



P.K. University
Shivpuri (M.P.)

Scheme

For

B.Sc. 3rd year

W.E.F. - Session 2023 - 2024

P.K. UNIVERSITY, SHIVPURI (M.P.)

P.K. University, Shivpuri (MP)
B.Sc. 3rd year Syllabus

S. No.	Course	Course Code	Title of the Paper	T		P	Total
				CCE	UE		
1.	Common Paper	UENGLBC301	English Language and Communication skill	-	50	-	50
2.		UPERSBC302	Personality Development and Character Building	-	50	-	50
3.		UDIGIBC303	Digital Awareness-Cyber Security	-	50	-	50
4.		UBHASBC304	Bhasha aur Sanskriti	-	50	-	50
5.		UDESBC305	Desktop publishing-Theory	30	70	-	100
6.		UDESBC306	Desktop publishing -practical	-	-	100	100
7.		UPROJSP307	Undergraduate 3 rd Year project in Major Physics/Mathematics, etc.)	-	-	100	100
8.	PCM	UNUMEMA308	Numerical Methods and Scientific Computational (Theory)	30	70	-	100
9.		UELEMA309	Elements of Discrete Mathematics(Theory)	30	70	-	100
10.		UQUANPH310	Quantum Mechanics, Solid State Physics and Devices(Theory)	30	70	-	100
11.		UQUANPH311	Quantum Mechanics, Solid State Physics and Devices Lab III	-	-	100	100
12.		UPHARCH312	Pharmaceutical and Medicinal Chemistry	30	70	-	100
13.		UPHARCH313	Pharmaceutical and Medicinal Chemistry Lab III	-	-	100	100
14.		ZBC	UINSEZO308	Insect Taxonomy and Applied Entomology(Paper-I)	30	70	-
15.	UAPPLZO309		Applied Entomology Lab III	-	-	100	100
16.	UECOLZO310		Ecology, Biodiversity and Evolution (Paper-II)	30	70	-	100
17.	UENVIZO311		Environmental Biology Lab III	-	-	100	100
18.	UPHARCH312		Pharmaceutical and Medicinal Chemistry	30	70	-	100
19.	UPHARCH313		Pharmaceutical and Medicinal Chemistry Lab III	-	-	100	100
20.	UETHNBO314		Ethno Botany	30	70	-	100
21.	UETHNBO315		Ethno Botany Lab III	-	-	100	100

UENGLBC301: English Language and Communication skill

Unit-I

Reading, Writing and Interpretation Skills: (Text-Based)

The Express -Stephen Spender

The World is Too Much with Us-William Wordsworth

My Financial Career -Stephen Leacock

Running for Governor-Mark Twain

Unit-II

Essay writing -Topical essays: Terrorism, Covid -19 Pandemic, India and the Modern World, The Role of Women in the New Era, The Global World.

Unit-III

Communicative Skills: Words often Confused, Misused, Idiomatic Expressions and Proverbs, etc.

Essential Conversations: Introducing Yourself, Introducing Other Persons, Meeting Someone First Time, At the Airport, Ordering Food in a Restaurant, Talking about a Movie, etc.

Filing an **F.I.R.**, Writing a Resume, E-mail Writing, Blog Writing on a given topic.

Key Words: Manifesto, Self- Possession, Streamline, Rage, Meteors, Fierce, Perjury, Intent, Campaign, Malicious, English Communication, Competence, Soft Skills, Practical Knowledge, Resume, CV, Blog, Blog

Textbooks, Reference Books, Other Resources

Suggested Readings and Web Materials:

- 1- Essential English Grammar — Raymond Murphy, Cambridge University Press.
- 2- Practical English Grammar Exercises 1- A. J. Thomson & A. V. Martinet, Oxford India.
- 3- Practical English Usage - Michael Swan, Oxford
- 4- English Grammar in Use — Raymond Murphy, Cambridge University Press.
- 5- Essays for UPSC Exams New Delhi.
- 6- A Practical Course in Spoken English- .1 K Gangal, PHI, New Delhi Publications.
- 7- Speak and Write Effectively- PDF materials on the web-NET
- 8- www.englishclub.com www.eslfast.com

UPERSBC302: Personality Development and Character Building

Unit-I

- Personality development (Physical, mental, intellectual and spiritual development) meaning, concept, factors of personality development.
- Character building (personal and national character): Meaning, concept, factors of character and means of character building.
- Panchkosha, Annamaya Kosha, Pranamaya Kosha, Manomaya Kosha, Vigyanmaya Kosha and Anandamaya Kosha general introduction meaning purpose and importance.
- Benefits of Panchkosh development and means of developing Panchkosh

Unit-II

- Physical and mental development
- Meaning, concept of physical and mental development
- Ideal daily routine, balanced diet, routine, subtle exercise
- Ashtanga Yoga-Yama Niyam, Ishwar Pranidhan, self-study, contentment, patience, virtue, practice of discipline.
- Pastglory, social and citizenship awareness, equal respect to all sects and scientific outlook.
- Nation, Nationality, Democracy, Independence, Suraj, Vasudhaiva Kutumbakam, Coexistence.

Unit-III

- Moral and mental development
- Difference among happiness, joy and pleasure.
- Ashtanga Yoga, Pranayama, Pratyahara, Dharana, Dhyana, Samadhi.
- Continuity of Karmayoga, Bhaktiyoga, Jnanayoga in life according to one's own will
- Indian time calculation.
- Self-respect and contemplation of mother tongue and Indian knowledge tradition.
- Biographies of Legends.
- Practice of service, tolerance, charity, dedication and self-examination. Self reliance

UDIGIBC303: Digital Awareness-Cyber Security

Unit-I

Overview of Computer and Web-technology, Architecture of cyberspace, World wide web, Advent of internet, Internet infrastructure for data transfer and governance, Internet society.

Use of Internet: Web browsers, search engines and Chat bots. Difference between Website & Portal, E-mail: Account opening, sending & receiving e-mails, managing Contacts & Folders.

Computer Security: Issues & protection, firewall & antivirus, making secure online transactions. Internet safety and digital security. Ethical use of digital resources, Measures of Online Self Protection.

Keywords: Browser, Search Engine, Website, Virus, Security, Firewall, Cyber Ethics.

Unit-II

Digital Payments and e-Commerce:

Internet Banking: National Electronic Fund Transfer (NEFT), Real Time Gross Settlement (RTGS), Immediate Payment Service (IMPS)

Digital Financial Tools: Understanding OTP [One Time Password], QR [Quick Response] Code, UPI [Unified Payment Interface], AEPS [Aadhaar Enabled Payment System]; USSD[Unstructured Supplementary Service Data], Card[Credit/Debit], e Wallet, PoS [Point of Sale]

Definition of E-Commerce-Main components of E-Commerce, Elements of E-Commerce security, E-Commerce threats, E-Commerce security best practices, Online Bill Payment. Digital payments related common frauds and preventive measures. RBI guidelines and provisions of Payment Settlement Act, 2007.

Keywords: Internet Banking, Digital Financial Tools, e Wallet, e-Commerce Security.

Unit-III

e-Governance Service-

Overview of e- Governance Services like Railway Reservation, passport, e Hospital; Accessing various e-Governance Services on Mobile Using “UMANGAPP”. Exploring services and resources of Government of India Portal (<https://www.mygov.in/>).

Digi-Locker: About digilocker, features and benefits of digilocker, registering, accessing and getting various certificates and mark sheets on digilocker.

Academic Bank of Credit (ABC): About ABC, features and benefits of ABC, Registering, accessing, getting and sharing academic credits.

Exploring Online Learning resources: Online learning through SWAYAM Central, (<https://swayam.gov.in/>) and e-pathshala (<https://epathshala.nic.in/>).

Keywords: *Internet Banking, NEFT, RTGS, IMPS, OTP, UPI, QR Code, AEPS, E-Governance, Umang.*

Unit-IV

Introduction to Cyber security-

Regulation of cyberspace, Concept of cyber security, Issues and challenges of cyber security.

Definition of cybercrimes and offences, Cybercrime targeting computers and mobiles, Cybercrime against women and children, Cyberbullying. Financial frauds, Social engineering attacks, Malware and Ransomware attacks, zero day and zero click attacks. Cybercriminals modus-operandi, Reporting of cybercrimes, Remedial and mitigation measures, Legal perspective of cybercrime, IT Act 2000 and its amendments, Organizations dealing with Cybercrime and Cyber security in India, Case studies.

Keywords: *Cyber Space, Cyber Security, Cyber Offences, Zero Click Attack, Zero Day Attack, Ransom ware, Reporting Cyber Crimes, Cyber Crimes Case Studies.*

Unit-V

Social Media Overview and Security-

Introduction to Social Networks, Types of Social media, Social media platforms, Social media monitoring, Hashtag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media, Case studies.

Keywords: *Social Media Platforms, Hashtagging, Social Media Marketing,*

Flagging of contents in social media

Suggested Readings:

1. Praveen Kumar Shukla, Surya Prakash Tripathi, Ritendra Goel "Introduction to Information Security and Cyber Laws" Dreamtech Press.
2. Vivek Sood, "Cyber law simplified", Tata McGraw Hill, Education (India).
3. T. Bradley "Essential Computer Security: Everyone's Guide to Email, Internet, and Wireless Security".
4. Cyber Crime Impact in the New Millennium, by R. CMishra, Author Press. Edition 2010.
5. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Bela

pureandNinaGodbole,WileyIndiaPvt.Ltd.(FirstEdition,2011)

6. SecurityintheDigitalAge:SocialMediaSecurityThreatsandVulnerabilitiesbyHenryA.Oliver,Create SpaceIndependentPublishingPlatform.(Pearson,13thNovember,2001)
7. Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt. Ltd.
8. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
9. Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
10. Fundamentals of Network Security by E. Maiwald, McGraw Hill

UDIGIBC304: Bhasha aur Sanskriti

Part of Ability Enhancement Compulsory Course

पठक पाठ्यक्रम : पठक पाठ्यक्रम पाठक पाठ्यक्रम पाठक				
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	पठक	पठक पाठ्यक्रम		
1	पठक पाठक	UBHASBC304		
2	पठक पाठक पाठक	पठक पाठक पाठक		
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6	पठक पाठक	02 पाठक		
7	पाठक पाठक	50 पाठक		
8	पाठक पाठक पाठक	17 पाठक		
9	पाठक	2 पाठक		

पठक पाठक

पठक पाठक पाठक पाठक पाठक पाठक 15 पाठक		
पाठक	पाठक	पाठक पाठक

1.	<p>1- $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$ $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$</p> <p>2- $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$ $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$</p> <p>3- $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$ $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$</p>	05
2.	<p>1- $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$ $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$</p> <p>2- $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$ $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$</p> <p>3- $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$</p>	05
3.	<p>1 - $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$</p> <p>2- $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$</p> <p>3- $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ (କିମ୍ବା $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍) $\frac{1}{x^{2n+2}}$, $\frac{1}{x^{2n+2}}$, $\frac{1}{x^{2n+2}}$, $\frac{1}{x^{2n+2}}$, $\frac{1}{x^{2n+2}}$,</p>	05

	<p>$\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$</p>
1	<p>$\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$</p>
2	<p>$\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$</p>
3	<p>$\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$, $\frac{1}{x^{2n+2}}$, $\frac{1}{x^{2n+2}}$, $\frac{1}{x^{2n+2}}$, $\frac{1}{x^{2n+2}}$</p>
4	<p>$\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$</p>
5	<p>$\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ : $\frac{1}{x^{2n+2}}$</p>
6	<p>$\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ / $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍</p> <p>1- book.google.com></p> <p>2-http://kavitakosh.org> $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍</p> <p>3-http://onlinefreenotes.com> $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍</p>

1- $\frac{1}{x^2}$ ର $x=0$ ର n ଥର ଡେରିଭେଟିଭ୍ (CCE) ଠିକ୍ ଠାରେ !

**UNUMEMA308: Numerical Methods and Scientific Computational
(Theory)**

Unit-I

Methods for Solving Algebraic and Transcendental Equations: 1.1 Ramanujan

1.2 Bisection

1.3 Regular Falsi

1.4 Secant

1.5 Newton-Raphson

Unit-II

Interpolation and Numerical Integration:

2.1 Lagrange interpolation

2.2 Finite difference operators

2.3 Interpolation formula using Differences

2.3.1 Gregory-Newton Forward Difference Interpolation

2.3.2 Gregory-Newton Backward Difference Interpolation

2.4 Numerical Integration

2.4.1 Newton- Cote's formulae

2.4.2 Trapezoidal rule

2.4.3 Simpson's 1/3 Rule

2.4.4 Simpson's 3/8 Rule

2.4.5 Gauss Integration

Unit-III

Methods to Solve System of Linear Equations:

3.1 Direct method for solving system of linear equations

3.1.1 Gauss elimination

3.1.2 LU decomposition

3.1.3 Cholesky decomposition

3.2 Iterative method

3.2.1 Jacobi

3.2.2 Gauss-Seidel

Unit-IV

Numerical Solution of Ordinary Differential Equations:

4.1 Single step methods

4.1.1 Picard

4.1.2 Taylor's series

4.1.3 Euler

4.1.4 Runge-Kutta

4.2 Multistep methods

4.2.1 Predictor-corrector

4.2.2 Modified Euler

4.2.3 Milne-Simpson

Keywords/Tags:

Algebraic and transcendental equations, Interpolation, Numerical Integration, Gauss elimination method, LU decomposition, Jacobi method, Gauss-Seidel method, Picard method, Runge - Kutta method, Predictor-corrector method, Milne-Simpson method

Suggested Readings:

Text Books:

1. S. S. Sastry: Introductory Methods of Numerical Analysis, Prentice Hall India Learning Private Limited, Fifth edition, 2012.
2. E. Balagurusamy: Numerical Methods, Tata McGraw Hill Publication, 2017.
3. 1:11:4 7kQT ftit t'.n 7e1

Reference Books:

1. M. K. Jain, S. R. K. Iyengar, R. K. Jain, Numerical Method for Scientific and Engineering Computation, New Age International (P) Ltd., 1999.
2. Saxena H. C.: Finite Differences & Numerical Analysis, S Chand, 2010.

UELEMMMA309: Elements of Discrete Mathematics (Theory)

Unit-I

- 1.1 Indian logic
 - 1.1.1 Origins
 - 1.1.2 The schools Vaisheshika
 - 1.1.3 Catuskoti
 - 1.1.4 Nyaya
 - 1.1.5 Jain logic
 - 1.1.6 Buddhist logic
 - 1.1.7 Navya-Nyaya
 - 1.1.8 Influence of Indian logic on modern logic
 - 1.1.9 Boolean Logic and Indian Thoughts
- 1.2 Relations
 - 1.2.1 Binary, Inverse, Composite and Equivalence relation
 - 1.2.2 Equivalence classes and its properties
 - 1.2.3 Partition of a set
 - 1.2.4 Partial order relation
 - 1.2.5 Partially ordered and totally ordered sets
 - 1.2.6 Hasse diagram
- 1.3 Lattices
 - 1.3.1 Definition and examples
 - 1.3.2 Dual, bounded, distributive and complemented lattices

Unit-II

- 2.1 Boolean Algebra
 - 2.1.1 Definition and properties
 - 2.1.2 Switching circuits and its applications
 - 2.1.3 Logic gates and circuits
- 2.2 Boolean functions
 - 2.2.1 Disjunctive and conjunctive normal forms
 - 2.2.2 Boolean expansion theorem
- 2.3 Minimize the Boolean function using Karnaugh Map

Unit III Graphs:

- 3.1 Definition and types of graphs
- 3.2 Sub graphs
- 3.3 Walk, path and circuit
- 3.4 Euler graph
- 3.5 Hamiltonian path and circuit
- 3.6 Dijkstra's Algorithm for shortest paths in weighted graph

Unit IV Tree:

- 4.1 Trees and its properties

- 4.2 Rooted, Binary and Spanning tree
- 4.3 Rank and nullity of a graph
- 4.4 Kruskal's and Prim's Algorithm
- 4.5 Cut-set and its properties
- 4.6 Fundamental Circuit and Cut-Set
- 4.7 Planar graphs
- 4.8 Kuratowski's two graphs
- 4.9 Matrix representation of graph
 - 4.9.1 Incidence
 - 4.9.2 Adjacency
 - 4.9.3 Circuit
 - 4.9.4 Cut-Set
 - 4.9.5 Path

Unit-I: Solid state Physics-1

Crystal Structure and bonding: Crystalline and amorphous solids, Translational symmetry Lattice and basis. Unit cell. Reciprocal lattice. Fundamental types of lattices (Bravais Lattice). Miller indices Lattice planes, Simple cubic. Face centered cubic. Body centered cubic lattices, Laue and Bragg's equations. Determination of crystal structure with X-rays, X-ray spectrometer. Ionic, covalent, metallic, van der Waals and hydrogen bonding. Band theory of solids, Periodic potential and Bloch theorem. Kronig-Penny model (Qualitative).

Unit-II: Solid state Physics-2 [15 Lectures]

Lattice Structure and Properties : Dulong Petit. Einstein and Debye theories of specific heats of solids. Elastic and atomic forces constants. Dynamics of a chain of similar atoms and chain of two types of atoms. Optical and acoustic modes. Electricity resistivity , specific heat of electron. Wiedemann- Franz law. Hall effect . resonance of substances in magnetic field , dia- ,para- and ferromagnetic materials. Classical Langevin theory of dia and paramagnetic domains, Curie's law, Weiss theory of ferromagnetism and ferromagnetic domains. Discussion of BH hysteresis.

Unit-III Semiconductor devices-1 [15 Lectures]

Electronic devices: Types of semiconductors (p and n). Formation of Energy Bands. Energy level diagram. Conductivity and mobility. Junction formation, Barrier formation in p-n junction diode. Current flow mechanism in forward and reverse biased diode (recombination), drift and saturation of drift velocity. Derivation of mathematical equations for barrier potentials, barrier width . single p-n junction device (physical explanation, current voltage characteristics and one or two applications). Two terminal devices, Rectification, Zener diode, Photo diode, Light emitting diode. Solar cell. Three Terminal devices. Junction field effect transistor(JFET). Two junction devices. Transistors as p-n-p and n-p-n. physical mechanism of current flow. Characteristics of transistor. 14

Unit – IV Semiconductor devices- 2 Amplifiers (only bipolar junction transistors).

CB,CE and CC configurations. Single stage CE amplifier (biasing and stabilization circuits), Q- point, equivalent circuit, input impedance, output impedance, voltage and current gain . Class A,B,C amplifiers(definitions). RC coupled amplifiers. Voltage feedback and current feedback. Effect of negative voltage series feedback on input impedance. Output impedance and gain, Stability, distortion and noise, Principle of an Oscillator, Barkhausen criterion , Colpitts, RC phase shift oscillators. Basic concepts of amplitude , frequency and phase modulations and demodulation.

Unit – V Nano Materials Nanostructures :

Introduction to nanotechnology, structure and size dependent properties. 3D, 2D, 1D nanostructure materials and their density of states, surface and interface effects. Modeling of quantum size effect. Synthesis of nano particles bottom up and top down approach , Wet Chemical Method . Nanolithography. Metal and Semiconducting nano materials. Essentials differences in structural and properties of bulk and nano materials (qualitative description). Naturally occurring nano crystals. Applications of nano materials.

References:

1. Quantum Mechanics: V. Devanathan, Narosa Publishing House, New Delhi, 2005
2. Quantum Mechanics: B.H. Brandsen, Pearson Education, Singapore, 2005
3. Quantum Mechanics: Concepts and Applications, Noureding Zettili, Jacksonville State University, Jacksonville, USA, John Wiley and Sons Ltd. 2009
4. Physics of Atoms and molecules: B.H. Brandsen and C.J. Joachim, Pearson Education, Singapore, 2003
5. Fundamentals of molecular spectroscopy C.M. Banwell and M. McCash, McGraw Hill (U.K. edition).
6. Introduction to Atomic Physics: H. E. White
7. Quantum Mechanics: Schaums Outlines, Y. Peleg, R. Pnini, E. Zaarur, E. Hecht

UQUANPH311: Quantum Mechanics and Spectroscopy- II Lab

List of Practicals:

1. Fresnel Biprism: Wavelength of sodium light
2. Fresnel Biprism: Thickness of mica sheet)
3. Newton's Rings: Wavelength of sodium light
4. Newton's Rings: Refractive index of liquid
5. Plane Diffraction Grating: Resolving power
6. Plane Diffraction Grating: Spectrum of mercury light
7. Spectrometer: Refractive index of the material of a prism using sodium light
8. Spectrometer: Dispersive power of the material of a prism using mercury light
9. Polarimeter: Specific rotation of sugar solution
10. Wavelength of Laser light using diffraction by single slit

UPHARCH312: Pharmaceutical and Medicinal Chemistry

Unit I

Pharmaceutical Chemistry

- Introduction to pharmacy, career in pharmacy, codes of pharmaceutical ethics, importance of pharmaceutical chemistry, pharmacopeia and its history (IP, BP, USP, NF)
- Drug and cosmetic act with special reference to schedule M, GMP, GLP, GCP, USFDA, NDA, clinical trial
- Concept of quality and total quality management, quality assurance and quality control, IPQA, IPQC.
- Documentation and maintenance of record, intellectual property rights, patents, trademark, copyright, patent act.

Unit II

Pharmacognosy

- Definition, history, scope and development of Pharmacognosy.
- Classification and Sources of drugs: classification of drugs, sources and uses of natural drug products, biological (plant, animals and microbes), geographical, marine and mineral sources.
- Drug receptors: Introduction to drug receptors, nature of drug receptors, different bonding involved in drug – receptor interaction, drug receptor theories.
- Drug absorption: routes of drug administration, absorption of drug and factors affecting absorption.

Unit III

Molecular Modeling and Drug Design

- Drug design and development an overview, analogues and prodrugs structure and activity relationship between chemical (SAR), factor governing drug design, approaches to drug design receptor site theory.
- Introduction to combinatorial synthesis in drug discovery, factors affecting bioactivity.
- QSAR- free- Wilson analysis. Structure a biological activity Hansch analysis relationship between Free – Wilson analysis and Hansch analysis.

Unit IV

Antibiotics and Antibacterials

- Introduction, antibiotic β – lactam Type – Penicillin, Cephalosporins, Antitubercular – Streptomycin, Broad spectrum Antibiotics – Tetracyclines, Anticancer – dactinomycin (Actinomycin D)

Unit V

Antifungal and Non – steroidal Anti – inflammatory Drugs

- Antifungal: Polyenes, Antibacterial – Ciprofloxacin, Norfloxacin, Antiviral – Acyclovir
- Antimalarials: Chemotherapy of Malaria SAR, Chloroquine, Chloroguanide and Mefloquine.
- Non – steroidal Anti – inflammatory Drugs; Diclofenac Sodium, Ibuprofen and Neptopam.

Keywords/Tags: Pharmacopeia, patents, trademark, copyright, QA, QC, Pharmacognosy, drug design, QSAR, antibiotics, antibacterials, antifungal, anti – inflammatory drugs, antimalarials.

Suggested Readings:

1. “Pharmaceutical Chemistry Inorganic Vol.1” , Chatwal G. R., Himalaya Publishing House, Mumbai, 2010 .
2. “Textbook of Pharmacognosy”, Wallis T.B., CBS Publishers and Distributors, New Delhi, 2005, Fifth Edition.
3. “Pharmaceutical Chemistry”

UPHARCH313: Pharmaceutical and Medicinal Chemistry

Practical

Unit I

Preparation of Pharmaceutical compound-

- a) Acetanilide
- b) Aromatic water
- c) Lotion
- d) Aspirin

Unit II

Preparation of pharmaceutical compound

- a) Tincture Iodine
- b) Alum
- c) Ferrous Ammonium sulphate
- d) Antimony potassium tartrate

Unit III

- a) Isolation of caffeine from tea leaves
- b) Extraction of active constituents from extraction method

Unit IV

- a) Identification of crude drug
- b) Morphology of turmeric, ginger, Mentha

Unit V

- a) Preparation of suspension. Emulsions, ointment
- b) Preparation of simple syrup as per IP and USP
- c) Preparation of pharmaceutical buffer and study of its theoretical and calculated pH
- d) Inorganic preparation of compounds like Zinc Oxide, calcium carbonate, Magnesium Carbonate.

Suggested Readings:

1. Practical Pharmaceutical chemistry by A.H. Beckett and J.B. Stenlake, 4th Edition, Part-II continuum international publishing Group Ltd, 2000
2. A Practical book of Pharmaceutical Inorganic chemistry by K.B. Patil, N.B. Patil and P.A. Patil, JP Innovative publication, 1st edition, 2019
3. Pharmaceutical chemistry inorganic by G.R. Chatwal, Himalaya publication, Vol.1
4. Experimental Pharmaceutical Chemistry by Aneesahmad Siddiqui, Seemi Siddiqui, Edition 1
5. Pharmacognosy by Dr. C.K. Kokate volume-1, forty fifth edition, Nirali Prakashan

UINSEZO308: Insect Taxonomy and Applied Entomology(Paper-I)

Unit-I

1. Introduction of Insect

History of Insect biology, Identifying characters and outline classification of class — Insecta up to orders.

- a. Diagnostic features with example of Insect orders — Isoptera, Orthoptera, Hemiptera, Coleoptera, Hymenoptera, Lepidoptera, Diptera.

2. General Morphology of an insect (Periplaneta)

Antennae, Mouth parts, Legs, Wings, Genitalia.

1. General Anatomy of an insect (Periplaneta)

Digestive System, Excretory System, Nervous System and Reproductive system.

2. Ecological services of Insect.

3. Role of Insect in Agriculture (Direct & Indirect)

Unit-II

Beneficial Insects

1. Sericulture

1.1 History of Sericulture, Systematic position, Silk

[I] producing moths (mulberry and non mulberry)

1.2 Mulberry Silkworm — lifecycle of *Bombyx mori*

1.3 Sericulture Industry and its management.

1.4 Diseases and enemies of silkworm.

1.5 Uses of Silk and Sericulture in India.

2. Apiculture

2.1 History of Apiculture, classification and species of Honeybee.

2.2 Social organization, division of labor and lifecycle of Honeybee.

2.3 Bee keeping methods and equipments.

2.4 Diseases and enemies of Honeybee. _

2.5 Products, its uses and Apiculture in India.

3. Lac Culture

3.1 History of Lac culture , Systematic position, structure of lac insect.

3.2 Lifecycle of lac insect and host plants.

3.3 Varieties and crops of lac.

3.4 Cultivation of lac and enemies of lac insect.

3.5 Uses of lac and Lac industry in India. .

4. Edible Insects — Locust, Termite, Grasshopper, Beetles, Caterpillars and Bees.

Keywords: Sericulture, Apiculture, Lac culture, Edible Insects

Unit-III

Important Insect pest of Crop and Forestry Classification, Lifecycle, Diseases and Control measures-

1. Crop pest

1.1 Sugarcane pest — *Pyrillaperpusilla*

1.2 Fruit pest — *Amritodusalkensoni*

1.3 Polyphagus pest — *Schistocercagregaria* 10

2. Forest pests

2.1 Sal borer — *Hoplocerambyxspinicornis*

2.2 Bamboo borer — *Dinoderusbrevis*

2.3 Common forest beetle — *SinoxylonSps.*

3. Insect and Plant interaction

Keywords: Crop Insect pest, Forest Insect pest.

Unit-IV

Pests of Medical and Veterinary Importance

1. Pests of Medical importance

1.1 Mode of transmission

1.2 Common vector insect — distribution, host, characters, lifecycle, diseases and their control.

a. Housefly — *Muscadomestica*

b. Mosquitoes — *Culex*, *Anopheles* and *Aedes*

1.3 Distinguished characters of *Culex*, *Anopheles* and *Aedes*. 10

2. Pests of Veterinary importance

2.1 Insect parasitism

2.2 Distribution, host, characters, lifecycle, host pest interaction, diseases and their control.

a. Horsefly — *Tabanus*sps.

b. Stable fly — *Stomoxys*sps.

c. Cattle blood sucking louse — *Linognathus*Sps.

Keywords: Pests of Medical importance, Pest of veterinary importance.

Unit-V

1. Insect pest control

1.1 Natural control

1.2 Artificial (applied/chemical) control

1.3 Biological control | 12

1.4 Integrated pest management. (IPM).

1.5 Equipment for insecticidal application and their maintenance.

1.6 Safety precautions by insecticides.

Keywords: Insect pest control, Biological control, IPM.

Suggested Readings:

1. Imms, A D, "Taxonomy of Insect", Springer; Softcover reprint of the original 15th ed. 1977 edition (10 November 1977) |
2. Tembhare, D. B, "Modern Entomology", Himalaya publications, Mumbai, 2002
3. Shukla, G S, Upadhyay, V B, "Economic Zoology", Rastogi publications, Meerut, 2014
4. ICAR, "Bee keeping in India"
5. Mathur, Upadhyay, "A Textbook of Entomology", Goel printing press, Baraut 51991]
6. Sarkar, S, Kundus, G, Chaki, K K, "Introduction to Economic Zoology" NCBS
4. Ghorai, N, "Lac culture", Intl. books & periodicals supply services
5. Awasthi, V B, "Introduction to general & applied Entomology", Scientific publisher, Jodhpur, 1997
6. Chapman, R.F. "The Insects structure and function, 4th ed. Cambridge University Press, 2002
7. Mullen, Gary, Lance, "Medical and Veterinary Entomology, 3rd ed.", Academic press ELSEVIER
8. Little, V.A., "General and Applied Entomology", IInd Edition, Oxford & IBH Publication Co., New Delhi
9. Metcalf, C.L., "Destructive and Useful Insects", Mc. Graw Hill, New York
10. Books Published by MP Hindi Granth Academy, Bhopal

UAPPLZO309: Applied Entomology (Paper-I) Practical

Unit: I

Identification and Comments on common insects of different orders of Class-Insecta .

Unit: II

Demonstration of Morphological parts of insect — Antennae, Mouth parts, Wings, Legs and Genitalia ~

Unit : III

Demonstration by Dissection - Internal system of Periplaneta (Cockroach)

Unit: IV

Techniques - a) Mounting of Morphological parts

b) To calculate the Total Haemocyte Count (THC)

c) To determine the Differential Haemocyte

Unit-V

Study the Life cycle of Beneficial Insects ---

a) Bombyxmori

b) Apis indica

c) Lacciferlacca

Unit : VI

Identification, Characters and Control Measures of Crop and Forestry Important Pests.

Unit :VII

Identification, Characters, Diseases and Control of Medical and Veterinary important pests.

Unit :IX

Collection and Preservation Techniques of different Insects according to Orders.

Unit : X

Physical/ Virtual visitto crop field/ forst site/Insect Culture site/veterinary Institute and submit a report to supervisor.

Key words/ Tags: Insect Taxonomy, Morphology and Anatomy, Haemocyte Count, Beneficial Insect, Insect Pests.

Suggested Readings: -

1. Saxena, O.P., “Modern Approach to Non Chordate Practical Zoology”, Rajhans Publication, 1992
2. Verma, P.S., “A Manual of Practical Zoology Invertebrates” S. Chand & Co.,2013
3. Swarup, N, Arora, S and Pathak, S.C, “Laboratory Techniques in Modern Biology”, Kalyani Publishers, New Delhi, 1992
4. Shukla, G S, Upadhyay, V B, “Economic Zoology”, Rastogi Publication , Meerat,2014
5. Awasthi, V.D., “Introduction to General and Applied Entomology”, Scientific Publisher, Jodhpur, 1997
6. Books Published by MP Hindi Granth Academy, Bhopal

UECOLZO310 : Ecology, Biodiversity and Evolution (Paper-II)

Unit-I

1. Concept of Ecology |

1.1 Introduction and History of Ecology.

1.2 Component of Ecosystem.

1.3 Classification of Ecosystem.

1.4 Function of Ecosystem-

- Productivity of ecosystem.

- Energy flow of the ecosystem — food chain, 10 food web, ecological pyramid and trophic level.

- Ecological footprint and Carbon footprint.

2. Bio-Geochemical cycle — Carbon, Oxygen, Nitrogen, Phosphorus cycle.

Keywords: Ecosystem, Bio-geochemical cycle Y t SWS. Peseyww

Unit-II

1. Population Concept

1.1 Basic concept and characteristics of population.

1.2 Factors affecting population.

1.3 Population interaction — Mutualism, Predation, Competition.

1.4 Species interaction — Herbivory, Carnivory, Symbiosis.

2. Community Concept

2.1 Characteristics of community.

2.2 Stratification in terrestrial and aquatic habitat. 10

3. Ecological Succession.

3.1 Types of succession.

Keywords: Population concept, Community concept, ecological succession.

Unit-III

1. Habitat Ecology

1.1 Concept of Habitat and Ecological Niche.

1.2 Fresh water habitat and its conservation.

1.3 Marine water habitat and its conservation.

1.4 Estuarine habitat and its conservation.

1.5 Terrestrial habitat and its conservation.

2. General idea of Ecological and Biological indicators.

3. Ecological division of India

Keywords: Habitat ecology, Ecological division, Bio indicators

Unit-IV

1. Biodiversity

1.1 Meaning, values and ethics of Biodiversity.

1.2 Importance of biodiversity.

1.3 Types of biodiversity — genetic, species and ecological biodiversity.

1.4 Causes of depletion of biodiversity.

1.5 Hotspots of biodiversity in India.

1.6 Conservation of biodiversity.

- In Situ — protected areas.

- Ex Situ- Germplasm bank, Gene bank, Seed bank, Zoo and Botanical garden.

1.7 Biodiversity Protection Act — 2002.

2. Role of People for conservation of biodiversity.

3. Emerging trends in conservation of biodiversity.

4. Medicinal Plants of Forest and its Uses. - Mahua, Harad, Baheda, Amla, Oak.

Keywords: Biodiversity, Conservation, Forest medicinal plants.

Unit-V

1. Evolution

- 1.1 Definition and History of evolution.
- 1.2 Origin of life — Theories of evolution.- Lamarckism -Darwinism-Neo-darwinism
- 1.3 Modern synthetic theory of evolution.
- 1.4 Evidence of organic evolution — anatomical, palaeontological, embryological.

2. Micro, Macro and Mega evolution.

3. Evolution of man.

4. Elementary idea of Geological timescale.

5. Adaptation — Definition and types of adaptation. .

6. Mimicry — Definition and kinds of mimicry.

Keywords: Evolution, Adaptation, Mimicry, Geological timescale.

Suggested Readings:

1. Odum, E P, “Fundamental of Ecology”, Saunders, USA
2. Smith, TH, Smith, R L, “Elements of Ecology”
3. Ricklefs, R E, Miller, G L, “Ecology”, Mc Milan
4. Rastogi, V B, “Animal Ecology and distribution of animals”, Rastogi publications,Meerat
5. Sharma, P D, “Ecology and Environment”, Rastogi publications,Meerat,2007
6. Kotwal, PC, “Biodiversity and Conservation”
7. Wilson, E O, “Diversity”, National Academic Press
8. Ghosh, A, Agarwal, S P, Sau, B, “Loss of Biodiversity and its Ethical implications”, Sadesh
9. Negi, S S, “Biodiversity and Conservation in India’, Indian publ. co.
10. Seth, P K, “Understanding evolution of Man: An introduction to Palaeontology”
11. Arora, M P, “Organic Evolution”, Himalayan Publication, 2000
12. Rastogi, V B, “Evolutionary Biology”
13. Tomar, B.S., Singh, S.P., “Evolution”, 2000
14. Books Published by MP Hindi Granth Academy, Bhopal

UENVIZO311: Environmental Biology (Paper-II) Practical

Unit-I

Identification and study of fresh water fauna and its economic Importance — Paramoecium, Spongilla, Leech, Prawn, Unio, Crab, Frog, Catla.

Unit-II

Identification & study of marine water fauna and its economic importance — Euplectella, Neries, King Crab, Pinctada, Asterias, Balanoglossus, Sea Horse, Scoliodon.

Unit-III

Identification & Study of terrestrial fauna and its economic importance — Earthworm, Millipede, Peripatus, Scorpion, Naja, Tortoise, Echidna, Kangaroo.

Unit-IV

Study of ecological experiments;

- a. To determine the population of some species of organism by Quadrat sampling method. ~
- b. To measure the population of a locality by mark and Recapture method.
- c. To estimate the biomass of particular area.

Unit-V

To identify, study and prepare slide/preservation of micro and macro-organisms from any water body.

Unit-VI

Study of pond ecosystem. - Visit to a nearby pond/lake.

Unit-VII

Identify, comment and use of important forest medicinal plants Mahua, Harad, Baheda, Amla, Oka.

Unit-VIII

Identify and comment on specimen related to adaptation and mimicry Scoliodon, Pigeon, Phrynosoma, Chameleon, Draco, Stick, Insect, Leaf Insect.

Unit-IX

Evolutionary experiment:

- a. Connecting link -
- Peripatus, Archaeopteryx, Platypus. |
- b. Homology and Homologous organs -
— Homology in four limbs structure of vertebrates.
— Serial homology- Crustacean appendages.
- c. Analogy -
— Wings of Bird and Bat.

Suggested Readings:

1. Saxena, O.P., “Modern Approach to Non Chordate Practical Zoology”, Rajhans Publication, Meerut, 1992
2. Trigunayat, M.M., Trigunayat, Kritika, “A Manual of Practical Zoology: Biodiversity”, Scientific Publishers, Jodhpur 2019
3. Lal, SS, “A Textbook of Practical Zoology -Invertebrate”, Rastogi Publication, Meerut, 2016
4. Lal, SS, “A Textbook of Practical Zoology -Vertebrate”, Rastogi Publication, Meerut, 2016”
5. Books Published by MP Hindi Granth Academy, Bhopal

UETHNBO314: Ethno Botany

Unit I

Enthobotany Introduction, concept, scope and objectives, Enthobotany as an interdisciplinary science. Various branches of Enthobotany. The relevance of Enthobotany in the present context; Major and minor ethnic groups or Tribals of India, and their life styles.

Unit II

Plants used by the tribals: a) Food plants b) intoxicants and beverages c) Resins and oils and miscellaneous uses. Plants in mythology, Taboos and totems in relation to plants, folklore and folktales, Wildlife protection in tribals. Plants in similes and metaphors.

Unit III

Medico –entobotanical sources in India; Significance of the following plants in entho botanical practices (along with their habitat and morphology) a) *Azadiractha indica* b) *Ocimum sanctum* c) *Vitex negundo*. d) *Gloriosasuperba* e) *Tinospora cordifolia* f) *Butea monosperma* g) *Cassia fistula* h) *Indigofera tinctoria*. Role of Enthobotany in modern medicine with special example: *Rauvolfia sepentina*, *Terminalia arjuna*, *Artemisia*, *Withania*. Role of ethnic group in conservation of plant genetic resources. Endangered taxa and forest management.

Unit IV

Ethnobotany and legal aspects. Ethnobotany as a tool to protect interests of ethnic groups. Sharing of wealth concept with few examples from India. Biopiracy, Intellectual Property Rights and Traditional Knowledge. Role of Peoples Biodiversity Register (PBR) and Biodiversity Management committees (BMC).

Unit V

Study of common Plants in skin Diseases, Bronchial inflammation, Asthma, Jaundice, Malaria, Expulsion of Worms, Jaundice, Piles, Rheumatism, Heart Disease, Amoebic Dysentery, leukoderma.

Keywords/Tags:

Ethnobotany, plants used by Tribals, Common Plants in curing Diseases, PBR.

Suggested Readings:

1. S.K. Jain, Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
2. S.K. Jain (ed.) Glimpses of Indian. Ethnobotny, Oxford and I B H, New Delhi – 1981
3. Lone et al, Palaeo ethnobotany
4. S.K. Jain (ed.) 1989. Methods and approaches in Ethnobotany. Society of ethnobotanists, Lucknow, India.
5. S.K. Jain, 1990. Contributions of Indian ethnobotay Scientific publishers, Jodhpur.
6. Colton C.M. 1997. Ethnobotany – Principles and applications. John wiley and sons- Chichester.
7. Rama Ro, N and A.N. Henry (1996). The Enthobotany of eastern Ghat in Andhra Pradesh, India. Botanical Survey of India Howrah
8. Rajiv K. Sinha – Enthobotany The Renaissance of Traditional Herbal Medicine

UETHNBO314: Ethno Botany Practical Lab

Unit I

Prepare an inventory of plants in the vicinity (in the college campus, Near Your Home, In your village or town.

Unit II

Herbarium Techniques

Unit III

Preparation of Questionnaire for collection of ethnobotanical data.

Unit IV

Study of Indigenous Literature for ethnobotanical knowledge.

Unit V

Listing of crop plants agricultural and horticultural crops with their varieties growing in your district.

Unit VI

Study of Plants with ethnomedicinal importance.

Unit VII

Preparation of herbal colors from plant products

Unit VIII

Identify the seeds of cereals, millets and legumes.

Unit IX

Prepare herbarium of at least 20 plants of local ethnobotanical importance.

Unit X

Field visit for ethnobotanical study.

Unit XI

Identification of plant parts of ethnomedicinal importance.

Unit XII

Plantation of at least one RET species of ethnobotanical importance in the campus by every student and conserve it.

Keywords/Tags:

Enthobotany and Herbarium

Suggested Readings:

1. Jain, S.K., Manual of Ethnobotany, Scientific Publishers Jodhpur, India, 2010 2nd edition.
2. Gary J. Martin, Ethnobotany A method manual, Chapman & Hall, Madras, India 2004
Author Surname, Initials, "Book Title", Publisher's name, City/country of publication, Year of publication. Edition No. if any.