce website (A systematic approach involving decisions regarding selection of hardware, software, outsourcing Vs. in-house development of a website)
- II Unit-II: E-payment System:**  
Models and methods of e-payments (Debit Card, Credit Card, Smart Cards, e-money), Digital Signatures (Procedure, Working And Legal Position), Payment Gateways, Online Banking (Meaning, Concepts, Importance, Electronic Fund Transfer, Automated Clearing House, Automated Ledger Posting), Risks Involved in e-payments.
- III Unit-III: On-line Business Transactions:**  
Meaning, Purpose, Advantages and Disadvantages of Transacting Online, E-Commerce Applications in Various Industries Like {Banking, Insurance, Payment of Utility Bills, Online Marketing, E-Tailing (Popularity, Benefits, Problems and Features), Online Services (Financial, Travel and Career), Auctions, Online Portal, Online Learning, Publishing and Entertainment} Online Shopping (Amazon, Snap Deal, Alibaba, Flipkart, etc.)
- IV Unit-IV: Website designing**  
Designing a home page, HTML document, Anchor tag Hyperlinks, Head and body section, Header Section, Title, Prologue, Links, Colorful Pages, Comment, Body Section, Heading Horizontal Ruler, Paragraph, Tabs, Images And Pictures, Lists and Their Types, Nested Lists, Table Handling.
- V Unit V: Advanced Website Designing:**  
Frames: Frameset Definition, Frame Definition, Nested Framesets, Forms and Form Elements. DHTML and Style Sheets: Defining Styles, elements of Styles, linking a style sheet to a HTML Document, Inline Styles, External Style Sheets, Internal Style Sheets & Multiple Style Sheets.



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### 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
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#### **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



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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 completing the 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.



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2022-23

Core papers

Computer Application

### Course 4F:Database Management System

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

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

### Course 4F: Database Management System

Unit	Details
<b>I</b>	<b>Overview of Database Management System</b> Introduction, Data and Information, Database, Database Management System, Objectives of DBMS, Evolution of Database Management System, Classification of Database Management System.
<b>II</b>	<b>File-Based System</b> 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.
<b>III</b>	<b>Entity-Relationship Model:</b> 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.
<b>IV</b>	<b>Structured Query Language</b> 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.
<b>V</b>	<b>PL/SQL:</b> 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.



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**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



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**BCOMCA/BA HECA & BA HUCA 5<sup>th</sup> 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| Niranjani 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.



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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)

I Year B Com (Gen & CA)–Semester – I

**Course1A: Fundamentals of Accounting**

**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.
- Analyze the difference between cash book and pass book in terms of balance and make reconciliation.
- Critically examine the balance sheets of a sole trader for different accounting periods.
- Design new accounting formulas & principles for business organisations.

**Syllabus:**

**Unit-I – Introduction**

Need for Accounting – Definition – Objectives, – Accounting Concepts and Conventions – GAAP - Accounting Cycle - Classification of Accounts and its Rules – BookKeeping and Accounting - Double Entry Book-Keeping - Journalizing - Posting to Ledgers, Balancing of Ledger Accounts (including Problems).

**Unit-II: Subsidiary Books:**

Types of Subsidiary Books - Cash Book, Three-column Cash Book- Petty Cash Book (including Problems).

**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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2022-23  
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 – I

**Course 1B: Business Organization and Management**

**Learning Outcomes:**

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

- Understand different forms of business organizations.
- Comprehend the nature of Joint Stock Company and formalities to promote a Company.
- Describe the Social Responsibility of Business towards the society.
- Critically examine the various organizations of the business firms and judge the best among them.
- Design and plan to register a business firm. Prepare different documents to register a company at his own.
- Articulate new models of business organizations.

**Syllabus:**

**Unit-I –Introduction Concepts of Business, Trade, Industry and Commerce:** Business – Meaning, Definition, Features and Functions of Business - Trade Classification – Aids to Trade – Industry Classification and Commerce - Factors Influencing the Choice of Suitable form of Organisation

**Unit –II– Forms of Business Organizations:** Features, Merits and Demerits of Sole Proprietor Ship and Partnership Business - Features Merits and Demerits of Joint Stock Companies - Public Sector Enterprises (PSEs) - Multinational Corporations (MNCs)- Differences between Private Limited Public Limited Company

**Unit-III -Company Incorporation:** Preparation of Important Documents for Incorporation of Company - Certificate of Incorporation and Certificate of Commencement of Business - Contents of Memorandum and Articles of Association - Contents of Prospectus

**Unit-IV- Management:** Meaning Characteristics - Fayol's 14 Principles of Management - Administration Vs Management - Levels of Management

**Unit-V-Functions of Management:** Different Functions of Management - Meaning – Definition – Characteristics Merits and Demits of Planning - Principles of Organisation – Line and staff of Organisation



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Semester-wise Syllabus under CBCS

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

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

**Course 1C: Business Environment**

**Learning Outcomes:**

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

- Understand the concept of business environment.
- Define Internal and External elements affecting business environment.
- Explain the economic trends and its effect on Government policies.
- Critically examine the recent developments in economic and business policies of the Government.
- Evaluate and judge the best business policies in Indian business environment.
- Develop the new ideas for creating good business environment.

**SYLLABUS:**

**Unit-I: Overview of Business Environment:** Business Environment – Meaning – Characteristics – Scope -Macro and Micro Dimensions of Business Environment - Environmental Analysis.

**Unit – II: Economic Environment:** Economic Environment – Nature of the Economy – Structure of Economy – Economic Policies & Planning the Economic Condition – NITI Ayog – National Development Council – Five Year Plans

**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



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

**Course 2A: Financial Accounting**

**Learning Outcomes:**

At the end of the course the student will be 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:** 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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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 firms behaviour.
- 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



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I Year B Com (Gen)– Semester – II

**Course 2C:Banking Theory and Practice**

**Learning Outcomes:**

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

- Understand the basic concepts of banks and functions of commercial banks.
- Demonstrate an awareness of law and practice in a banking context.
- Engage in critical analysis of the practice of banking law.
- Organize information as it relates to the regulation of banking products and services.
- Critically examine the current scenario of Indian Banking system.
- Formulate the procedure for better service to the customers from various banking innovations.

**Syllabus:**

**Unit-I: Introduction:**

Meaning & Definition of Bank – Functions of Commercial Banks – Credit Creation with Examples - Kinds of Banks – Central Banking Vs. Commercial Banking.

**Unit-II: Banking Systems:**

Unit Banking, Branch Banking, Investment Banking - Innovations in Banking – E banking - Online and Offshore Banking, Internet Banking - Anywhere Banking - ATMs – RTGS-NEFT – Mobile Banking

**Unit-III: Types of Banks:**

Indigenous Banking - Cooperative Banks, Regional Rural Banks, SIDBI, NABARD - EXIM bank

**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.



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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 the concept 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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Semester-wise Syllabus under CBCS

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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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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 behaviour and market segmentation process.
- Comprehend the 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



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(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.
- Demonstrate the procedure 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 of well-reasoned arguments and reaching better conclusions.
- Communicate accounting policy choices with 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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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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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, Residential Status of Individual - Incidence of Tax – Incomes Exempt 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-III: 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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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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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 and Reappointment – Rights, Duties, Liabilities and Disqualifications - Audit Report: Contents –Preparation - Relevant Provisions of Companies Act, 2013.



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II Year B Com (Gen)– Semester – IV

**Course 4F: Goods and Service Taxes**

**Learning Outcomes:**

At the end of the course, the student will be 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



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2022-23

**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, Training 10, 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



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2022-23

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, Training 10, 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



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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



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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 e-commerce
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 on e-commerce activities

**II. Syllabus Total 75hrs (Teaching 60, Training 10 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 e-commerce – 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, Flipkart, 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. Whiteley 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**

1. P. ...



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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 Chartered Accountants for filing returns
- file returns of Income Tax and GST

**II. Syllabus:** Total 75hrs (Teaching 60, Training 10, 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 Companies ITR5, 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 e filing 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](http://www.incometaxindiafiling.gov.in)
5. [www.taxguru.in](http://www.taxguru.in) 6. [www.bharatlaws.com](http://www.bharatlaws.com)
7. [www.cbic-gst.gov.in](http://www.cbic-gst.gov.in) 8. [www.taxmann.com](http://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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2022-23

Core papers

B.A/B.Sc., STATISTICS (WM) CBCS REVISED SYLLABUS 2020-21  
Semester – I (CBCS With Maths Combination Common to BA/BSc)  
**Paper - I: Descriptive Statistics**

**UNIT-I**

**Introduction to Statistics:** Importance of Statistics. Scope of Statistics in different fields. Concepts of primary and secondary data. Diagrammatic and graphical representation of data: Histogram, frequency polygon, Ogives, Pie. Measures of Central Tendency: Mean, Median, Mode, Geometric Mean and Harmonic Mean. Median and Mode through graph.

**UNIT-II**

**Measures of Dispersion:** Range, Quartile Deviation, Mean Deviation and Standard Deviation, Variance. Central and Non-Central moments and their interrelationship. Sheppard's correction for moments. Skewness and kurtosis.

**UNIT-III**

**Curve fitting:** Bi- variate data, Principle of least squares, fitting of degree polynomial. Fitting of straight line, Fitting of Second degree polynomial or parabola, Fitting of power curve and exponential curves.

**Correlation:** Meaning, Types of Correlation, Measures of Correlation: Scatter diagram, Karl Pearson's Coefficient of Correlation, Rank Correlation Coefficient (with and without ties), Bi-variate frequency distribution, correlation coefficient for bi-variate data and simple problems. Concept of multiple and partial correlation coefficients (three variables only) and properties

**UNIT-IV**

**Regression :** Concept of Regression, Linear Regression: Regression lines, Regression coefficients and its properties, Regressions lines for bi-variate data and simple problems. Correlation vs regression.

**UNIT-V**

**Attributes :** Notations, Class, Order of class frequencies, Ultimate class frequencies, Consistency of data, Conditions for consistency of data for 2 and 3 attributes only, Independence of attributes, Association of attributes and its measures, Relationship between association and colligation of attributes, Contingency table: Square contingency, Mean square contingency, Coefficient of mean square contingency, Tschuprow's coefficient of contingency.

**Text Books:**

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand &



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2022-23

**Core papers**

**B.A/B.Sc., STATISTICS (WM) CBCS REVISED SYLLABUS 2020-21**

Semester – II (CBCS With Maths Combination Common to BA/BSc)

Paper - II: **Probability Theory and Distributions**

**UNIT-I**

**Introduction to 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. Boole's inequality and Baye's theorem and its applications in real life problems.

**UNIT-II**

**Random variable:** Definition of random variable, discrete and continuous random variables, functions of random variable. Probability mass function. Probability density function, Distribution function and its properties. For given pmf, pdf calculation of moments, coefficient of skewness and kurtosis. Bivariate random variable - meaning, joint, marginal and conditional Distributions, independence of random variables and simple problems.

**UNIT- III**

**Mathematical expectation :** Mathematical expectation of a random variable and function of a random variable. Moments and covariance using mathematical expectation with examples. Addition and Multiplication theorems on expectation. Definitions of M.G.F, C.G.F, P.G.F, C.F and their properties. Chebyshev and Cauchy - Schwartz inequalities.

**UNIT-IV**

**Discrete Distributions:** Binomial, Poisson, Negative Binomial, Geometric distributions: Definitions, means, variances, M.G.F, C.F, C.G.F, P.G.F, additive property if exists. Poisson approximation to Binomial distribution. Hyper-geometric distribution: Definition, mean and variance.

**UNIT - V**

**Continuous Distributions:** Rectangular, Exponential, Gamma, Beta Distributions: mean, variance, M.G.F, C.G.F, C.F. **Normal Distribution:** Definition, Importance, Properties, M.G.F, CF, additive property.

**Text Books:**

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. BA/BSc I year statistics - descriptive statistics, probability distribution - Telugu Academy - Dr M.Jaganmohan Rao, Dr N.Srinivasa Rao, Dr P.Tirupathi Rao, Smt.D.Vijayalakshmi.
3. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI

**Reference books:**



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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,  $\chi^2$ - 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.  $\chi^2$ -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.



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**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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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, 2<sup>nd</sup> ed. Revised reprint, Books and Allied Pvt. Ltd.
5. Brockwell, P.J. and Devis, R.A. (2003). Introduction to Time Series Analysis. Springer.



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**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



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2022-23

Core papers

Semester-V Paper VII

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

#### UNIT-IV

Network Scheduling: Basic Components of a network, nodes and arcs, events and activities– Rules of Network construction – Time calculations in networks - Critical Path method (CPM) and PERT.

#### UNIT –V

Game Theory: Two-person zero-sum games. Pure and Mixed strategies. Maximin and Minimax Principles - Saddle point and its existence. Games without Saddle point-Mixed strategies. Solution of  $2 \times 2$  rectangular games. Graphical method of solving  $2 \times n$  and  $m \times 2$  games. Dominance Property. Matrix oddment method for  $n \times n$  games. Only formulation of Linear Programming Problem for  $m \times n$  games.

#### Reference Books:

1. S.D. Sharma, Operations Research, Kedar Nath Ram Nath & Co, Meerut.
2. Kanti Swarup, P.K. Gupta, Manmohan, Operations Research, Sultan Chand and sons, New Delhi.
3. J.K. Sharma, Operations Research and Application, Mc. Millan and Company, New Delhi.
4. Gass: Linear Programming. Mc Graw Hill.
5. Hadly : Linear programming. Addison-Wesley.
6. Taha : Operations Research: An Introduction : Mac Millan.
7. Dr.NVS Raju; Operations Research, SMS education,

#### Practical/Lab to be performed on a computer using OR/Statistical packages

1. IBFS of transportation problem by using North- West corner rule, Matrix minimum method and VAM
2. Optimum solution to balanced and unbalanced transportation problems by MODI method (both maximization and minimization cases)
3. Solution of Assignment problem using Hungarian method (both maximization and minimization cases)
4. Solution of sequencing problem - processing of  $n$  jobs through two machines
5. Solution of sequencing problem - processing of  $n$  jobs through three machines
6. To perform Project scheduling of a given project (Deterministic case-CPM).
7. To perform Project scheduling of a given project (Probabilistic case-PERT).
8. Graphical method of solving for  $m \times 2$  and  $2 \times n$  games.
9. Solution of  $m \times n$  games by dominance rule.



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2022-23

Core papers

**CBCS PATTERN FOR MICROBIOLOGY**

**B.Sc MICROBIOLOGY (CBCS) REVISED SYLLABUS - 2020**

**MBT- I: INTRODUCTION TO MICROBIOLOGY AND MICROBIAL DIVERSITY**

**TOTAL HOURS: 48**

**CREDITS: 4**

**UNIT-I:**

**No. of hours: 10**

History and developments in microbiology. Contributions of Anton von Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Ivanowsky. Importance and applications of microbiology. Classification of microorganisms- Whittaker's five kingdom classification, Bergey's Manual of Systematic Bacteriology. General characteristics of Bacteria, Archaea, Mycoplasmas, Cyanobacteria, Fungi, Algae, Protozoa and viruses.

**UNIT-II:**

**No. of hours: 10**

Methods of sterilization: Physical methods – Dry heat, moist heat, radiation methods, filtration methods, Chemical sterilization and disinfection methods .

Microbial cultures: Concept of pure culture, Methods of pure culture isolation, pure culture (streak plate, pour plate and spread plate), single cell isolation methods. Preservation of microbial cultures: subculturing, overlaying cultures- mineral oils, lyophilization, and culture storage at low temperature.

**UNIT-III:**

**No. of hours: 8**

Staining Techniques - Simple and Differential staining techniques.

Principles of microscopy - Bright field and Electron microscopy (SEM and TEM).

Microbial culture media-Natural basal media, differential media, enriched media enrichment media, selective and transport media, anaerobic culture media.

**UNIT-IV:**

**No. of hours: 10**

Microbial growth: Principles of growth, Kinetics of growth, measurement of growth:

Microbial growth: Principles of growth, Kinetics of growth, measurement of growth:  
(Direct methods: viable plate counts, membrane filtration). Indirect methods( Metabolic activity

– measurements of DNA, Protein, Microscopic counts,) electronic counters, most probable number; Batch and continuous Synchronous and Diauxic growth, Types of cultures-stock,.  
Reproduction in bacteria and spore formation.

**UNIT-V:**

**No. of hours: 10**

Cell structure of micro organisms- Cell wall of bacteria (Gram positive and gram negative) and Cell wall of fungi and yeasts- Morphology and chemical composition of bacteria, Actinomycetes, Cell wall lacking bacteria (Mycoplasma, Chlamydiae). Economic importance of algae and fungi. SCP.



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Core papers

**B.Sc MICROBIOLOGY (CBCS) REVISED SYLLABUS – 2020**

**MBT – II: MICROBIAL PHYSIOLOGY AND BIOCHEMISTRY**

**TOTAL HOURS: 48**

**CREDITS: 4**

**UNIT-I:**

**No. of hours: 8**

Microbial nutrition: Classification of micro organisms based on nutrients (carbon, nitrogen, other energy and electron sources). Autotrophs, heterotrophs, mixotrophs, Phototrophs (Photosynthetic pigments) .

**UNIT-II:**

**No. of hours: 10**

Aerobic respiration - Glycolysis, HMP path way, ED path way, TCA cycle, Electron transport, oxidative and substrate level phosphorylation. Kreb's cycle, glyoxylate cycle, hexose monophosphate (HMP) shunt, gluconeogenesis.

Anaerobic respiration Fermentation, Biochemical mechanisms of lactic acid, ethanol, butanol and citric acid fermentations. Nitrate and sulphate respiration. Outlines of oxygenic and anoxygenic photosynthesis in bacteria.

**UNIT – III:**

**No. of hours: 10**

General characters , outline classification of Carbohydrates (Mono, Di and Polysaccharides), Lipids- General characters–Triglycerides, phospholipids, glycolipids and waxes.



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**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, Filariasis & 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 donovani*, *L.tropica*, *Trypanosoma gambiense*. Principles of chemotherapy, Antibacterial drugs – Penicillin, Antifungal drugs – Nystatin, Antiviral agents – Ribavirin, 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 fluorescence. Polyclonal and monoclonal antibodies - production and applications.

Concept of Hypersensitivity and Autoimmunity. Hybridoma technology.



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2022-23

**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 characters 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 applications of Industrial products: Citric acid, Ethanol, Penicillin, Glutamic acid, and vitamin B12, Single cell proteins, Production of bacterial and viral vaccines.



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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.



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2022-23

**B.sc Microbiology**

**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<sub>2</sub>, 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.



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2022-23

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 trophic 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 column. 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).



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2022-23

**Major Domain Subject: BIO-CHEMISTRY  
SEMESTER-I**

**Course: Biomolecules**

**Code: BCH-1**

**60 HRS**

**(5 periods/week)**

**Unit - I: Biophysical Concepts 12 hours**

Water as biological solvent, Buffers, measurement of pH, electrodes, Biological relevance of pH, pKa value, analysis of drinking water and pond water, Total dissolved salts (TDS), BOD, COD, soil analysis (texture, organic matter, elements), Electrical conductivity.

**Unit - II: Carbohydrates 12 hours**

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, Bacterial cell wall polysaccharides. Outlines of glycoproteins, glycolipids and blood group substances.

**Unit - III: Lipids 12 hours**

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, Biomembranes-formation of micelles, bilayers, vesicles, liposomes. Membrane composition and organization - Fluid mosaic model.

**Unit-IV: Amino Acids and Proteins 12 hours**

Amino Acids: Classification, structure, stereochemistry, chemical reactions of amino acids due to carbonyl and amino groups. Titration curve of glycine and pK values. Essential and nonessential amino acids, non-protein amino acids. Peptide bond - nature and conformation. Naturally occurring peptides - glutathione, enkephalin.

**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 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-Burchard test.
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.



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2022-23

Core papers

Major Domain Subject: BIO-CHEMISTRY

SEMESTER-II

Course: Analytical techniques

Code: BCH-II

60 HRS

(5 periods/week)

**Unit-I: Cell homogenization and centrifugation**

12 hours

Methods of tissue homogenization: (Potter-Elvehjem, mechanical blender, sonicator and enzymatic). Centrifugation techniques, principles and applications- differential, density gradient. Ultra-centrifugation- preparative and analytical.

**Unit-II: Chromatographic techniques**

12 hours

Types of chromatographic techniques, Principle and applications - Paper chromatography- solvents, Rf value, applications; Thin layer chromatography- principle, choice of adsorbent and solvent, Rf value, applications; Gel filtration, Ion- exchange- principle, resins, action of resins, experimental techniques, applications, separation of metal ions; Affinity chromatography.

**Unit-III: Spectroscopy and tracer techniques**

12 hours

Electromagnetic radiation, Beer-Lambert's law.  
Colorimetry and Spectrophotometry, spectrofluorimetry, flame photometry. Tracer techniques: Radio isotopes, units of radio activity, half life,  $\beta$  and  $\gamma$ - emitters, use of radioactive isotopes in biology, ELISA, RIA.

**Unit-IV: Electrophoresis**

12 hours

Electrophoresis- principles and applications of paper, polyacrylamide (native and SDS) and agarose gel electrophoresis, isoelectric focusing, immune-electrophoresis-types and applications.

**Unit-V: Microbial techniques:**

12 hours

Microscopy: Basic principles of light microscopy, phase contrast, electron microscope and fluorescent microscope and their applications.

Preparation of different growth media, isolation and culturing and preservation of microbes, Gram's

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



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2022-23

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, inhibitors 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. Photosynthesis- Light and Dark reactions, Calvin cycle, C<sub>4</sub> Pathway. Disorders of carbohydrate metabolism- Diabetes Mellitus.

**Unit-IV: Lipid Metabolism****12 hours**

Catabolism of fatty acids ( $\beta$ - 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- glycolytic 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.



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2022-23

Core papers

Major Domain Subject: BIO-CHEMISTRY

SEMESTER-IV

Course: Physiology, Nutritional and Clinical Biochemistry

Code: BCH-IV

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<sub>2</sub>). 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 bilirubin 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.



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2022-23

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





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2022-23

Core papers

**Biochemistry**

III B.Sc. -SEMESTER-V

SYLLABUS- 2022-2023

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**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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2022-23

Core papers

**Biochemistry**

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.



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2022-23

**B.Sc., Biotechnology: Choice based credit system**

**B.Sc., I Semester W.E.F. 2020-21**

**BT-101: Bio-molecules & Analytical Techniques**

**Course Objectives:** To ensure students gain knowledge about the structure, properties and functions of biomolecules and characterization of biomolecules using analytical techniques.

**Unit-I-Carbohydrates, Protein and Lipids**

Classification, structure, properties of carbohydrates. Classification, structure and properties of amino acids, peptide bond and peptides. Classification, structure (primary, secondary, tertiary, quaternary) and functions of proteins. Denaturation and renaturation of proteins. Classification structure and properties of saturated and unsaturated fatty acids. Structure and functions of glycolipids, phospholipids, and cholesterol.

**Unit-II- Nucleic acid, and Bioenergetics**

Structure and functions of DNA and RNA. Free energy, entropy, enthalpy and redox potential. High energy compounds, Glycolysis, TCA cycle, Electron-Transport System and Oxidative Phosphorylation.

**Unit-III-Centrifugation, Chromatography and Electrophoresis**

Basic principles and types of centrifugations (Analytical and Preparative). Principle, instrumentation and application of paper, TLC, ion exchange, gel permeation, affinity chromatography. Basic principles and types of electrophoresis, factors affecting electrophoretic migration. PAGE (Native, SDS-PAGE). Introduction to 2D & Isoelectric Focusing, Pulsed Field Gel Electrophoresis.

**Unit - IV-Spectroscopy, Microscopy and Laser Techniques**

Beer-Lambert law, light absorption and transmission. Extinction coefficient, Design and application of photoelectric colorimeter and UV-visible spectrophotometer. Introduction to crystallography and application. Types and design of microscopes - compound, phase contrast, fluorescent electron microscopy (TEM, SEM). Introduction to radioisotopes, measurement of radioactivity (scintillation counter and autoradiography). Pros and Cons of usage of radioactive material in life sciences.

## **Unit –V- Biostatistics**

Mean, median, mode, standard deviation, One-way Anova, t-test, F-test and chi-square.

### **List of Practicals:-**

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. Preparation of standard buffer and pH determination
9. Separation of amino acids by paper chromatography



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2022-23

Core papers

B.Sc., Biotechnology: Choice based credit system

B.Sc., -II Semester W.E.F. 2020-21

**BT-201: Microbiology, Cell and Molecular Biology**

**Course Objectives:** To acquaint students with concepts of microbiology, cell and molecular biology. This course is aimed to give an understanding of the basics of microbiology, dealing types of microbes, classification and their characterization, structure and function of prokaryotic and eukaryotic cell organelles, cell division and basics of molecular biology including DNA replication, transcription, translation and regulation of gene expression.

**Unit-I- Scope and Techniques of Microbiology**

History and contribution of Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister and Alexander Fleming. Ultrastructure of bacteria and growth curve. Pure culture techniques. Sterilization techniques, principles and application of physical methods (autoclave, hot air oven, incineration), chemical methods and radiation methods. Simple, gram and acid-fast staining.

**Unit-II-Microbial and viral Taxonomy**

Concepts of microbial species and strains. Classification of bacteria based on morphology, nutrition and environment. General characteristics, transmission and cultivation of viruses. Structure and properties of plant (tobacco mosaic virus, TMV), animal (Newcastle disease virus, NDV), human (Human immunodeficiency virus, HIV) and bacterial viruses (T4 phage). Emerging and reemerging viruses (dengue virus), zoonotic viruses (rabies), SARS-CoV-2. Introduction to fungi, algae and mycoplasma.

**Unit-III- Cell Structure and Functions**

Structure, properties and functions of cellular organelles (E.R, Golgibodies, Mitochondria, Ribosomes, Chloroplast and Vacuoles) of eukaryotic cells. Cell cycle and cell division (mitosis and meiosis). Chemical composition and dynamic nature of the membrane, cell signaling and communication, endocytic pathways.

#### **Unit-IV- DNA Replication, Repair and Regulation of Gene Expression**

DNA replication in prokaryotes (semiconservative, dispersive, conservative, uni and bi-direction, rolling circle). Mechanism of DNA replication, enzymes and protein involved in DNA replication. DNA damage and repair. Regulation of gene expression in prokaryotes Lac and Trip operon concept.

#### **Unit – V - Central Dogma of Molecular Biology**

Genome organization of prokaryotic and eukaryotic organisms. Genetic code, prokaryotic transcription, enzymes involved in transcription. Post-transcriptional modification (Capping Poly adenylation) and splicing.

Translation: mechanism of translation in prokaryotic organisms.

#### **List of Practicals:-**

1. Cleaning and preparation of glassware
2. Preparation of nutrient agar medium for bacteria
3. Preparation of PDA medium for fungi
4. Sterilization techniques (autoclave, hot air oven, filter)
5. Isolation of bacteria from soil
6. Simple staining technique
7. Differential staining technique
8. Microbial counting by Haemocytometer
9. Identification of different bacteria
10. Motility test by hanging drop
11. Preparation of pure culture by slab, slant, streak culture
12. Study of stages of mitotic cell division



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2022-23

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 antibodies. Antigen 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 for Immunology 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.



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2022-23

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)



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2022-23

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 applications

#### **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.



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2022-23

**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

Learning outcomes

Students after successful completion of the course will be able to

Understand the soil profile and nutrients in soil

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 test etc.))

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 -Organic compost (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*. Cyanobacterial biofertilizers- *Anabaena*, *Nostoc*, *Hapalosiphon* and fungal biofertilizers- AM mycorrhiza and ectomycorrhiza. Mechanism of nitrogen fixation and phosphorus solubilization



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2022-23

**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 pesticides production**

(Skill enhancement course (Elective), 05 credits)

Maximum Marks Theory: 100 + practical:50

**I. Learning outcomes:**

On successful completion of the practical course, student shall be able to

1. Understand the importance of bio fertilizers for sustainable agriculture.
2. Appreciate the role of VAM in P solubilisation
3. Define bio pesticide and its nature
4. Produce bio fertilizers and bio pesticides on large scale
5. Able to prepare inoculums for field application

**Syllabus:** (Total 90 hrs (including Teaching, Lab, Field Training and unit test setc.)

**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- Mycorrhizal biofertilizers (10h)** Importance, types, characteristic features of ecto and endo mycorrhiza. Mechanism of phosphorus solubilisation. Uptake of phosphates by the roots. Consortium based inoculums and significance.

**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 - Mass production techniques (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 application methods (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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2022-23

### Core papers

CBCS / Semester System (w.e.f. 2020-'21 Admitted Batch)

I Semester /Botany Core Course - 1

**Fundamentals of Microbes and Non-vascular Plants**

**(Viruses, Bacteria, Fungi, Lichens, Algae and Bryophytes)**

(Total hours of teaching – 60 @ 04 Hrs./Week)

#### Theory:

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#### Learning Outcomes:

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

- Explain origin of life on the earth.
- Illustrate diversity among the viruses and prokaryotic organisms and can categorize them.
- Classify fungi, lichens, algae and bryophytes based on their structure, reproduction and life cycles.
- Analyze and ascertain the plant disease symptoms due to viruses, bacteria and fungi.
- Recall and explain the evolutionary trends among amphibians of plant kingdom for their shift to land habitat.
- Evaluate the ecological and economic value of microbes, thallophytes and bryophytes.

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#### Unit – 1: Origin of life and Viruses

12Hrs.

1. Origin of life, concept of primary Abiogenesis; Miller and Urey experiment. Five kingdom classification of R.H. Whittaker
2. Discovery of microorganisms, Pasteur experiments, germ theory of diseases.
3. Shape and symmetry of viruses; structure of TMV and Gemini virus; multiplication of TMV; A brief account of Prions and Viroids.
4. A general account on symptoms of plant diseases caused by Viruses.
5. Significance of viruses in vaccine production, bio-pesticides and as cloning vectors.

#### Unit – 2: Special groups of Bacteria and Eubacteria

12Hrs.

1. Brief account of Archaeobacteria, Actinomycetes and Cyanobacteria.
2. Cell structure of Eubacteria.

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, reproduction and 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.



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2022-23

Core papers

II Semester /Botany Core Course – 2

Basics of Vascular plants and Phytogeography

(Pteridophytes, Gymnosperms, Taxonomy of Angiosperms and Phytogeography)

(Total hours of teaching – 60 @ 02 Hrs./Week)

Theory:

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**Learning Outcomes:**

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

- Classify and compare Pteridophytes and Gymnosperms based on their morphology, anatomy, reproduction and life cycles.
  - Justify evolutionary trends in tracheophytes to adapt for land habitat.
  - Explain the process of fossilization and compare the characteristics of extinct and extant plants.
  - Critically understand various taxonomical aids for identification of Angiosperms.
  - Analyze the morphology of the most common Angiosperm plants of their localities and recognize their families.
  - Evaluate the ecological, ethnic and economic value of different tracheophytes and summarize their goods and services for human welfare.
  - Locate different phytogeographical regions of the world and India and can analyze their floristic wealth.
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**Unit – 1: Pteridophytes**

**12 Hrs.**

1. General characteristics of Pteridophyta; classification of Smith (1955) into divisions.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of (a) *Lycopodium* (Lycopsida) and (b) *Marsilea* (Filicopsida).
3. Stellar evolution in Pteridophytes;
4. Heterospory and seed habit.

**Unit – 2:Gymnosperms****14 Hrs.**

1. General characteristics of Gymnosperms; Sporeclassification upto classes.
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) Curcubitaceae

**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.



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2022-23

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, the students will be able to;

- Understand on the organization of tissues and tissue systems in plants.
- Illustrate and interpret various aspects of embryology.
- Discuss the basic concepts of plant ecology, and evaluate the effects of environmental and biotic factors on plant communities.
- Appraise various qualitative and quantitative parameters to study the population and community ecology.
- Correlate the importance of biodiversity and consequences due to its loss.
- Enlist the 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, helobial and 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, ecological pyramids.
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.



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Core papers

IV Semester/ Botany Core 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;

- Comprehend the 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 food in plants.
- Analyze the biochemical reactions in relation to Nitrogen and lipid metabolisms.
- Evaluate the physiological factors that regulate growth 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 (C<sub>3</sub>, C<sub>4</sub> and CAM);
4. Photorespiration - C<sub>2</sub> 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,  $\beta$ -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.
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2022-23

Core papers

IV Semester / Botany Core Course –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 chromosome and the structure of genetic material.
- Demonstrate techniques to observe the cell and its components under 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 in plant 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 eukaryotic 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.



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2022-23

**Core papers**

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*



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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 outcomes:

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.



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Core papers

Electronics

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w.e.f. 2020-21 (revised in June 2020)

SEMESTER-1

PAPER – I

**CIRCUIT THEORY AND ELECTRONIC DEVICES**

**Objectives:**

- To explain the basic concepts and laws of DC and AC electrical networks and solve them using mesh and nodal analysis techniques.
- To analyze circuits in time and frequency domain.
- To synthesize the networks using passive elements.
- To understand the construction, working and VI characteristics of electronic devices.
- To understand the concept of power supply.

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**UNIT- 1: (12Hrs)**

**SINUSOIDAL ALTERNATING WAVEFORMS:**

Definition of current and voltage. The sine wave, general format of sine wave for voltage or current, phase relations, average value, effective (R.M.S) values. Differences between A.C and D.C. Phase relation of R, L and C

**UNIT-II: (12hrs)**

**PASSIVE NETWORKS AND NETWORKS THEOREMS (D.C):**

Branch current method, Nodal Analysis, star to delta & delta to star conversions. Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power, Milliman and Reciprocity theorems.

**UNIT-III: (12hrs)**

**RC, RL AND RLC CIRCUITS:**

Frequency response of RC and RL circuits, their action as low pass and high pass filters. Passive differentiating and integrating circuits. Series resonance and parallel resonance circuits, Q – Factor.

**UNIT-IV: (12hrs)**

**BJT, FET and UJT:**

BJT: Construction, working, and characteristics of CE Configurations. Hybrid parameters and hybrid equivalent circuit of CE Transistor,

FET: Construction, working and characteristics of JFET and MOSFET. Advantages of FET over BJT.

UJT: Construction, working and characteristics of UJT. UJT as a Relaxation oscillator.

**UNIT-V:(12hrs)**

**POWER SUPPLIES & PHOTO ELECTRIC DEVICES**

Rectifiers: Half wave, full wave rectifiers-Efficiency-ripple factor- Filters- L-section &  $\pi$ -section filters. Three terminal fixed voltage I.C. regulators(78XX and &79XX). Light Emitting Diode – Photo diode and LDR.



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**SEMESTER – II**

**PAPER – 2**

**Digital Electronics**

**Objectives:**

- To understand the number systems, Binary codes and Complements.
- To understand the Boolean algebra and simplification of Boolean expressions.
- To analyze logic processes and implement logical operations using combinational logic circuits.
- To understand the concepts of sequential circuits and to analyze sequential systems in terms of state machines.
- To understand characteristics of memory and their classification.
- To implement combinational and sequential circuits using VHDL.

**Unit – I (12hrs)**

**NUMBER SYSTEM AND CODES:** Decimal, Binary, Hexadecimal, Octal. Codes: BCD, Gray and Excess-3 codes- code conversions- Complements (1's, 2's, 9's and 10's), Addition - Subtraction using complement methods.

**Unit- II (12hrs)**

**BOOLEAN ALGEBRA AND THEOREMS:** Boolean Theorems, De-Morgan's laws. Digital logic gates, Multi level NAND & NOR gates. Standard representation of logic functions (SOP and POS), Minimization Techniques (Karnaugh Map Method: 2,3 variables).

**Unit-III (12hrs)**

**COMBINATIONAL DIGITAL CIRCUITS:**

Adders-Half & full adder, Subtractor-Half and full subtractors, Parallel binary adder, Magnitude Comparator, Multiplexers (4:1) and Demultiplexers (1:4), Encoder (8-line-to-3-line) and Decoder (3-line-to-8-line). IC-LOGIC FAMILIES: TTL logic, CMOS Logic families (NAND&NOR Gates).

**UNIT-IV (12hrs)**

**SEQUENTIAL DIGITAL CIRCUITS:**

Flip Flops: S-R FF, J-K FF, T and D type FFs, Master-Slave FFs, Excitation tables, Registers:-Serial In Serial Out and Parallel In and Parallel Out, Counters Asynchronous-Mod-8, Mod-10, Synchronous-4-bit & Ring counter.

**UNIT-IV (12hrs)**

**SEQUENTIAL DIGITAL CIRCUITS:**

Flip Flops: S-R FF , J-K FF, T and D type FFs, Master-Slave FFs, Excitation tables, Registers:-Serial In Serial Out and Parallel In and Parallel Out, Counters Asynchronous-Mod-8,Mod-10,Synchronous-4-bit &Ring counter.

**UNIT-(12hrs)**

**MEMORY DEVICES:**

General Memory Operations, ROM, RAM (Static and Dynamic), PROM, EPROM, EEPROM, EAROM,



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2<sup>nd</sup> YEAR

**SEMESTER – III**

**PAPER – 3**

**Analog Circuits and Communication**

**OBJECTIVES:**

- To understand the concepts, working principles and key applications of linear integrated circuits.
- To perform analysis of circuits based on linear integrated circuits.
- To design circuits and systems for particular applications using linear integrated circuits.
- To introduce students to various modulation and demodulation techniques of analog communication.
- To analyse different parameters of analog communication techniques.
- It also focuses on Transmitters and Receivers.

**Unit – I (12hrs)**

**OPERATIONAL AMPLIFIERS:** Definition, Characteristics of Op-Amp, Block diagram of op-amp, inverting, noninverting, virtual ground, , summing amplifier, subtractor, voltage follower, op-amp parameters, voltage to current convertor ,integrator, differentiator, differential amplifier, Logarithmic amplifier.

**Unit- II:(12hrs)**

**OP-AMP CIRCUITS:** voltage regulator, comparator, zero cross detecting circuit, instrumentation amplifier, Schmitt trigger. sine wave generator, square wave generator, triangular wave generator, Active filters (Basics)-low pass, high pass, band pass filters IC-555 –functional block diagram and mention it's applications

**UNIT –III (12Hrs) AMPLITUDE MODULATION:**

Need for modulation, amplitude modulation-frequency spectrum of AM wave, representation of AM, power relations in the AM wave. Generation of AM- Transistor modulators. Detection of AM signals – Diode detector.

***UNIT-IV (12hrs) FREQUENCY MODULATION:***

Theory of FM, Frequency deviation and carrier swing, modulation index, deviation ratio, percent modulation. Mathematical representation of FM, frequency spectrum and bandwidth of FM waves, Generation of FM signals – Varactor diode modulator and Reactance modulator. Detection of FM waves – FM demodulation with discriminator.

***UNIT-V (12hrs) RADIO BROADCASTING AND RECEPTION:***

Spectrum of electromagnetic waves, Radio broadcasting and reception, Transmitter, AM receivers- Straight forward receiver, Super heterodyne receiver. FM receivers.



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2<sup>nd</sup> YEAR

Semester-IV

Paper- IV

I

**TITLE: MICROPROCESSOR SYSTEMS**

**OBJECTIVES:**

- To understand basic architecture of 16 bit and 32 bit microprocessors.
- To understand interfacing of 16 bit microprocessor with memory and peripheral chips involving system design.
- To understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors
- To understand RISC based microprocessors.
- To understand concept of multi core processors.

**UNIT -I: (12Hrs)**

**CPU ARCHITECTURE**

*Introduction to Microprocessor, INTEL -8085(p) Architecture, CPU, ALU unit, Register organization, Address, data and control Buses. Pin configuration of 8085. Addressing modes*  
8086 Microprocessor: Architecture, Pin description. Instruction format, Instruction Execution timing, Addressing modes

**UNIT -II: (12 Hrs)**

**8085 Instruction Set:**

Data transfer Instruction, Logical Instructions, Arithmetic Instructions, Branch Instructions,  
**Machine Control instructions.**

**UNIT -III: (12Hrs)**

Assembly Language Programming using 8085, Programmes for Addition, Subtraction, Multiplication, Division, largest and smallest number in an array. BCD to ASCII and ASCII to BCD.

**UNIT -IV: (12Hrs)**

Basic 8086 Configurations – Minimum mode and Maximum Mode, Interrupt Priority Management I/O Interfaces: Serial Communication interfaces, Parallel Communication, Programmable Timers, Keyboard and display, DMA controller

**UNIT -V: (12Hrs) ARM PROCESSOR:** Introduction to 16/32 bit processors, Arm architecture & organization, Arm based MCUs, Programming model, Instruction set.



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2022-23

Core papers

Electronics

**B.Sc. Electronics CBCS Syllabus**  
**2<sup>nd</sup> YEAR**

**IV SEMESTER**

**Paper: V**

**MICRO CONTROLLER AND INTERFACING**

**OBJECTIVES:**

- To understand the concepts of microcontroller based system.
- To enable design and programming of microcontroller based system.
- To know about the interfacing Circuits.

**UNIT-I:** (10Hrs) Introduction, comparison of Microprocessor and micro controller, Evolution of microcontrollers from 4-bit to 32 bit , Development tools for micro controllers, Assembler-Compiler-Simulator/Debugger.

**UNIT -II:** (10Hrs)

**Microcontroller Architecture:** Overview and block diagram of 8051, Architecture of 8051, program counter and memory organization, Data types and directives, PSW register, Register banks and stack, pin diagram of 8051, Port organization, Interrupts and timers.

**UNIT-III:**(10Hrs)

**Addressing modes, instruction set of 8051:** Addressing modes and accessing memory using various addressing modes, instruction set: Arithmetic, Logical, Simple bit, jump, loop and call instructions and their usage. Time delay generation and calculation, Timer/Counter Programming,

**Unit -IV:** (15Hrs)

Assemble language programming Examples: Addition, Multiplication, Subtraction, division, arranging a given set of numbers in largest/smallest order.

**UNIT-V :** (15Hrs)

**Interfacing and Application of Microcontroller:** Interfacing of – PPI 8255, DAC (0804), Temperature measurement (LM35), interfacing seven segment displays, displaying information on a LCD, control of a stepper Motor (Uni-Polar),



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2022-23

Core papers

Core papers

Electronics

B.Sc. Electronics CBCS SYLLABUS 3rd 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. Electronic Instrumentation by H.S.Kalsi , TMH Publishers
2. Electronic Instrument Hand Book by Clyde F. Coombs , McGraw Hill
3. Introduction to Biomedical Instrumentation by Mandeep Singh, PHI Learning.
4. Biomedical Instrumentation and Measurements by Leslie Cromwell ,Prentice Hall India.
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

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3. Demonstrate skills in using instruments like Rectifiers, Multimeters, Power supplies, Voltage Regulators etc. through hands-on experience.
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2. Electronic Instrument Hand Book by Clyde F. Coombs , McGraw Hill
3. Introduction to Biomedical Instrumentation by Mandeep Singh, PHI Learning.
4. Biomedical Instrumentation and Measurements by Leslie



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2022-23

Core papers

Electronics

B.Sc. Electronics CBCS SYLLABUS 3rd.YEAR

V SEMESTER

**ELECTRONICINSTRUMENTATION**

<b>Sub:</b> ELECTRONICS	Paper-VII	<b>Year:</b> 2022-23	<b>Group:</b> B.Sc	<b>Credits</b> -3
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**INSTRUMENTATION OBJECTIVES:**

The student will be introduced to

To introduce students to monitor, analyze and control any physical system

To understand students how different types of meters work and their construction

To Study of absolute is merely confirmed within laboratories To Study integrating instruments like ammeter,voltmeter

To Measurement of impedance using bridges To Study of PLL ,ph-meter, PLC

**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,**

**pH meter - principle working with block diagram, features of pH 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.**



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2022-23

Core papers

**B.Sc. PHYSICS SYLLABUS UNDER CBCS**

**For Mathematics Combinations**

[2020-21 Batch onwards]

**I Year B.Sc.-Physics:I Semester**

**Course I: MECHANICS, WAVES AND OSCILLATIONS**

**Work load:60 hrs per semester**

**4 hrs/week**

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**Course outcomes:**

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

- *Understand Newton's laws of motion and motion of variable mass system and its application to rocket motion and the concepts of impact parameter, scattering cross section.*
- *Apply the rotational kinematic relations, the principle and working of gyroscope and its applications and the precessional motion of a freely rotating symmetric top.*
- *Comprehend the general characteristics of central forces and the application of Kepler's laws to describe the motion of planets and satellite in circular orbit through the study of law of Gravitation.*
- *Understand postulates of Special theory of relativity and its consequences such as length contraction, time dilation, relativistic mass and mass-energy equivalence.*
- *Examine phenomena of simple harmonic motion and the distinction between undamped, damped and forced oscillations and the concepts of resonance and quality factor with reference to damped harmonic oscillator.*
- *Appreciate the formulation of the problem of coupled oscillations and solve them to obtain normal modes of oscillation and their frequencies in simple mechanical*

## **UNIT-I:**

### **1. Mechanics of Particles (5 hrs)**

Review of Newton's Laws of Motion, Motion of variable mass system, Motion of a rocket, Multistage rocket, Concept of impact parameter, scattering cross-section, Rutherford scattering-Derivation.

### **2. Mechanics of Rigid bodies (7 hrs)**

Rigid body, rotational kinematic relations, Equation of motion for a rotating body, Angular momentum and Moment of inertia tensor, Euler equations, Precession of a spinning top, Gyroscope.

## **Unit-II:**

### **3. Motion in a Central Force Field (12hrs)**

Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, Equation of motion under a central force, Kepler's laws of planetary motion-Proofs, Motion of satellites, Basic idea of Global Positioning System (GPS), weightlessness, Physiological effects of astronauts

## **UNIT-III:**

### **4. Relativistic Mechanics (12hrs)**

Introduction to relativity, Frames of reference, Galilean transformations, absolute frames, Postulates of Special theory of relativity, Lorentz transformation, time dilation, length contraction, variation of mass with velocity, Einstein's mass-energy relation

## **Unit-IV:**

### **5. Undamped, Damped and Forced oscillations: (012 hrs)**

Simple harmonic oscillator and solution of the differential equation, Damped harmonic oscillator, Forced harmonic oscillator – Their differential equations and solutions, Resonance, Logarithmic decrement, Relaxation time and Quality factor.

## **Unit-V:**

### **6. Vibrating Strings: (07 hrs)**

Transverse wave propagation along a stretched string, General solution of wave equation and its significance, Modes of vibration of stretched string clamped at ends, Overtone.

### **7. Ultrasonics: (05 hrs)**

Ultrasonics, General Properties of ultrasonic waves, Production of ultrasonics by piezoelectric and magnetostriction methods, Detection of ultrasonics, Applications of ultrasonic waves,



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2022-23



**B.Sc. PHYSICS SYLLABUS UNDER CBCS**

**For Mathematics Combinations**

[2020-21 Batch onwards]

**I Year B.Sc.-Physics: II Semester**

**Course-II: WAVE OPTICS**

**Work load:60 hrs per semester**

**4 hrs/week**

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**Course outcomes:**

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

- ❖ *Understand the phenomenon of interference of light and its formation in (i) Lloyd's single mirror due to division of wave front and (ii) Thin films, Newton's rings and Michelson interferometer due to division of amplitude.*
- ❖ *Distinguish between Fresnel's diffraction and Fraunhofer diffraction and observe the diffraction patterns in the case of single slit and the diffraction grating.*
- ❖ *Describe the construction and working of zone plate and make the comparison of zone plate with convex lens.*
- ❖ *Explain the various methods of production of plane, circularly and polarized light and their detection and the concept of optical activity..*
- ❖ *Comprehend the basic principle of laser, the working of He-Ne laser and Ruby lasers and their applications in different fields.*
- ❖ *Explain about the different aberrations in lenses and discuss the methods of*

**UNIT-I Interference of light: (12hrs)** Introduction, Conditions for interference of light, Interference of light by division of wave front and amplitude, Phase change on reflection- Interference in thin films: wedge- shaped films, colours in thin films, Newton's rings in reflected light-Theory and experiment,

Determination of wavelength of monochromatic light, Michelson interferometer and determination of wavelength.

**UNIT-II Diffraction of light:(12hrs)**

Introduction, Types of diffraction: Fresnel and Fraunhofer diffractions, Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit, Plane diffraction grating, Determination of wavelength of light using diffraction grating. Fresnel's half period zones, Zone plate, comparison of zone plate with convex lens.

**UNIT-III Polarisation of light:(12hrs)**

Polarized light: Methods of production of plane polarized light, Double refraction, Brewster's law, Malus law, Nicol prism, Nicol prism as polarizer and analyzer, Quarter wave plate, Half wave plate, Plane, Circularly and Elliptically polarized light-Production and detection, Optical activity, Basic principle of LCDs.

**UNIT-IV Aberrations and Fibre Optics:**

**(12hrs)**

Monochromatic aberrations, Spherical aberration, Methods of minimizing spherical aberration, Coma, Astigmatism and Curvature of field, Distortion; Chromatic aberration-the achromatic doublet; Achromatism for two lenses (i) in contact and (ii) separated by a distance.

Fibre optics: Introduction to Fibers, different types of fibers, rays and modes in an optical fiber, Principles of fiber communication (qualitative treatment only), Advantages of fiber optic communication.

**UNIT-V Lasers and Holography:(12hrs)**

Lasers: Introduction, Spontaneous emission, stimulated emission, Population Inversion, Laser principle. Types of lasers-He-Ne laser, Ruby laser, Applications of lasers; Holography: Basic principle of holography, Applications of holography

**REFERENCE BOOKS:**

- BSc Physics, Vol.2, Telugu Akademy, Hyderabad
- A Text Book of Optics-N Subramanvam. I. Briilal. S.Chand & Co.



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2022-23

**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.



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2022-23

**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**

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**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.*

## 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, Zener diode and Light 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 characteristics of a 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**

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**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(Infinite Potential 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. 5<sup>th</sup> 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-Constant Current 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 of a 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, Elsevier Publications
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. 5<sup>th</sup> 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-IV DISPLAY 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) Stethoscope (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 by Mandeep Singh, PHI Learning.
4. Biomedical Instrumentation and Measurements by Leslie Cromwell ,Prentice Hall India.
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 including reading material.

Course 7C: Electronic Instrumentation- PRACTICAL SYLLABUS



### 3. Theories of bonding in metals:

4h

Valence bond theory and Free 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.

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#### 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, mesomorphic state. 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<sub>2</sub>O system and ethanol-water system. Partially miscible liquids-phenol-water system. Critical solution temperature (CST), Effect of impurity on consolute 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 boiling point and depression in freezing point. Experimental methods for the determination of molar mass of a non-volatile solute using osmotic pressure, Elevation in boiling 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



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2022-23

**CHEMISTRY**

**SEMESTER – II**

**Course II – (Organic & General Chemistry) 60 hrs (4h/w)**

**Course outcomes:**

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

1. Understand and explain the differential behavior of organic compounds based on fundamental concepts learnt.
2. Formulate the mechanism of organic reactions by recalling and correlating the fundamental properties of the reactants involved.
3. Learn and identify many organic reaction mechanisms including Free Radical Substitution, Electrophilic Addition and Electrophilic Aromatic Substitution.
4. Correlate and describe the stereochemical properties of organic compounds and reactions.

**ORGANIC CHEMISTRY**

**36h**

**UNIT-I**

**Recapitulation of Basics of Organic Chemistry**

**Carbon-Carbon sigma bonds (Alkanes and Cycloalkanes)**

**12h**

General methods of preparation of alkanes- Wurtz and Wurtz-Fittig reaction, Corey House synthesis, physical and chemical properties of alkanes, Isomerism and its effect on properties, Free radical substitutions; Halogenation, concept of relative reactivity v/s selectivity. Conformational analysis of alkanes (Conformations, relative stability and energy diagrams of Ethane, Propane and butane). General molecular formulae of cycloalkanes and relative stability, Baeyer strain theory, Cyclohexane conformations with energy diagram, Conformations of monosubstituted cyclohexane.

## 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 suitable examples, *syn* and *anti*-addition; addition of H<sub>2</sub>, X<sub>2</sub>, HX. oxymercuration-demercuration, hydroboration-oxidation, ozonolysis, hydroxylation, Diels Alder reaction, 1,2- and 1,4-addition reactions in conjugated dienes.

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**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<sub>2</sub> 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<sub>3</sub>, Ni(CO)<sub>4</sub>, Molecular orbital theory -LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules (N<sub>2</sub>, O<sub>2</sub>, 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**

Continuous Evaluation: Monitoring the progress of student's learning

Class Tests, Worksheets and Quizzes

Presentations, Projects and Assignments and Group Discussions: Enhance critical thinking skills and personality

Semester-end Examination: critical indicator of student's learning and teaching methods adopted by teacher throughout the semester.



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2022-23

**CHEMISTRY**

**SEMESTER - III**

**Course III (ORGANIC CHEMISTRY & 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; SN<sup>Ar</sup>, 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 periodic acid 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; Nucleophilic addition-elimination reactions with ammonia derivatives.

Mechanisms of Aldol and Benzoin condensation, Claisen-Schmidt, Perkin, Cannizzaro and Wittig reaction, Beckmann, haloform reaction and Baeyer-Villiger oxidation,  $\alpha$ - substitution reactions, oxidations and reductions (Clemmensen, Wolf-Kishner, with LiAlH<sub>4</sub> & NaBH<sub>4</sub>).

Addition reactions of  $\alpha$ ,  $\beta$ -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

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**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 at acyl group- 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 Schmidt 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.

**Vibrational spectroscopy:** Classical equation of vibration, computation of force constant, Harmonic and anharmonic oscillator, Morse potential curve, vibrational degrees of freedom for polyatomic molecules, modes of vibration. Selection rules for vibrational transitions, Fundamental frequencies, overtones and hot bands.

**Electronic spectroscopy:** Energy levels of molecular orbitals ( $\sigma$ ,  $\pi$ ,  $n$ ). 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.

**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  $\lambda_{\text{max}}$  of conjugated dienes and  $\alpha, \beta$  – 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-end Examination: 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 Finar Vol 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



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2022-23

**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. Metallocarbonyls: 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 - electrophilic 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

### Nitrogen Containing Functional Groups

Preparation, properties and important reactions of nitro compounds, amines and diazonium salts.

#### 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 Michael 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-Bromamide reaction, Carbylamine reaction, Mannich reaction, Hoffmann's exhaustive methylation, Hofmann-elimination reaction and Cope elimination.

**Diazonium Salts:** Preparation and synthetic applications of diazonium salts 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
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2022-23

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. Inorganic Reaction Mechanism:**

**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**

Toxicity of metal ions (Hg, Pb, Cd and As), 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-Onsager'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****Chemical Kinetics:****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



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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



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2022-23

**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  $R_f$  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<sup>+2</sup>, Mn<sup>+2</sup> and Pb<sup>+2</sup>.

#### **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. West and Douglas A. Skoog, Ninth edition , Cengage.
2. Analytical chemistry by Gary D. Christian, Purnendu K. Dasgupta and Kevin A. Schug, Seventh edition , Wiley.
3. Quantitative analysis by R.A. Day jr. and A.L. Underwood, 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 – Lambert’s Law (Using potassium permanganate solution) using colorimeter/ Spectro photometer.

#### **VI. Lab References:**



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2022-23

Computer Science

**PROBLEM SOLVING IN C**

Semester	Course Code	Course Title	Hours	Credits
I	C1	PROBLEM SOLVING IN C	60	3

**Objectives:**

This course aims to provide exposure to problem-solving through programming. It introduces the concepts of the C Programming language.

**Course Learning Outcomes:**

Upon successful completion of the course, a student will be able to:

1. Understand the evolution and functionality of a Digital Computer.
2. Apply logical skills to analyse a given problem
3. Develop an algorithm for solving a given problem.
4. Understand 'C' language constructs like Iterative statements, Array processing, Pointers, etc.
5. Apply 'C' language constructs to the algorithms to write a 'C' language program.

**UNIT I**

**General Fundamentals:** Introduction to computers: Block diagram of a computer, characteristics and limitations of computers, applications of computers, types of computers, computer generations.

**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–Storing Values 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.



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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 Stacks through 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 Representation of 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”, Yashavant Kanetkar, 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 database using 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 3<sup>rd</sup> 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 with Java.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 of Inheritance

**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 Data Types, 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)

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## 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, Process Abstraction, Process Hierarchy, 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, File Allocation 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<sup>th</sup> 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



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2022-23

**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



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2022-23

**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 include(), 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).



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2022-23

Core papers

**COURSE-I**

**CBCS/ SEMESTER SYSTEM**

**B.A./B.Sc. MATHEMATICS (w.e.f. 2020-21 Admitted Batch)**

**DIFFERENTIAL EQUATIONS**

**SYLLABUS (75 Hours)**

**Course Outcomes:**

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

1. Solve linear differential equations
2. Convert nonexact homogeneous equations to exact differential equations by using integrating factors.
3. Know the methods of finding solutions of differential equations of the first order but not of the first degree.
4. Solve higher-order linear differential equations, both homogeneous and non homogeneous, with constant coefficients.
5. Understand the concept and apply appropriate methods for solving differential equations.

**Course Syllabus:**

**UNIT – I (12 Hours)**

**Differential Equations of first order and first degree:**

Linear Differential Equations; Differential equations reducible to linear form; Exact differential equations; Integrating factors; Change of variables.

**UNIT – II (12 Hours)**

Orthogonal Trajectories

**Differential Equations of first order but not of the first degree:**

Equations solvable for  $p$ ; Equations solvable for  $y$ ; Equations solvable for  $x$ ; Equations that do not contain  $x$  (or  $y$ ); Equations homogeneous in  $x$  and  $y$ ; Equations of the first degree in  $x$  and  $y$  – Clairaut's Equation.

### 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  $b\sin ax$  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  $Q = x^m V$ , where  $V$  is a function of  $x$ .

### 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.



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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 form 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.



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2022-23

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.



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**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  $\mathbb{R}$ , Absolute value and Real line, Completeness property of  $\mathbb{R}$ , 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).**

**INFINITE 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.

### **INFINITE 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  $n^{\text{th}}$  root test or Root Test.
  3. D'Alembert's 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 THEOREMS :**

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 Donald 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.



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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. 4<sup>th</sup> Edition, 2007.



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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 with examples. 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, New Delhi-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



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**COURSE-VII B CBCS/ SEMESTER SYSTEM**

**B.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  $t^n \cdot f(t)$ , 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. Saxena, 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. Ramesh Babu, 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, Pragathi Prakashan, Meerut.
4. Shanthi Narayana, 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



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2022-23

Core papers

**ZOOLOGY**

**ZOOLOGY SYLLABUS FOR I SEMESTER**

**PAPER – I: ANIMAL DIVERSITY – BIOLOGY OF NONCHORDATES**

**HOURS:60 (5X12)**

**Max. Marks: 100**

**UNIT I**

- 1.1 Principles of Taxonomy – Binomial nomenclature – Rules of nomenclature
- 1.2 Whittaker's five kingdom concept and classification of Animal Kingdom.

**Phylum Protozoa**

- 1.3 General Characters and classification of protozoa up to classes with suitable examples
- 1.4 Protozoan – Pathogenicity (Trypanosoma, Plasmodium, Giardia, Leishmania, Trichomonas – causative agent, mode of infection, symptoms, Prevention and Controlling measures)
- 1.5 *Elphidium* (type study)

**UNIT –II**

**Phylum Porifera**

- 2.1 General characters and classification up to classes with suitable examples
- 2.2 Skelton in Sponges
- 2.3 Canal system in sponges

**Phylum Coelenterata**

- 2.4 General characters and classification up to classes with suitable examples
- 2.5 Metagenesis in *Obelia*
- 2.6 Polymorphism in coelenterates
- 2.7 Corals and coral reefs

**Phylum Ctenophora :**

- 2.8 General Characters and Evolutionary significance (affinities)

**Unit – III**

**Phylum Platyhelminthes**

- 3.1 General characters and classification up to classes with suitable examples
- 3.2 Life cycle and pathogenicity of *Fasciola hepatica*

- 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 Coelomoduets  
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 Impotence 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

**Phylum Echinodermata**

- 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

**Phylum Hemichordata**

- 5.7 General characters and classification up to classes with suitable examples

**5.8 *Balanoglossus* - Structure and affinities**

**ZOOLOGY SYLLABUS FOR II SEMESTER**  
**PAPER – II: ANIMAL DIVERSITY – BIOLOGY OF CHORDATES**  
**HOURS: 60 (5X12) Max. Marks: 100**

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**Unit - I**

- 1.1 General characters and classification of Chordata upto classes
- 1.2 Protochordata- Salient features of Cephalochordata , Affinities of Cephalochordata.
- 1.3 Salient features of Urochordata
- 1.4 Structure and life history of *Herdmania* (Retrogressive metamorphosis)

**Unit - II**

- 2.1 Cyclostomata, General characters, Comparison of *Petromyzon* and *Myxine*
- 2.2 Pisces : General characters of Fishes
- 2.3 *Scoliodon*: External features, Digestive system, Respiratory system, Structure and function of Heart, Structure and functions of the Brain.
- 2.4 Migration in Fishes
- 2.5 Types of Scales
- 2.6 Dipnoi

**Unit - III**

- 3.1 General characters of Amphibia
- 3.2 Classification of Amphibia up to orders with examples.
- 3.3 *Rana hexadactyla*: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and functions of the Brain
- 3.4 Reptilia: General characters of Reptilia, Classification of Reptilia upto orders with examples
- 3.5 *Calotes*: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and function of Brain
- 3.6 Identification of Poisonous and Non-poisonous snakes.

#### **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

**ZOOLOGY SYLLABUS FOR III SEMESTER**  
**PAPER – III: CELL BIOLOGY, GENETICS, MOLECULAR BIOLOGY AND**  
**EVOLUTION**

**HOURS: 60 (5X12)**

**Max. Marks: 100**

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**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.
- 1.4 Structure 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**

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**UNIT I      Animal Physiology - I**

- 1.1 Process of digestion and assimilation
- 1.2 Respiration - Pulmonary ventilation, transport of oxygen and CO<sub>2</sub>

(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

**UNIT 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

**UNIT IV      Cellular Metabolism – II**

- 4.1 Carbohydrate Metabolism - Glycolysis, Krebs cycle, Electron Transport Chain, Glycogen metabolism, Gluconeogenesis
- 4.2 Lipid Metabolism –  $\beta$ -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**

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**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; applications
- 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

5.1.2 Fish 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.



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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**

- 1.1 Present status of Aquaculture – Global and National scenario
- 1.2 Major cultivable species for aquaculture: freshwater, brackish water and marine.
- 1.3 Traditional, extensive, modified extensive, semi-intensive and intensive cultures of fish and shrimp.
- 1.4 Design and construction of fish and shrimp farms

**Unit: 2**

- 2.1 Functional classification of ponds – head pond, hatchery, nursery ponds
- 2.2 Functional classification of ponds -rearing, production, stocking and quarantine ponds
- 2.3 Need of fertilizer and manure application in culture ponds
- 2.4 Physio-chemical conditions of soil and water optimum for culture (Temperature, depth, turbidity, light, water, PH, BOD, CO<sub>2</sub> and nutrients)

**Unit: 3**

- 3.1. Induced breeding in fishes
- 3.2. Culture of Indian major carps: Pre-stocking management (Dewatering, drying, ploughing/desilting; Predators, weeds and algal blooms and their control, Liming and fertilization)
- 3.3. Culture of Indian major carps - Stocking management
- 3.4. Culture of Indian major carps - post-stocking management

**Unit: 4**

- 4.1 Commercial importance of shrimp & prawn
- 4.2 *Macrobrachium rosenbergii*- biology, seed production.
- 4.3 Culture of *L. vannamei*– hatchery technology and culture practices

#### 4.4 Mixed culture of fish and prawns

#### **Unit: 5**

5.1 Viral diseases of Fin Fish & shell fish

5.2 Fungal diseases of Fin & Shell fish

5.3 Bacterial diseases of Finfish & Shell fish

5.4 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. Elsevier 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](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](http://aquaticcommons.org/1666/1/Better-Practice3_opt.pdf)

3. <https://www.notesonzooology.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 characters of Fresh water cultivable species
- Estimate physico chemical characteristics 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)



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2022-23

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**

3.1 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.

3.2 Fish by-products – fish glue, Using glass, chitosan, pearl essence, shark fins, fish Leather and fish maws.

**Unit – IV Sanitation and Quality control**

4.1 Sanitation in processing plants - Environmental hygiene and Personal hygiene in processing plants.

4.2 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 Alimentarius*.

#### 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-Learningdownload3\\_new.aspx?Degree\\_Id=03](https://ecourses.icar.gov.in/e-Learningdownload3_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-Learningdownload3\\_new.aspx?Degree\\_Id=03](https://ecourses.icar.gov.in/e-Learningdownload3_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\\_Hygiene%20drying%20and%20packing%20of%20fish.pdf](https://krishi.icar.gov.in/jspui/bitstream/123456789/20770/1/Training%20Manual_Hygiene%20drying%20and%20packing%20of%20fish.pdf)
7. [https://krishi.icar.gov.in/jspui/bitstream/123456789/20770/1/Training%20Manual\\_Hygiene%20drying%20and%20packing%20of%20fish.pdf](https://krishi.icar.gov.in/jspui/bitstream/123456789/20770/1/Training%20Manual_Hygiene%20drying%20and%20packing%20of%20fish.pdf)
8. [https://agritech.tnau.ac.in/fishery/fish\\_byproducts.html](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





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2022-23

Core papers  
DEPARTMENT OF TOURISM AND TRAVEL MANAGEMENT

Paper-II: PRINCIPLES AND PRACTICES OF TOURISM

SEMESTER – II

**Module 1**

**Tourism development and state intervention National economic goals-political legislation, equity and social needs, social investment, regulation and government controls, regional development in Tourism-**

**Module 2**

**Tourist motivation Factors types Push and Pull factors - Determinants of tourism- Theories of Motivation - psychological, cultural, economic, personal and social barriers to travel**

**Module 3**

**Impact of tourism Meaning, positive and negative Social, cultural, economic and environmental impacts of tourism - Employment and Revenue generation Tourist impact analysis**

**Module 4**

**Components of Tourism- Types of transportation Railways, airways, waterways and roadways Role of railways in promoting tourism in India Accommodation and food**

**Module 5**

**Tourism finance Introduction, meaning, nature, scope and functions of finance Application of financial management in tourism industry Tourism Finance Corporation of India and other Organizations Aims, objectives and functions**

**References:**

- 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,**

ELBS.

1. Christopher. Hallway: Longman (2012): The Business of Tourism. Pearson.



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2021-22

Core papers

DEPARTMENT OF TOURISM & TRAVEL MANAGEMENT

Semester-III

Syllabus

Paper – III TOURISM PRODUCTS

#### Module-1

Definitions – concept, types and characteristics of tourism products, elements of tourism products – geographical elements and other tourist attractions – different levels of models and layers – product lifecycle.

#### 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 and climate on tourism, seasonal rhythm – geographical components and tourism development linkages.

#### Module-3

Natural tourist resources – important national parks and wild life sanctuaries – examples from south INDIA. Beaches and islands, waterfalls: desert tourism, deserts, safaris and festivals, recreation and adventure tourism (land, water and air based)

Module-4 Concept of tourism pilgrimage in India – select Hindu, Buddhist, Jain, Sikh, Islam and Christian pilgrim centres and related circuits

Module-5 Performing arts and Handicrafts of India – music and dance (tribal, folk, & classical) tourism festivals – introduction to medical, health and wellness tourism – world heritage sites in India.

#### References: -

1. Ranga Mukesh, tourism promotion in India.
2. Sarkar H, museums and protection of monuments and antiquities in India.
3. Vijaya Lakshmi, history of tourism.
4. Williams S (1998) Tourism geography, Routledge, London. WWW.Unwto.org.
5. <http://www.buzzle.com>

6. [www.international.icomos.org](http://www.international.icomos.org)
7. [www.unesco.org](http://www.unesco.org)
8. [www.pondiuni.edu.in](http://www.pondiuni.edu.in)
9. [www.globalpropertyguide.com](http://www.globalpropertyguide.com)
10. [www.amazon](http://www.amazon)



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2022-23

Core papers

DEPARTMENT OF TOURISM & TRAVEL MANAGEMENT

Semester IV – Syllabus

Paper IV: - CULTURAL TOURISM IN ANDHRA PRADESH

Module -1

Definition to History and culture (Tangible and Intangible) – Brief History of – Salient Features of A.P Culture

Module - 2

Pre and Proto History – Art and Architecture of A.P as Tourism Products – Major Museums and Art Galleries – Major Pilgrim Centres (Temple, Church and Mosque) in A.P

Module -3

Performing Arts and Handicrafts – Andhra Paintings and Stone Crafts – Music and Dance (Tribal, Folk and Classical)

Module -4

Language and Literature – Dress and Ornaments – Food (cuisine) and Health (Medical Systems)

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 – UNESCO Initiatives – Field Visits.

References:

APTDC Publications

Shivangi Reddy, E, - Andhra Pradesh Tourism Vana ulu – Akcakale (Telugu), Hyderabad, 2003

[www.aptdc.gov.in](http://www.aptdc.gov.in)

[www.aptourism.gov.in](http://www.aptourism.gov.in)

[www.tavell.in/Andhra](http://www.tavell.in/Andhra)



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2022-23

Core papers

DEPARTMENT OF TOURISM & TRAVEL MANAGEMENT

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](http://www.tourism.gov.in)
7. [www.qtic.com](http://www.qtic.com)

[www.cedeop.europa.eu](http://www.cedeop.europa.eu)



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2022-23

Core papers

DEPARTMENT OF TOURISM & TRAVEL MANAGEMENT

Semester V Syllabus

Paper - 6- TRAVEL AGENCY AND TOUR OPERATION BUSINESS

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.](http://www.growourregion.com)**

**6.[www.usaidg.gov.com](http://www.usaidg.gov.com)**



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2022-23

Core papers

DEPARTMENT OF TOURISM & TRAVEL MANAGEMENT

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](http://www.ilo.org)**
- 6. [https://ringinstitute .com](https://ringinstitute.com)**
- 7. <https://alison.com>**



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2022-23

Core papers

Horticulture

Semester-I Paper-I



CBCS / Semester System (w.e.f. 2020-'21 Admitted Batch)

I Semester /Horticulture Core Course - I

Fundamentals of Horticulture and Soil Science

(Total hours of teaching – 60 @ 04 Hrs./Week)

**Theory :**

**Learning Outcomes:** On successful completion of this course, the students will be able to:

- Understand the scope and potential of horticulture products in India and Andhra Pradesh.
- Classify the horticulture plants based on soil and climate.
- Illustrate different systems of planting in orchard and predict the number of plants in a given land.
- Demonstrate the methods and types of training and pruning.
- Explain the basics of soil science and justify the role of soil as a medium for plant growth.
- Explain about integrated nutrient management and demonstrate the skills of soil testing.

**Unit I : Introduction to Horticulture**

**12 Hrs.**

1. Horticulture: Definition, importance of horticulture in terms of economy, production, employment generation, environmental protection and human resource development.
2. Divisions of horticulture with suitable examples and their importance.
3. Area, production of Horticultural crops in A.P. and India.
4. Fruit and vegetable zones of India and Andhra Pradesh.
5. Export scenario and scope for Horticulture in India.

**Unit II : Classification Horticulture Crops**

**12 Hrs.**

1. Classification of horticultural crops based on soil and climatic requirements.
2. Vegetable crop gardens – Nutrition and kitchen garden – tracer garden – vegetable forcing – market garden – roof garden.
3. Gardens in floriculture – flower gardens – soil and mixed gardens; land scape Horticulture.

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**Unit III :Characteristics of Orchards****12 Hrs.**

1. Orchard: Definition, different systems of planting orchards – square, rectangular Quincunx, hexagonal and contour.
2. Calculation of planting densities in different systems of planting.
3. Different types and methods of pruning.
4. Training: Definition, principles and objectives; merits and demerits of open and close centered, and modified leader systems.

**Unit IV :Physico-chemical characteristics of Soil****12 Hrs.**

1. Soil: Definition, minerals and weathering to form soils; factors of soil formation.
2. Soil taxonomy; soil color, texture and structure; other physical properties and stability.
3. Soil colloids and charges; ion adsorption and exchange; soil temperature and soil air.
4. Soil pH and acidity; soil alkalinity and salinity.

**Unit V :Soil as a living matter****12 Hrs.**

1. Soil organic matter – composition and decomposability.
2. Humus – fractionation of organic matter.
3. Soil biology: Soil microorganisms and fauna –beneficial and harmful roles.
4. Integrated nutrient management and soil tests.

**Text books:**

- **Prasad and Kumar ,2014.**: Principles of Horticulture 2<sup>nd</sup> Edition Agribios India
  - **Kumar, N., 1990** Introduction to Horticulture. Rajyalakshmi Publications, Nagarkoil, Tamilnadu
  - **Jithendra Singh, 2002.** Basic Horticulture. Kalyani Publishers, Hyderabad
  - **KausalkumarMisra and Rajesh Kumar, 2014** Fundamentals of Horticulture
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2022-23

**Core papers**

**II Semester /HorticultureCore Course - 2**  
**Plant Propagation and Nursery Management**  
(Total hours of teaching – 60 @ 04 Hrs./Week)

**Theory :**

**Learning Outcomes:** On successful completion of this course, the students will be able to:

- Explain sexual and asexual propagation methods of plants.
- Demonstrate skills on vegetative propagation of plants.
- Demonstrate the techniques on raising of different types of nursery beds
- Justify the role of various propagation structures used to raise horticulture plants.
- Understand the regulation to establish a plant nursery and quality parameters to be maintained.
- Implement different routine/regular activities in a nursery.
- Understand the economics of a plant nursery and can maintain necessary records.

**Unit -1: Sexual propagation**

**12 Hrs.**

1. Sexual propagation – advantages and disadvantages.
2. Seed germination, process of seed germination; factors affecting seed germination;
3. Pre-germination treatments and viability tests; sowing methods of seeds.
4. Polyembryony in propagation of *Opuntia*, trifoliolate orange, mango and *Citrus*.

**Unit -2: Asexual propagation**

**12 Hrs.**

1. Asexual propagation – advantages and disadvantages.
2. Using bulbs, corms, tubers and rhizomes to raise nursery.
3. Stolons, runners and offsets in raising nursery.
4. Apomixis : Definition; role of apomictics in propagation of apple, mangosteen and *Citrus*.

**Unit- 3 : Vegetative propagation techniques**

**12 Hrs.**

1. Cuttings: Definition, propagation by root, leaf and stem cuttings.
2. Layering : Definition, techniques of simple, serpentine, mound, trench and air layering.
3. Grafting : Definition; approach and detached scion (Veneer, whip, cleft, side and bark) grafting techniques.
4. Budding :Definition; techniques of T- , patch and chip budding.

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**Unit – 4 :Basic requirements of a nursery**

**12 Hrs.**

1. Plant nursery: Definition, importance; Basic facilities for a nursery; layout and components of a good nursery.
2. Nursery beds – types, their merits and demerits; precautions to be taken during preparation.
3. Brief account of growing media; nursery tools and implements.
4. Containers for plant nursery.
5. Brief account of plant propagation structures.

**Unit -5: Nursery management**

**12 Hrs.**

1. Bureau of Indian Standards (BIS-2008) related to nursery; guidelines for nursery raising.
2. Nursery accreditation and Certification.
3. Seasonal activities and routine operations in a nursery; watering, weeding and control of pests and diseases.
4. Common possible errors in nursery activities.
5. Economics of nursery development and record maintenance; online nursery information and sales systems.



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2022-23

**Core papers**

**III Semester /Horticulture Core Course - 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 vegetable cultivation 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 and Leafy 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 (e) 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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2022-23

**Core papers**

**IV Semester /Horticulture Core 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.
- Examine the 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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2022-23

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 able to:

- 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.



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2022-23

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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2022-23

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**

**2022-2023**



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**DEPARTMENT OF ENGLISH**

**FIRST SEMESTER**

**MA English**

**2022-2023**

**With effect from 2020 - 21 (Under CBCS Pattern)**

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**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**



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**FIRST SEMESTER**

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**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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**FIRST SEMESTER**

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**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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**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**



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**DEPARTMENT OF ENGLISH**

**MA English**

**2022-2023**

**FIRST SEMESTER**

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**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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**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**

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**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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**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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**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.**



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**2022-2023**

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**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.**



**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



**M.Sc. Zoology**

**2022-2023**

**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, vermiculture, poultry etc.
PO4	With gained skill set in molecular biology techniques, can have scope to start diagnostic labs, besides getting opportunities in pharma industries.



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**M.Sc. Zoology**

**2022-2023**

**Semester- I**

**ZOO15101 : STRUCTURAL ANATOMY OF INVERTEBRATA & VERTEBRATA**

**Course outcome:** It gives scope to learn, understand and appreciate diversity of anatomical features of invertebrates and vertebrates with respect to various physiological functions.

**UNIT -I**

- 1.1 Species concept, International code of Zoological nomenclature, Taxonomical procedures, New trends in taxonomy
- 1.2 Acoelomata, Pseudocoelomata, Coelomata, Protostomia and Dueterostomia
- 1.3 Patterns of feeding and digestion in Porifera and Coelenterata
- 1.4 Feeding in Polychaeta, Mollusca and Echinodermata

**UNIT-II**

- 2.1 Structure of Gill, Lungs and Trachea
- 2.2 Circulatory system in Annelids, Arthropods and Mollusca
- 2.3 Advanced nervous system- Annelida, Arthropoda and Mollusca
- 2.4 Larval forms of Crustacea and Echinodermata

**UNIT-III**

- 3.1 Vertebrate integument and its derivatives: skin structure and functions, glands, scales, horns, claws, nails, hoofs, feathers and hairs
- 3.2 Evolution of heart
- 3.3 Evolution of aortic arches
- 3.4 Comparative account of respiratory organs

**UNIT-IV**

- 4.1 Evolution of Urinogenital system in vertebrate series
- 4.2 Organs of Olfaction, taste and lateral line system
- 4.3 Comparative anatomy of the brain in relation to its functions
- 4.4 Spinal cord and cranial nerves in mammals

### List of Practicals

1. Museum study of all phylum wise representatives (Protozoa to Echinodermata)
2. Museum study of all class wise representatives (Cyclostomes & Mammals)
3. Virtual dissection of crab nervous system
4. Virtual dissection of *Poiceloceros* digestive, reproductive and nervous system
5. Virtual dissection of cockroach reproductive and nervous system
6. Virtual dissection of weberian ossicle and brain in *Labeo rohita*
7. Virtual dissection of cranial- Nerves of *Labeo rohita*
8. Virtual dissection of cranial Nerves of frog/ toad
9. Virtual dissection of circulatory (arterial & venous) system in *Calotes*
10. Virtual dissection of Urinogenital system in *Calotes*.

### **SUGGESTED READING MATERIAL**

1. Hyman, L.H. The Invertebrates. Vol.1. Protozoa through Ctenophora, Mc Graw HillCo., New York.
2. Barrington, E.J.W. Invertebrate structure and function. Thomas Nelson and Sons Ltd., London.
3. Jagerstein, G. Evolution of Metazoan life cycle, Academic Press, New York & London.



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**M.Sc. Zoology**

**2022-23**

**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 as a unit of expression.
- 1.2 Interaction of genes: Multiple alleles, ABO groups & Rh factor, Epistasis; Incomplete dominance, 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 – Monrye W. Strickberger 3<sup>rd</sup> Ed., May, 2000.
2. Genetics – K.B. Ahluwalia – 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. Waddington.
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 Associates 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. Gelbart. 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<sup>2+</sup>, 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, Indian Edition, B.I. Publications, Pvt. Ltd.
3. The Cell (A Molecular Approach) by Geoffrey M. Cooper, 2<sup>nd</sup> Edn. 2000, ISBN.
4. Text Book of Microbiology, by R. Aananthnarayan & C.K. Jayaram Panikar, 4<sup>th</sup> Edition, Orient Longmen, Hyderabad, 1990.
5. General Microbiology by C.B. Powar & H.F. Dagainawala 1<sup>st</sup> Edition, Himalaya Publishing House, 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. Presscotts, 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 Chromatography – 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

## ZOO15104B: BIOLOGY OF PARASITISM (Internal Elective)

### Course Outcome:

Students will learn about the mode of entry, mode of infection and life-cycle of different metazoan parasites such as protozoans, digeneans, cestodes and nematodes in plants and animals. Students will learn about the zoonotic parasites and their impact on human beings.

### UNIT-I:

- 1.1. Introduction to parasitology; animal associations and host – parasite relationship
- 1.2. Distribution of diseases and Zoonosis caused by animal parasites
- 1.3. Morphology, life- cycle, mode of infection of *Plasmodium*, molecular biology of *Plasmodium* – drug targets, mechanism of drug resistance, vaccine strategies and proteomic approaches
- 1.4. Morphology, life-cycle, mode of infection of *Leishmania*, molecular biology of *Leishmania* – drug targets, drug resistance and vaccine strategies.

### UNIT-II:

- 2.1. Morphology, biology, life-cycle and mode of infection of *Entamoeba* and *Giardia*
- 2.2. Morphology, biology, life-cycle and Mode of infection of *Taenia*, *Diphyllobothrium*, *Diphylidium*
- 2.3. Morphology, biology, life-cycle and Mode of infection of *Schistosoma*, *Fasciola*, *Paragonimus*, *Opisthorchis*.
- 2.4. Gastro-intestinal nematodes, their morphology, biology and life-cycles.

### UNIT-III:

- 3.1. Modes of entry of *Schistosoma* and *Wuchereria*
- 3.2. Modes of entry of *Brugia* and *Ancylostoma*
- 3.3. Modes of entry of *Trichinella* and *Dracunculus*
- 3.4. Molecular biology of nematodes, vaccine strategies.

### UNIT-IV:

- 4.1. Immune response and self-defense mechanisms, immune evasion and biochemical adaptations of parasites
- 4.2. Parasites of veterinary importance
- 4.3. Parasites of insects and their significance
- 4.4. Nematode parasites of plants, morphology, biology, life-cycle and infection of crop plants by plant parasitic nematodes.

### Suggested Literature:

1. Foundations of Parasitology, Roberts L.S. and Janovy J., McGraw-Hill Publishers, New York, USA.
2. Modern Parasitology: A Textbook of Parasitology, FEG Cox., Wiley-Blackwell, U. K.

### Practicals

1. Study of prepared slides and museum specimens of selected parasites of representative groups of protozoans, helminths and arthropods.
2. Demonstration of *in vitro* culture of *Plasmodium*, infection of mice with *Plasmodium*, chasing the process of infection by histopathology and immunereactions.
3. Culturing insect parasitic nematode, and chasing the life-cycle of the nematode on the insect host.
4. Culturing an insect parasitoid and studying their infection on an insect host.
5. Studying the infection of tomato plant by root knot nematode.

## ZOO15104C: Principles of Ecology (Internal Elective)

### Outcome:

Students acquire knowledge on different ecological concepts: characteristics of several Ecosystems. Students will gain adequate knowledge on food chain system, Biochemical cycles, food web, energy flow etc.. Students learn latest topics on bio Indicators, Bio and phytoremediation. This paper gives complete knowledge on all aspects of Ecology.

### Unit I:

Introduction to ecology, evolutionary ecology, environmental concepts –laws and limiting factors, Ecological models. Characteristics of population, population size and exponential growth, limits of population growth, population dynamics, life history pattern, fertility rate and age structure. Competition and coexistence, intra-specific and inter-specific interactions, scramble and contest competition model, and commensalism, prey-predator interactions.

### Unit II:

Nature of ecosystem, production, food webs, energy flow through ecosystem, biogeochemical cycles, of ecosystem, ecosystem management. The biosphere, biomes and impact of climate on organisms. Stresses and their management, global climatic pattern, global warming, ozone, acid and nitrogen deposition, coping with limatic variations. Major classes of contaminants. Uptake, biotransformation, detoxification, and accumulation of toxicants.

### Unit III:

Factors influencing bioaccumulation from food and trophic transfer. Pesticides and other chemical in agriculture, industry and hygiene and their disposal. Impact of chemicals on biodiversity of microbes, animals and plants. Bioindicator and biomarkers of environmental health. Biodegradation and bioremediation of chemicals.

### Unit IV:

Biodiversity – assessment, conservation and management, biodiversity act and related international conventions. Sustainable development, natural resource management in changing environment. Molecular ecology, genetic analysis of single and multiple population, phylogeography, molecular approach to behavioural ecology, conservation genetics.

### Suggested Literature:

1. Field Sampling: Principles and Practices in Environmental Analysis, Conklin, A.R.Jr., (2004), CRC Press.
2. Principles and Standards for Measuring Primary Production, Fahey, T.J. and Knapp, A.K., (2007), Oxford University Press, UK
3. Ecological Modeling, Grant, W.E. and Swannack, T.M., (2008), Blackwell.
4. Fundamental Processes in Ecology: An Earth system Approach, Wilkinson, D.M., (2007), Oxford University Press, UK

## List of Practical:

### Habitat studies:

1. Physical and chemical characteristics of soil.
2. Assessing influence of light, temperature and moisture on plant germination and growth/animal behavior and growth.
3. Assessing influence of soil nutrient status on plant germination and growth.

### Community/ecosystem studies:

1. Assessment of density, frequency and abundance of plants/animal in a community using various techniques i.e. transect, quadrat etc.
2. Comparison of stands/communities and ordination.
3. Profile diagrams.
4. Biomass and reproductive allocation under various environments.
5. Nutrient uptake and budget for various communities/Food chain assessment.
6. Decomposition of various organic matters and nutrient release mechanisms/role of arthropods and other micro-, and macrofauna in decomposition.
7. Understanding ecosystem succession by studying various stages of vegetation/community assemblages development.
8. Molecular techniques in laboratory.
9. Insect diversity in soil.

### Landscape studies:

1. Principles of GIS, GPS and RS technology.
2. Interpretation (visual and automated) of remote sensing information for landscape differentiation

**ZOO15105 –Practical 1 (15101 and 15102)**

**ZOO15106 –Practical 2 (15103 and 15104A or B or C)**

## Semester- II

### ZOO25101: METABOLIC REGULATION & CELL FUNCTION

**Course outcome:** It enables to understand primary aspects of carbohydrate, protein, lipid and nucleotide metabolism. It also highlights their interplay and biological significance in energy metabolism and cell function. It also helps to understand the mechanisms involved in catabolism of nitrogenous wastes and clinical disorders associated with nucleotide metabolism.

#### UNIT – I

- 1.1 Chemical bonds (Covalent, Hydrogen bonds, Ionic bonds, Vanderwall's interactions)
- 1.2 Thermodynamic principles in biology
- 1.3 Outline classification of organic compounds (carbohydrates, proteins and lipids)
- 1.4 Orders of protein structure (primary, secondary, tertiary and quaternary)

#### UNIT – II

- 2.1 Glycolysis, TCA cycle and their biological importance
- 2.2 Pentosephosphate pathway, gluconeogenesis
- 2.3 Regulation of carbohydrate metabolism (Glycolysis and TCA cycle)
- 2.4 Mitochondrial electron transport system, Oxidative phosphorylation

#### UNIT – III

- 3.1 Beta-oxidation of palmitic acid; Biosynthesis of long chain fatty acids (Palmitic acid)
- 3.2 Oxidative deamination, decarboxylation and transamination of amino acids.
- 3.3 Biosynthesis of Urea and detoxification of ammonia
- 3.4 Biosynthesis of polyamines

#### UNIT – IV

- 4.1 Nucleotides and types
- 4.2 Biosynthesis of Nucleotides
- 4.3 Degradation of Nucleotides
- 4.4 Clinical disorders of purine metabolism

#### SUGGESTED READING MATERIAL

1. Robert K. Murrey, D.K. Granner, P.A. Mayes and V.W. Rodwell; Harper's Biochemistry McGraw Hill Publishers.
2. Biochemistry by A.L. Lehninger, Kalyani publishers, New Delhi.
3. D. Voet and J.G. Voet, Biochemistry, J. Wiley & Sons.
4. David L. Nelson and Michael M. Cox, Lehninger: Principles of Biochemistry, McMillan Worth Publications.

#### List of Practicals

1. Estimation of glucose
2. Estimation of soluble and structural proteins
3. Estimation of carbohydrates
4. Estimation of amino acids
5. Estimation of Glucose
6. Estimation of Blood glucose
7. Estimation of Lipids
8. Estimation of Triglycerides

## ZOO25102: DEVELOPMENTAL BIOLOGY

**Course outcome:** Students learn about germ cell determination, primordial germ cell migration, determination of germ layers in insects, nematodes, amphibians, reptilians, aves and mammals. They also learn about sex determination, oogenesis, fertilization and post fertilization events. Limb development, metamorphosis and morphogenesis also help in understanding of developmental biology very well.

### UNIT I

- 1.1 Germ line determination: Germ plasm and the determination of the primordial germcells.
- 1.2 Germ cell determination in Nematodes, Insects and Amphibians.
- 1.3 Germ cell migration in *Drosophila*
- 1.4 Germ cell migration in Amphibians, Reptiles, Birds and Mammals

### UNIT II

- 2.1 Gametogenesis: Morphological basis in animals, semen composition, formation, sperm function, Spermatogenesis
- 2.2 Leydig cells: Morphology, Differentiation, function and its regulation.
- 2.3 Oogenesis and Vitellogenesis: Ovulation, super ovulation and ovum transport in mammals.
- 2.4 Fertilization: Biochemistry of fertilization and post fertilization events.

### UNIT III

- 3.1 Creating Multi-cellularity: Cleavage types, comparative account of gastrulation, Neurulation
- 3.2 Germ layers: Ectoderm, Mesoderm and Endoderm
- 3.3 Tetrapod limb development
- 3.4 Metamorphosis in Insects and Amphibians

### UNIT IV

- 4.1 Biology of sex determination: Testis determining genes, ovarian development, secondarysex determination in mammals, Environmental sex determination
- 4.2 Body axes: Establishment of body axes in mammals
- 4.3 Proximate tissue interaction
- 4.4 Genes and Morphogenesis

### List of Practicals

1. Observation of developmental stages in frog and chick
2. Observation of different cleavage stages in the eggs of *Lymnaea* (fresh water snail)
3. Role of shell during developmental of chick
4. Protein turnover during development of chick
5. Phosphorous metabolism in developing chick embryo

### Reference Books:

1. Austen, C.R. and Short, R.V. Reproduction in Animals
2. Schatten and Schatten. Molecular Biology of Fertilization
3. F.T. Longo, Fertilization, Chapman & Hall
4. R.G. Edwards, Human Reproduction
5. S.F. Gillbert. Development Biology, Sinauer Associates Inc., Massachusetts
6. Ethan Bier the Coiled Spring Harlsor Laboratory Press, New York.

## ZOO25103: ANIMAL PHYSIOLOGY

**Course outcome:** Students will have scope to learn various concepts of physiological functions of the body such as digestion, respiration, excretion and the functions of nerves and muscles.

### UNIT – I

- 1.1 Feeding mechanisms and regulation
- 1.2 Comparative physiology of digestion of carbohydrates, protein and fats
- 1.3 Gastro-intestinal Hormones in regulation of digestion
- 1.4 Vitamins and their role in cellular metabolism

### UNIT – II

- 2.1 Respiration- Types of Respiration, Respiratory organs, Mechanism of Respiration
- 2.2 Circulation of body fluids and types of hearts
- 2.3 Patters of nitrogen excretion among different animal groups and their evolutionary significance
- 2.4 Osmoregulation in different animal groups (aquatic and terrestrial)

### UNIT – III

- 3.1 Principles of Thermoregulation
- 3.2 Homeothermic animals and Poikilothermic animals
- 3.3 Hibernation and Aestivation
- 3.4 Biological rhythms

### UNIT – IV

- 4.1 Bioluminescence- Chemistry and functional significance
- 4.2 Chromatophores and regulation of their function
- 4.3 Structure and function of muscles, Theories of muscle contraction.
- 4.4 Physiology of receptors (Photo, Phono and chemo receptors)

### List of Practicals

1. Assay of lipase
2. Assay of amylase
3. Assay of pepsin
4. Assay of ascorbic acid
5. Demonstration of cell fragility in different media (Iso, hypo and hyper)

### SUGGESTED READING MATERIAL

1. C.L. Prosser. Comparative Animal Physiology. W.B. Saunders & Company
2. R. Eckert. Animal Physiology. Mechanisms and Adaptation. W. H. Freeman & Company
3. W.S. Hoar. General and Comparative Animal Physiology
4. Schiemdt-Nielsen. Animal Physiology. Adaptation and Environment. Cambridge
5. C.L. Prosser. Environment and Metabolic Physiology Wiley-Liss. New York.

**ZOO25104A: Animal world and Economic Zoology (Open  
elective)**

**Course outcome:** Gives an outlook on characterization of Invertebrate and vertebrate phyla. Explain the role of various animals of economic importance. Gain knowledge on culture beneficial animals like earthworm, honeybees and fish and crustaceous. Gain knowledge on diseases causing organisms and its preventive mechanism.

**Unit I:** Characterization of Invertebrate phyla from Protozoa to Echinodermata

**Unit II:** Characterization of Vertebrate phyla from Fishes to Mammals

**Unit III:** Beneficial animals: Corals - Earthworm - Vermiculture - Beneficial Insects (Apiculture, Lac culture). Aquaculture – Prawns - Lobsters - Crabs - Pearloysters – 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

**Practicals:**

1. Different animals of the globe- endemic to parts of world
2. Museum study of some representatives from invertebrates to vertebrates
3. List out beneficial animals
4. List out harmful animals
5. Visit to near by Zoo, Butterfly park, Insect museum at Yogi Vemana university, and submit the reports as a part of practical work.

**ZOO25104B: Biodiversity and Wild Life Management  
(Open elective)**

**Course outcome:** Students learn about basic aspects and importance of biodiversity to maintain balanced ecosystem. Students also acquire knowledge on biodiversity hotspots and threats to hotspots. Students will also learn importance of establishing wildlife sanctuaries for conserving endangered species. They will get familiar with biodiversity and wild life.

**Unit: I**

1. Introduction to Biodiversity: Definition, History of Biodiversity
2. Maintaining Biodiversity - Importance of Biodiversity
3. Human impact on Biodiversity.
4. Types of Biodiversity: Species diversity, Genetic diversity, Ecosystem diversity & Functional diversity.

**Unit: II**

1. Biodiversity resources of India – Biodiversity hotspots in India
2. Biodiversity documentation and Nomenclature
3. Biodiversity laws and acts
4. Conservation threats to Biodiversity

**Unit: III**

1. Wild life - Importance of wild life management and wild life sanctuaries in India
2. Management of rare and endangered species
3. Types of wild life management practices in India
4. Deforestation and effects on wild life – Human impact on Wild life.

**Unit: IV**

1. Special management programme of wild animals in India
2. Wild life trade: assessment and documentation.
3. Wild life legislation and acts.
4. Wild life threats and preventions.

**Practicals:**

1. Characterization of different wild animals
2. Various wild life sanctuaries and its fauna
3. Museum study of endangered species
4. Biodiversity hot spots
5. Field visits
6. Visit to near by Zoo, Museum, forest Zones, nursery and aquaria and prepare and submit reports of these visits

**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 of India Kolkata
7. Ghosh, A.K. (2008), Biodiversity conservation: Issues on concern In: Zool Res in Humanwelfare, Ramkrishna and Chatterjee (Eds.), Z.S.I., Govt of India, Kolkata, 19-22
8. Jeffries, M.J. (2006), Biodiversity and conservation, 2nd ed., Roulledge. London and NewYork.

## **PRACTICALS**

**Practical – I (25101 and 25102)**

**Practical – II (25103 and 25104A or B)**

### 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 CO<sub>2</sub> 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,  $\theta$ -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) 3.2 Post transcriptional modification (Cap, Poly A formation and splicing), Ribozymes 3.3 Translation: General features (Genetic code, codon, degeneracy and universality) molecular mechanism of translation 3.4 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 ( $T_m$ ) 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 corticosteroid 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. Oxford Univ. Press, Oxford.
4. Prakash S. Lohar. Endocrinology-Hormones and human health-2005. MJP Publishers-Chennai



**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 transcriptase 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 Delhi 1998
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 Transgenesis 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 calcein-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. Guthrie
- 7 Casarett&Doull'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. Reller, P. Moore, Churchill Livingstone

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- Nernst 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 perception and 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 (Reintegrative memory –Recall – Recognition- Relearning Retrieval 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. Coelenterata 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. Spatial 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. Oxford University 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. Schwartz. (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. Princeton Univ. 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 histocompatibility 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 (Rheumatoid arthritis, Systemic Lupus Erythematosus (SLE). 4.2 Primary immune disorders (SCID, Digeorge's syndrome) 4.3 Immunodeficiency diseases (AIDS), HIV's mechanism of Immunosuppression 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 Publications, 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., Roulledge, London and New York.

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