Mandsaur University

Subject Name	L	T	P	Credits
Physics-IV (Waves and Optics)	3	1	4	6

Course Objectives:

- The students will introduce about the harmonics oscillations and its graphical and analytical methods.
- To learn the fundamental principles of wave motion and sound wave.
- To learn the mathematical techniques employed in wave optics for measurement of wavelength and refractive index.
- To learn about the Interferometer working and its performance.
- To Understand about the various optical phenomenon of interference, diffraction and polarization

Unit-1

Superposition of Two Collinear Harmonic oscillations: Simple harmonic motion (SHM). Linearity and Superposition Principle (1) Oscillations having equal frequencies and (2) Oscillations having different frequencies (Beats),Superposition of Two Perpendicular Harmonic Oscillations: Graphical and Analytical Methods, Lissajous Figures (1:1 and 1:2) and their uses.

Unit-2

Waves Motion: General: Transverse waves on a string, Normal Modes of a string. Group velocity, Phase velocity, Plane waves. Spherical waves, Wave intensity.
Sound: Sound waves, production and properties, Intensity and loudness of sound, Decibels. Intensity levels. Musical notes, Musical scale,.

Unit-3

Wave Optics: Electromagnetic nature of light, Definition and Properties of wave front. Huygens Principle. Interference: Division of amplitude and division of wave front. Young's double slit experiment, Newton's Rings: measurement of wavelength and refractive index.

Unit-4

Michelson's Interferometer: Construction and working, Idea of form of fringes, Determination of wavelength, Wavelength difference, Refractive index and Visibility of fringes.

Unit-5

Diffraction: Single slit; Double Slit. Multiple slits & Diffraction grating. Fresnel Diffraction: Half-period zones.

Polarization: Transverse nature of light waves. Plane polarized light – production and analysis, Circular and elliptical polarization.

Text Books:

1. Fundamentals of Optics: F.A. Jenkinsand H.E. White, McGraw-Hill.
2. Principles of Optics: B.K. Mathur, Gopal Printing.
3. .Fundamentals of Optics: H.R. Gulatiand D.R. Khanna, S. Chand Publication.
4. University Physics: F.W. Sears, M.W. Zemansky and H.D. Young

References:

1. R.P. Goyal, "Unified Physics III Semester", Shivlal Agrawal and Company Publishers.
2. Brijlal and N. Subrahmanyam, "Text book of optics", S. Chand & Company Ltd, New Delhi.
3. An introduction to Lasers–Theory and Applications: M.N. Avadhanalu, S. Chand and Co, Ltd.
4. Optics: Ajoy Ghatak, McGraw Hill Publications.
5. Principles of Optics: Max Born and Wolf, Pregmon Press.

Course Outcomes:

- The use of graphical and analytical methods, lissajous figures

- Account for fundamental quantities for waves and optics.

- Explain the relationship in between various optical phenomenon.

- Identify, illustrate and explain physical concepts in waves and optics.

- Describe and discuss technical applications of simple optical instruments.

- Describe the basic principle of the wave theory of lights it applies to the optical phenomenon of interference, diffraction and polarization

List of experiments:

1. Study of interference using biprism.

2. Study of diffraction at straight edge.

3. Resolving power grating.

4. Resolving power of telescope.

5. Polarization by reflection and verification of Brewster's Law

6. Determination of wavelength of Laser by diffraction.

7. Determination of radius of curvature of Plano-Convex lens by Newton's rings

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Subject Name	L	T	P	Credits
Mathematics – IV	3	1	-	4

Unit-I
Abstract Algebra-I: Definition and basic properties of group, Order of an element of a group, Abelian groups, Subgroups, Algebra of subgroups, Cyclic groups and their simple properties, Coset decomposition and related theorems, Lagrange's theorem and its consequences.

Unit-II
Abstract Algebra-II: Normal sub group, Quotient groups, homomorphism and isomorphism of groups (definition only), Kernel of homomorphism of groups, fundamental theorem of homomorphism of groups, Permutation groups (even and odd permutations), Alternating groups, Cayley's theorem.

Unit-III
Abstract Algebra-III: Definition and types Rings, cancellation law of Rings, property of Rings, Subring, Integral Domain, Field, Subfield with basic theorem. Division Ring, Ring Homomorphism, Polynomial Ring.

Unit-IV
Linear Algebra-I: Definition and examples of vector spaces, subspaces, Sum and direct sum of subspaces, Linear span, Linear dependence, independence and their basic properties, Basis, Finite dimensional vector spaces, Existence theorem for basis, Invariance of the number of elements of a basis set, Dimension , Dimension of sums of vector subspaces.

Unit-V
Linear Algebra-II: Linear transformations and their representation as matrices, the algebra of linear transformations, The rank- nullity theorem, Eigen values and Eigen vectors of a linear transformation, Diagonalisation, Quotient space and its dimension.

References
1. A first Course in Abstract Algebra, Jhon B. Fraliegh, Pearson Education India, 2003.
2. N. Jacobson, Basis Algebra, Vols, I & II. W.H. Freeman, 1980 (also published by Hindustan Publishing Company).
3. Topics in Algebra, I, Wiley Eastern Ltd., New Delhi, 1977.
4. Murray R. Spiegel, , Schaum Publishing Co., New York.

Subject Name	L	T	P	Credits
Computer Network	3	1	-	4

Course Objectives:

- To study basics of Data Communication.
- To study OSI and TCP models.
- To study different error correction and detection methods.
- To study about various network protocols.
- To study about network security and firewalls.

Unit-I
Introduction: Data Communication, Component and Basic Concepts Characteristics – Delivery, Accuracy, Timeliness and Jitter Components – Message, Sender, Receiver, Transmission medium and protocol, Transmission modes – Simplex, Half Duplex, Full Duplex, Transmission Fundamentals- Communication Media-Conductive Metal (Wired Cable), Optical Fiber links, Wireless Communication-Radio links, Satellite Links, Communication Services & Devices, Telephone System, Integrated Service Digital Network (ISDN), Cellular Phone.

Unit-II
Transmission Media: Guided and unguided media, Attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Shannon capacity, comparison of media.
The OSI Model – Functions of all the Seven Layers, Networking Devices – Functions and Applications of Hub, Switches, Bridges, Repeaters, Internetworking Devices – Functions and Applications of Routers and Gateways, TCP/IP Model, IP Addressing – Dynamic IP Addressing, Static IP Addressing, Types of IP Addresses, Protocols –TCP vs UDP, IPV4 vs IPV6.

Unit-III
Data Security and Integrity: Data Link Issues –Single bit error and Burst Error, Concepts of redundancy, Checksum, Single Bit Error, correction and Hamming Code correction method. Detection methods - Parity Checking Code, CRC, VRC, LRC, Checksum.
Protocol Concepts – Basic flow control, Sliding window protocol, Go-Back-N protocol and selective repeat protocol, Contention Protocol, Stop-Go-Access Protocol.

Unit-IV
Network Protocols: Internet Protocols, Overview of TCP/IP, Transport protocols, Elements of Transport Protocol, Transmission control protocol (TCP), User data-gram protocol (UDP), FTP, SMTP, TELNET Protocols, IP Addressing Class A, B & C, Domain Name Addressing, URL, E-mail address, SMTP, POP3, SNMP, HTTP, FTP, DNS, ICMP.

Unit-V

Network Security: Network Security Issues, Security Barriers Needs Firewalls   and Features of Firewalls, Types of Firewall Technology, Network Level and Application Level, IP Packets Filter Screening Routers, Limitations of Firewalls.

Reference Books:

1. Networking Essentials: Study guide mcse ames chews Charles Perkins, matthew strebe bpb publications.
2. Local area Networks's k.basandra & s. jaiswal, galgotia publications.
3. "Computer Networks" Andrew & Tanenbaum,
4. Data and Computer communication william sterling
5. Data Communication by prakash c gupta

Course Outcomes:

- Understand basics of data communication.

- Learn about various types of transmission media and TCP/IP and OSI models.

- Learn about error detection and correction mechanism.

- Knowledge about various types of network protocols.

- Understand firewall and network security.

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Subject Name	L	T	P	Credit
Object Oriented Programming using C++	3	1	4	6

Course Objectives:

- To learn basic concepts of object oriented programming.
- To learn dynamic memory management and constructors and destructors.
- To learn inheritance and its types.
- To understand data hiding, operator and function overloading.
- To understand about file handling and its functions.

Unit I

History of C++, C++ Characteristics, Difference between C and C++, Basic Structure of a C++ program, Compiling and Executing C++ Program. Selection control statements in C++. Data types, Expression and control statements Iteration statements in C++, Introduction to Arrays, Multidimensional Arrays, Strings and String related Library Functions.

Unit II

Functions, Passing Data to Functions, Scope and Visibility of variables in Functions, Structures in C++. Creating classes and Abstraction: Classes objects, data members, member functions, this Pointer, Friends, Friend Functions, Friend Classes, Friend Scope, and Static Functions.

Unit III

Constructors and Destructors, Static variables and Functions in class. Operator Overloading in C++, Overloading Unary Operators, Overloading binary operators.

Unit IV

Inheritance in C++, Types of Inheritance, Pointers, Objects and Pointers, Multiple Inheritance, Virtual Functions, Polymorphism, Abstract classes.

Unit-V

C++ I/O system, formatted I/O, file I/O basics, creating disk files and file manipulations using seekg(), seekp(), tellg() and tellp() functions, Storage Management: Static Memory allocation, Dynamic Memory Allocation: new and delete. Difference between static memory allocation and dynamic memory allocation

Reference Books:

1. Robert Lafore; Object Oriented Programming in C++
2. Ken Barclay; Object Oriented design with C++

3. Balagurusamy; Object Oriented Programming in C++
4. Complete Reference C++

Course Outcomes:

- Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.
- Understand dynamic memory management techniques using pointers, constructors, destructors, etc
- Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
- Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.
- Demonstrate the use of file handling techniques.

List of Experiments

1. Program to print "Hello".

2. Program to swapping two variables using third variable.

3. Program to check entered alphabet is vowel or consonant.

4. Program to print ASCII value of any alphabet.

5. Program to implement call by value.

6. Program for call by reference.

7. Program to find greatest among three numbers using nested if.

8. Program for factorial using while loop.

9. Program to print reverse of a number using while loop.

10. Program for Fibonacci series.

11. Program for calculator using switch case.

12. Program to pass structure to the function.

13. Program to implement array of structure.

14. Program to implement an array.

15. Program to find maximum and minimum number entered in array.

16. Program for multidimensional array.

17. Program for implementing concept of pointer.

18. Program for demonstrate array of pointer.

19. Program to implement pointer to a function.

20. Program for increment and decrement operation in pointer.

21. Program for arithmetic operations in array.

22. Program to demonstrate constructor and destructor.

23. Program for parameterized overloading constructor.

24. Program for copy constructor.

25. Program to implement concept of inheritance.

26. Program to implement single level, multilevel, multiple, hybrid and hierarchical inheritance.

27. Program for function overloading and operator overloading.

28. Program for access private member of base class using friend function.

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Subject Name	L	T	P	Credits
DTP Lab	-	-	4	2

Course Objectives:

- To Study PageMaker and creating Labels, Pamphlets etc.
- To CorelDraw and creating, Greetings Cards Book Covers, Brochures.
- To study Adobe Photoshop and Creating Digital Images & Backgrounds.

List of Experiments

PageMaker/InDesign

- Page layout Basics
- Understanding Tools & Workspace
- Creating: Labels, Pamphlets, Bill books, Viz. Cards
- Greetings Cards, Newsletter, Magazine, Multi-Page Brochure
- Advertisements, etc.
- Books & Booklets
- Column Style Documents

CorelDraw

- Understanding Tools & Workspace
- Drawing Shapes & Graphics
- Logos & Artistic Text
- Multicolor Designs: Viz. Cards & Greetings Cards
- Book Covers, Brochures
- Advertisements
- Banner
- Web Graphics

Adobe Photoshop

- Understanding Tools & Workspace
- Image/Photo Editing-Mixing-Enhancements

- Creating Modeling & Wedding Photographs
- Creating Digital Images & Backgrounds
- Converting Color To B/W And B/W To Color
- Filters & Automated Options
- Creating Web Graphics

Course Outcomes:

- Student will learn to create Newsletter, Magazine, Multi-Page Brochure
- Student will learn to create Advertisements, Banner etc.
- .Student will learn Adobe Photoshop and will able to design Digital Images & Backgrounds, Image/Photo Editing-Mixing-Enhancements