

Bachelor of Science

(Computer Science)

3 Years Graduate Degree Programme

CURRICULA

(Effective for 2020-21)



Shri Vaishnav Institute of Management, Indore

Approved by AICTE, New Delhi and Affiliated to DAVV, Indore

UGC-NAAC Accredited 'A' Grade Institute

Scheme No. 71, Gumasta Nagar, Indore-452009, Madhya Pradesh, India

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Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and
Approved by H E the Governor of M. P.
Session 2017-18

Class: B. Sc. Computer Science

For Regular Students:

First Year	Internal		Total	Theory	Total	Practical	Total
	Three Months	Six Months					
Fundamentals of Computers	5	10	15	42.5	85	50	150
Programming in C				42.5			
Object Oriented Programming Concept using C++	5	10	15	42.5	85	50	150
Data structures				42.5			
Database Management System	5	10	15	42.5	85	50	150
Operating System Concepts				42.5			
Grand Total							450

Class: B. Sc (Computer Science) for Private

I Year	Theory	Total	Practical	Grand Total
Fundamentals of Computers	50	100	50	150
Programming in C	50			
II Year				
Object Oriented Programming using C++	50			
Data Structures	50			
III Year				
Database Management System	50	100	50	150
Operating System Concepts	50			
Grand Total				450

- Remark:
- (i) Each theory paper will contain five objective type question of 1 mark and
 - (ii) Five short answer type question of 3 marks and
 - (iii) Five long answer type question of 6 marks, with internal choice in (ii) and (iii)

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B. Sc. I YEAR COMPUTER SCIENCE
PAPER I: FUNDAMENTALS OF COMPUTERS

Max Marks: 50

Min Marks: 17

UNIT I

Block diagram of computer: input unit, output unit, CPU, memory unit, generations of computers, types of Computers: desktop, laptop, palmtop, and workstations & super computers. All types of input and output devices, hardware, software and firmware.

Windows: features of windows - desktop, start menu, control panel, my computer, windows explorer, accessories. Managing multiple windows, arranging icons on the desktop, creating and managing folders, managing files and drives, logging off and shutting down windows

UNIT II

Word; What is word processing, creating documents in MS-Word, formatting features of MS-Word, standard toolbar, drawing toolbar, tables and other features. Mail-merge, insertion of files, pictures, clipboard, graphs, print formatting, page numbering and printing documents

Excel - Introduction to workbook and worksheet. Entering information in a worksheet - numbers, formula, etc., saving a workbook, editing cells, using commands and functions, moving and copying, inserting and deleting rows and columns, creating charts, Page setup: margins, adding headers & footers before printing, print preview of worksheet, removing grid lines from printout, printing the title rows.

UNIT III

Number system: decimal, binary, octal, hexadecimal, conversions from one base to another base. Codes: ASCII code, EBCDIC code, Gray code. Boolean algebra, de-morgan's theorem, binary arithmetic: - addition, subtraction, multiplication & division, unsigned binary numbers, signed magnitude numbers, 1's complement & 2's complement representation of numbers, 2's complement arithmetic. Boolean functions & truth tables, SOP, POS form, minterms/maxterms, simplification of logic circuits using boolean algebra and karnaugh maps. Logic gates: - AND, OR, NOT, NAND, NOR, X -OR and X -NOR gates, their symbols and truth tables, circuit design with gates: adder/subtractor circuit.

UNIT IV

Memory cell, primary memory: RAM, static and dynamic RAM, ROM, PROM, EPROM, EEPROM, cache memory, secondary memory and its types, virtual memory concept, memory accessing methods: serial and random access. Data bus, control bus & address bus. Word length of a computer, memory addressing capability of a CPU, processing speed of a computer, microprocessors, single chip microcomputers (microcontrollers)

UNIT V

General architecture of a CPU, instruction format, and data transfer instructions, data manipulation instructions and program control instructions. Types of CPU organization: accumulator based machine, stack based machine and general- purpose register based machine, addressing modes, data transfer schemes: (i) programmed data transfer: synchronous, asynchronous and interrupt driver data transfer (ii) direct memory access data transfer: Cycle stealing block transfer and burst mode of data transfer

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Text book

1. Digital logic and Computer Design by Malvino leach
2. Computer System Architecture by M Morris Mano
3. PC Software for Windows by R. K. Taxali
4. Fundamentals of computers by P.K. Sinha
5. Computer Organization and Architecture by Stallings.
6. Computer today by Suresh K. Basandra
7. Computers Fundamentals and Architecture by B. Ram

Suggested list of practical in MS-Word & Excel:

1. Create a banner of college using MS-Word
2. Design a greeting card using WORD ART
3. Create your bio-data and use page borders and shading in MS-Word
4. Create a document, insert header, footer, page title, page number using MS-Word
5. Implement Mail-merge
6. Insert table in MS-Word document
7. Create a mark sheet using MS-Excel
8. Creation and printing of types of graphs in Excel
9. Built-in functions in Excel
10. Create Faculty Time table

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B. Sc. I YEAR COMPUTER SCIENCE
PAPER II: PROGRAMMING IN C

Max Marks: 50

Min Marks: 17

UNIT-I

Classification of programming language: procedural languages, problem oriented languages, nonprocedural languages. Structured programming concepts: modular programming: top-down analysis, bottom-up analysis, and structured programming. Problem solving using computers: problem definition and analysis, problem design, coding, compilation, debugging and testing, documentation, implementation and maintenance.

UNIT-II

Introduction to C language: constants, variables, keywords, data types, operators, expressions, operator precedence and associativity. Structure of C program: variable declaration, declaration of variable as constant.

UNIT-III

Managing Input/output Operators: Formatted and Unformatted. Control Statements: Branching Jumping & Looping. Scope Rules, Storage Classes.

UNIT-IV

Arrays (one and two dimensional), Functions: user defined function, standard function, categories in functions, passing arguments to a function, recursion. Pointers: operators, declaration pointer to arithmetic, array of pointers. Structures: declaring, accessing, initializing, array of structures.

UNIT-V

File handling in c: opening and closing a data file, inserting data to data file. **Graphics programming -** introduction, functions, stylish lines, drawing and filling images, palettes and colors, justifying text bit of animation.

Text Books-

How to solve it by Computers by R. G. Dromy, PHI

Let us C by Yashwant Kanetkar IV Edition

ANSI C by E. Balagurusamy

Programming in C by S.S. Bhatia

Reference Books-

How to design Programs-An Introduction to programming and computing- Felleisen, et. al, PHI Publication

Introduction to Algorithms by Cormen.PHI

Programming in C: Denis Richie

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Suggested list of programs for practical

1. Write a program to print digits of entered number in reverse order.
2. Write a program to print sum of two matrices.
3. Write a program to print subtraction of two matrices.
4. Write a program to print multiplication of two matrices.
5. Write a program to demonstrate concept of structure.
6. Write a program for finding the root of a Quadratic Equation.
7. Write a program for Mark sheet.
8. Write a program for finding the sum of given matrices of order $m \times n$
9. Write a program for finding the multiplication of given matrices of order $m \times n$
10. Write a program to generate even/odd series from 1 to 100.
11. Write a program to find area of a circle, rectangle, square using case.
12. Write a program to check whether a given number is even or odd.
13. Write a program whether a given number is prime or not.
14. Write a program for call by value and call by reference.
15. Write a recursive program to calculate factorial of a given number.
16. Write a program to generate a series
 $1+1/1! +2/2! +3/3! +\dots +n/n!$
17. Write a program to create a pyramid structure
*
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18. Write a program to create a pyramid structure
1
12
123
1234
19. Write a program to create a pyramid structure
1
22
333
4444
20. Write a program to reverse a string.
21. Write a program to find whether a given string is PALINDROME or not.
22. Write a program to input 10 numbers add it and find its average.
23. Write a program to generate series
 $1 + 1/2! +1/3! +\dots +1/n!$
24. WAP to print table of any number.
25. WAP to print Fibonacci series
26. WAP to find length of string without using function.
27. WAP to perform all arithmetic operations using case statement.
28. WAP to check entered number is Armstrong or not

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B.Sc. Annual Examination System wise syllabus

Recommended by Central Board of studies

Session: 2017-18

Max. Marks	: 42.5
Class	: B. Sc.
Year	: First
Subject	: Mathematics
Paper	: First
Title	: Algebra and Trigonometry

Unit-1	Rank of Matrix, Normal and Echelon form of a matrix. Characteristic equations of a matrix. Eigen values, Eigen vectors, Linear Independence of row and column matrix.
Unit-2	Cayley Hamilton theorem and its use in finding inverse of a matrix. Application of matrix to solve a system of linear (homogenous and non-homogenous) equations, theorems on consistency and inconsistency of a system of linear equations. Solving linear equations up to three unknowns.
Unit-3	Relation between the roots and coefficients of a general polynomial equation in one variable, transformation of equations. Reciprocal equations. Descarte's rule of sign.
Unit-4	Logic – Logical connectives, Truth Tables, Tautology, Contradiction, Logical Equivalence, Algebra of Propositions, Boolean Algebra – definition and properties, switching circuits and its applications, logic gates and circuits.
Unit-5	De – Moivre's theorem and its applications, direct and inverse circular and hyperbolic functions, expansion of trigonometric functions, logarithm of complex quantities, Gregory's series, summation of trigonometrical series.

Text Books:

1. S. L. Loney - Plane Trigonometry Part-11.
2. K.B. Datta - Matrix and Linear Algebra. Prentice Hall of India Pvt. Ltd. New Delhi 2000.
3. Chandrika Prasad - A Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd., Allahabad.
4. C. L. Liu- Elements of Discrete Mathematics (Second Edition). McGraw Hill, International Edition, Computer Science Series, 1986.

Reference Books:

1. H.S. Hall and S.R. Knight- Higher Algebra H.M Publication. 1994.
2. N. Jacobson - Basic Algebra Vol. I and II W. H. Freeman.
3. I. S. Luther and I. B. S. Passi - Algebra Vol. I and II Narosa Publishing House.
4. N. Saran and R. S. Gupta- Analytical Geometry of Three Dimension, Pothishala Pvt. Ltd. Allahabad.

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B.Sc. Annual Examination System wise syllabus
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Session: 2017-18

Max. Marks	:	42.5
Class	:	B.Sc.
Year	:	First
Subject	:	Mathematics
Paper	:	Second
Title	:	Calculus and Differential Equations

Unit-1	Successive differentiation. Leibnitz theorem. Maclaurin's and Taylor's series expansions. Asymptotes.
Unit-2	Curvature, tests for concavity and convexity, points of inflexion, multiple points, tracing of curves in cartesian and polar coordinates.
Unit-3	Integration of transcendental functions, Definite Integrals, Reduction formulae, Quadrature, Rectification.
Unit-4	Linear differential equations and equations reducible to the linear form. Exact differential equations, first order and higher degree equations solvable for x, y and p, Clairaut's equation and singular solutions, geometrical meaning of a differential equation. Orthogonal trajectories.
Unit-5	Linear differential equation with constant coefficients. Homogeneous linear ordinary differential equations. Linear differential equations of second order. Transformation of equations by changing the dependent variable independent variable, method of variation of parameters.

Text Books:

1. Gorakh Prasad- Differential Calculus. Pothishala Private Ltd., Allahabad.
2. Gorakh Prasad- Integral Calculus. Pothishala Private Ltd., Allahabad.
3. D. A. Murray- Introductory Course in Differential Equations. Orient Longman (India) 1967.

Reference Books:

1. G. E. Simmons- Differential Equations, Tata McGraw Hill. 1972.
2. E. A. Codington- An Introduction to ordinary differential Equation. Prentice Hall of India. 1961.
3. H. T. H Piaggio- Elementary Treatise on Differential Equations and their Application, C. B.S. Publisher & Distributors, Delhi. 1985.
4. S. G. Deo- Differential Equations. Narosa Publishing House.
5. N. Piskunov - Differential and Integral Calculus. Peace Publishers. Moscow.

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Max. Marks	:	42.5
Class	:	B.Sc.
Year	:	First
Subject	:	Mathematics
Paper		Third
Title		Vector Analysis and Geometry

Unit-1	Scalar and vector product of three vectors, product of four vectors. Reciprocal: vectors, vector differentiation. Gradient. Divergence and curl
Unit-2	Vector Integration, Theorems of Gauss. Green. Stoke (without proof) and problems based on them.
Unit-3	General equation of second degree, tracing of conics, system of conics, polar equation of a conic.
Unit-4	Equation of cone with given base, generators of cone, condition for three mutually perpendicular generators. Right circular cone, equation of cylinder and its properties.
Unit-5	Central conicoids, Paraboloids, plane sections of conicoids. Generating lines.

Text Books:

1. N. Saran and S. N. Nigam- Introduction to Vector Analysis. Pothishala Pvt. Ltd. Allahabad.
2. Gorakh Prasad and H. C. Gupta-Text Book on Coordinate Geometry. Pothishala Pvt. Ltd. Allahabad.
3. N. Saran and R.S. Gupta- Analytical Geometry of Three Dimension, Pothishala Pvt. Ltd. Allahabad (Unit IV).

Reference Books:

1. R. J. T. Bell- Elementary Treatise on Coordinate Geometry of Three Dimensions. Macmillan India Ltd., 1994(Unit-V).
2. Murray R. Spiegel-Theory and Problems of Advance Calculus. Schaum Publishing Company. New York.
3. Murray R. Spiegel-Vector Analysis. Schaum Publishing Company. New York.
4. Shanti Narayan-A Text Book of Vector Calculus, S. Chand & Co., New Delhi.
5. Shanti Narayan- A Text Book of Vector Algebra. S. Chand & Co., New Delhi.
6. S. I. Loney-The Elements of Coordinate Geometry. Macmillan and Company. London.
7. P. K. Jain and Khalil Ahmad- A text book of Analytical Geometry of Two Dimensions. Macmillan Indian Ltd., 1994
8. P. K. Jain and Khalil Ahmad- A text book of Analytical Geometry of Three Dimensions. Willey Eastern Ltd, 1999.

**Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies
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Class: B.Sc. First Year

Max. Marks: 40 + (CCE) 10 = 50

Subject : Physics

Paper : 1

Title of Paper : Mathematical Physics, Mechanics and Properties of Matter

Unit-I: Mathematical Physics [15 Lectures]

Addition, subtraction and product of two vectors; Polar and axial vectors and their examples from physics: Triple and quadruple product (without geometrical applications): Scalar and vector fields: Differentiation of a vector; Repeated integral of a function of more than one variable; Unit tangent vector and unit normal vector; Gradient, Divergence and Curl: Laplacian operator; Idea of line, surface and volume integrals; Gauss', Stokes' and Green's Theorems.

Unit-II: Mechanics [15 Lectures]

Position, velocity and acceleration vectors, Components of velocity and acceleration in different coordinate systems, Newton's Laws of motion and its explanation with problems, various types of forces in nature (explanation). Pseudo Forces (e.g. Centrifugal Force), Coriolis force and its applications. Motion under a central force, Derivation of Kepler's laws, Gravitational law and field, potential due to a spherical body, Gauss & Poisson's equation of Gravitational self-energy, System of particles, Centre of mass and reduced Mass, Elastic and inelastic collisions

Reference Books:

1. University Physics: Sears and Zeeman sky, XI edition, Pearson Education
2. Concepts of Physics: H.C. Varma, Bharati Bhavan Publishers
3. Problems in Physics: P. K. Srivastava. Wiley Eastern Ltd.
4. Berkley Physics Course. Vol. I, Mechanics: E.M. Purcell, McGraw hill
5. Properties of Matter: D. S. Mathur. Shamlal Charitable Trust. New Delhi
6. Mechanics: D.S. Mathur. S Chand and Company, New Delhi-5.
7. The Feymman Lectures in Physics Vol. I: R. P. Feymman, R.B. Lighten and M. Sands

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Class: B.Sc. First Year
Max. Marks: 40 + (CCE) 10= 50

Subject : **Physics**
Paper : **2**
Title of Paper : **Thermodynamics and Statistical Physics**

Unit-I: Thermodynamics-1 [15 Lectures]

Reversible and irreversible process, Heat engines, Definition of efficiency, Carnot's ideal heat engine, Carnot's cycle, Effective way to increase efficiency, Carnot's engines and refrigerator, Coefficient of performance, Second law of thermodynamics, Various statements of Second law of thermodynamics, Carnot's theorem, Clapeyron's latent heat equation. Carnot's cycle and its applications, Steam engine, Otto engine, Petrol engine, Diesel engine

Unit II: Thermodynamics-II [15 Lectures]

Concept of entropy, Change in entropy in adiabatic process, Change in entropy in reversible cycle, Principle of increase of entropy, Change in entropy in irreversible process, T-S diagram, Physical significance of Entropy, Entropy of a perfect gas, Kelvin's thermodynamic scale of temperature, The size of a degree, Zero of absolute scale, Identity of a perfect gas scale and absolute scale. Third law of thermodynamics, Zero point energy. Negative temperatures (not possible), Heat death of the universe, Relation between thermodynamic variables (Maxwell's relations)

Unit-III: Statistical Physics-I [15 Lectures]

Description of a system: Significance of statistical approach, Particle-states, System-states, Microstates and Macro-states of a system, Equilibrium states, Fluctuations, Classical & Statistical Probability, The equi-probability postulate, Statistical ensemble, Number of states accessible to a system. Phase space, Micro Canonical Ensemble, Canonical Ensemble.

Helmholtz free energy, Enthalpy, First law of thermodynamics, Gibbs free energy, Grand Canonical Ensemble

Unit-IV: Statistical Physics-II [15 Lectures]

Statistical Mechanics: Phase space. The probability of a distribution, The most probable distribution and its narrowing with increase in number of particles. Maxwell-Boltzmann statistics, Molecular speeds, Distribution and mean, r. m. s. and most probable velocity. Constraints of accessible and inaccessible states, **Quantum Statistics:** Partition Function, Relation between Partition Function and Entropy, Bose-Einstein statistics, Black-body radiation, The Rayleigh-Jeans formula, The Planck radiation formula, Fermi-Dirac statistics, Comparison of results, Concept of Phase transitions.

Unit-V: Contributions of Physicists [15 Lectures]

S.N. Bose, M.N. Saha, Maxwell. Clausius, Boltzmann. Joule, Wien, Einstein, Planck. Bohr, Heisenberg, Fermi. Dirac, Max Born, Bardeen.

Text and Reference Books:

1. **Heat and Thermodynamics:** Mark W. Zemansky. Richard H. Dittman. Seventh Edition, McGraw-Hill International Editions.
2. **Thermal Physics (Heat and Thermodynamics):** A.B. Gupta, H. P. Roy. Books and Allied (P) Ltd, Calcutta.

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3. **Heat and Thermodynamics:** Brijlal and N. Subrahmanyam, S. Chand & Company Ltd. New Delhi.
4. Berkley Physics Course. Vol 3. Thermodynamics: F. Reif. McGraw Hill
5. **Thermodynamics and Statistical Physics,** D. P. Khandelwal and A. K. Pandey, Himalaya Publication.
6. **Laboratory manual of Physics for undergraduate classes.** D. P. Khandelwal, Vani publishing house, New Delhi.

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Class: B.Sc. First Year

Max. Marks: 50

Subject **Physics**

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex-Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practical's

1. To verify laws of parallel and perpendicular axes for moment of inertia.
2. To determine acceleration due to gravity using compound pendulum.
3. To determine damping coefficient using a bar pendulum.
4. To determine Young's Modulus by bending of beam method.
5. To determine Young's Modulus using Cantilever method.
6. To determine coefficient of rigidity by static method.
7. To determine coefficient of rigidity by dynamic method.
8. To determine Surface Tension by Jaeger's method.
9. To determine Surface Tension of a liquid by capillary rise method.
10. To determine Viscosity of fluid using Ponselle's method.
11. To study conversion of mechanical energy into heat using Calendar & Barne's method.
12. To determine heating efficiency of electrical Kettle with various voltages.
13. To determine heating temperature coefficient of resistance using platinum resistance thermometer.
14. To determine thermo electromotive force by a thermocouple method.
15. To determine heating efficiency of electrical Kettle with various voltages.
16. To determine heat conductivity of bad conductors of different geometry by Lee's method.
17. To verify Newton's Laws of cooling.
18. To determine specific heat of Coefficient of thermal conductivity by Searl's method.
19. To determine specific heat of a liquid.
20. To compare Maxwell-Boltzmann, Bose Einstein and Fermi-Dirac Distribution function vs. temperature using M.S. Excel / C++.
21. To plot equation of state and Vander-wall equation with temperature using M.S. Excel

**Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and
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Academic Year (2017-2018)

B. Sc. I

There will be Three sections of a Question Paper Section (A) Contains 5 Objective Question of 1/2 Mark each Section (B) Contains 5 Short answer type question of 02 Marks each section (c) contains 5 long answer type question of 06 marks each

1. For Regular students:

Section (A)	Objective Questions	5		2.5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	6	30
		Total Marks		42.5

Section (A)	Objective Questions	5	1	5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	7	35
		Total Marks		50

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B.Sc. II YEAR COMPUTER SCIENCE
PAPER I: OBJECT ORIENTED PROGRAMMING CONCEPTS USING C++

Max Marks: 50

Min Marks: 17

UNIT I

Introduction to C++: Programming paradigms, Key concepts of Object-oriented Programming, Advantages of OOP's. Input and Output in C++: Pre-defined streams, Unformatted console I/O operations, formatted console I/O operations.

UNIT-II

C++ Declarations: Parts of C++ Program, types of Tokens, Keywords, Identifiers, data types, constants, Operators, Precedence of operators, referencing and dereferencing operators, scope access operator. Control structures: Decision Making Statements, looping statement.

UNIT-III

Functions: main (), parts of function, passing arguments: value, address, reference, inline functions, function overloading: principles, precautions, library functions. Classes and objects: declaring classes and objects, accessing class members, keyword: public, private, protected, defining member functions: member function inside the class, member function outside the class, static member variables and functions, friend function, friend classes, overloading member functions.

UNIT-IV

Constructors and Destructors: characteristics, applications, constructors with arguments, overloading constructors, types of constructors. Operator overloading: overloading unary operator, binary operator. Inheritance: access specifiers: public inheritance, private inheritance, protected data with private inheritance, Types of inheritances: single, multiple, hierarchical, multilevel, hybrid, multipath, virtual base class.

UNIT-V

Pointers & arrays: pointer declaration, pointer to class & object, Array: declarations & initialization, arrays of classes. Polymorphism: Static (Early) binding, Dynamic (Late) Binding, virtual function, pure virtual function.

Text books:

Object-Oriented Programming with ANSI & Turbo C++ by Ashok N. Kamthane.

Object Oriented Programming in C++ by E. Balagurusamy

Reference Books:

C++ The complete Reference by Herbert Schildt, TMH publication.

Object Oriented Programming in C++ by Robert Lafore.

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Suggested list of programs for practical

1. Write a program to find average of 3 numbers.
2. Write a program to find biggest among 3 numbers.
3. Write a menu driven program (Switch case) to perform arithmetic operations.
4. Write a program to check whether entered number is Prime or not.
5. Write a program to check whether entered number is even or odd.
6. Write a program for addition of two matrixes.
7. Write a program for multiplication of two matrixes.
8. Write a program to find transpose of a matrix.
9. Write a program to print :
*
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10. Write a program to print:
1
22
333
11. Write a program to print:
1
23
456
12. Write a program to check whether entered string is palindrome or not
13. Write a program to print Fibonacci series.
14. Write a program to find factorial of a given number.
15. Write a program to demonstrate use of static data member,
16. Write a program to demonstrate use of a static member function.
17. Write a program to create array of objects.
18. Write a program to demonstrate use of friend function.
19. Write a program to illustrate use of copy constructor.
20. Write a program to demonstrate constructor overloading.
21. Write a program to illustrate use of destructor.
22. Write a program to overload a unary operator.
23. Write a program to overload a binary operator.
24. Write a program to demonstrate single Inheritance.
25. Write a program to demonstrate multiple Inheritance.
26. Write a program to demonstrate multilevel Inheritance.
27. Write a program to demonstrate hierarchical inheritance.
28. Write a program to demonstrate hybrid Inheritance.
29. Write a program to demonstrate the use of function overloading.
30. Write a program to demonstrate the use of inline member function.
31. Write a program to demonstrate the use of parameterized constructor

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B.Sc. II YEAR COMPUTER SCIENCE
PAPER II: DATA STRUCTURES

Max Marks: 50

Min Marks: 17

UNIT-I

Concept of data structure and analysis of algorithm, abstract data structure, introduction to stack and primitive operations on stack, stack as an abstract data type, stack application; infix, prefix, postfix and recursion, introduction to queues, primitive operation on queues, circular queue, dequeue , priority queue and applications of queue.

UNIT-II

Introduction to linked list, basic operations on linked list, stacks and queues using linked list, doubly linked list, circular linked list, applications of linked list.

UNIT-III

Trees-basic terminology ,binary trees, tree representations as array and linked list, basic operations on binary tree, traversal of binary trees:- inorder, preorder, postorder. Applications of binary tree, threaded binary tree, AVL tree, binary tree representations of trees.

UNIT-IV

Sequential search, binary search, insertion sort, selection sort, quick sort, bubble sort, heap sort, comparison of sorting methods.

UNIT-V

Hash Table, Collision resolution technique, Introduction to graphs, Definition, Terminology, Directed, Undirected and Weighted Graph, Representation of Graph, Graph Traversal-Depth first, Breadth first search, Spanning tree, Minimum Spanning tree, Shortest path algorithm.

Text Books-

Data Structure: By Lipschultz (Schaums Outline Series)

Data Structures through C (A Practical Approach) by G.S. Baluja

Data Structure: By Trembley & Sorrenson

Reference Books-

Fundamental of Data Structure by S. Sawhney & E. Horowitz

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Suggested list of Programs for practical

1. Write a program to find the factorial of a given no using recursion.
2. Write a program for bubble sorting.
3. Write a program for linear search.
4. Write a program for binary search.
5. Write a program for selection sorting,
6. Write a program for quick sorting.
7. Write a program for insertion sorting.
8. Write a program to print Fibonacci series using recursion.
9. Write a program to perform insertion and deletion operation in the stack.
10. Write a program to perform insertion and deletion operation in the queue using static implementation.
11. Write a program to perform insertion and deletion operation in queue using dynamic implementation.
12. Write a program to insert a node at the beginning in singly linked list.
13. Write a program to insert a node at the middle in singly linked list.
14. Write a program to insert a node at the last in singly linked list.
15. Write a program to delete a node from the beginning in singly linked list.
16. Write a program to delete a node from the middle in the singly linked list.
17. Write a program to delete a node from the last in the singly linked list.
18. Write a program to traverse all the nodes in singly linked list.
19. Write a program to insert a node in the beginning in the circular linked list.
20. Write a program to insert a node at the last circular linked list.
21. Write a program to perform all the insertion operations in the singly linked list using switch case.
22. Write a program to perform all the deletion operations in the singly linked list using switch case.
23. Write a program to count the number of nodes in binary tree.
24. Write a program to evaluate postfix operation.
25. Write a program to convert infix operation to postfix operation.

Department Of Higher Education, Govt., of M. P.

Scheme of Examination and Syllabus for Annual Exam System

B. Sc. II Year

Academic Session: 2018-2019

Recommended by Central Board of Studies

Paper Number & Title of the Paper	Paper-wise Maximum Marks	Total Theory Marks	Minimum Passing Marks in Theory	Internal Assessment Maximum Marks.	Minimum Passing Marks in Internal Assessment	Practical Maximum Marks	Practical Passing Marks	Total
I- Abstract Algebra	42.5	127.5	42	1st term-	8			150
II- Advanced calculus	42.5			(3 Months)				
III- Differential Equations	42.5			(6 Months)				

Note: There will be three sections in each paper. All questions from each section will be compulsory.

Section A (5 Marks): This section will contain 5 objective type questions, one from each unit, with the weightage of 1 mark.

Section B (12.5 Marks): This section will contain 5 short answer type questions (each having internal choice), one from each unit, with the weightage of 2.5 marks.

Section C (25 Marks): This section will contain 5 long answer type questions (each having internal choice), one from each unit, with the weightage of 5 marks.

There should be 12 teaching periods per week for Mathematics like other Science Subjects

(6 Period Theory - 6 Period Practical)

Department of Higher Education, Govt., of M. P.
B.Sc. Annual Examination System wise syllabus
Recommended by Central Board of studies

Session: 2018-19

Max. Marks : 42.5
 Class : B.Sc.
 Year : Second
 Subject : Mathematics
 Paper : First
 Title : Abstract Algebra

Unit-1	Definition and basic properties of groups, subgroups, subgroups generated by a subset, Cyclic groups and simple properties.
Unit-2	Coset decomposition. Lagrange's theorem and its corollaries including Fermat's theorem. Normal subgroups. Quotient groups.
Unit-3	Homomorphism and Isomorphism of groups, fundamental theorem of homomorphism. Transformation and Permutation group. S_n (various subgroups of S_n $n < 5$ to be studied). Cayley's theorem.
Unit-4	Group Automorphism. Inner Automorphism, group of Automorphisms. Conjugacy relation and Centraliser. Normaliser. Counting principle and class equation of a finite group. Cauchy's theorem for finite abelian groups and non-abelian groups.

Unit-5	Definition and basic properties of rings. Ring homomorphism subrings. Ideals and Quotient rings. Polynomial rings & its properties. Integral domain and Field.
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Text Books:

1. I. N. Herstein- Topics in Algebra. Wiley Pastern Ltd. New Delhi. 1977.
2. PB Bhattacharya. S. K. Jain and S R Nagpaul-Basic Abstract Algebra. Wiley Pastern, New Delhi. 1997

Reference Books:

1. Shantinarayan- A text Book of Modern Abstract Algebra, S. Chand and Company. New Delhi.
2. Surjeet Singh- A Text Book of Modern Algebra.
3. N. Jacobson- Basic Algebra. Vol. I and II, W. II Freeman.
4. I. S. Luther and I. B. S. Passi- Algebra. Vol. I and II, Narosa Publishing House.

Department of Higher Education, Govt., of M.P.

B.Sc. Annual Examination System wise syllabus

Recommended by Central Board of studies

Session: 2018-19

Max. Marks	:	42.5
Class	:	B.Sc.
Year	:	Second
Subject	:	Mathematics
Paper	:	Second
Title	:	Advanced calculus

Unit-1	Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion, series of non-negative terms. comparison test. Cauchy's integral test. Cauchy's root test, ratio tests. Raabe's tests, logarithmic tests. Alternating series. Leibnitz's test. Absolute and conditional convergence.
Unit-2	Continuity of functions of single variable, sequential continuity. Properties of continuous functions. Uniform continuity, chain rule of differentiability. Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives.
Unit-3	Limit and continuity of functions of two variables. Partial differentiation, Change of variables. Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables. Jacobians.

Unit-4	Envelopes, Evolutes. Maxima and Minima of functions of two variables. Lagrange's multiplier method. Beta and Gamma Functions.
Unit-5	Double and triple integrals, volumes and surfaces of solids of revolution Dirichlet's integrals, change of order of integration in double integrals.

Text Books:

1. R. R. Goldbeg -Real Analysis. Oxford & I.B.H. Publishing co. New Delhi
2. Gorakh Prasad- Differential Calculus. Pothishala Pvt. Ltd. Allahabad.
3. Gorakh Prasad- Integral Calculus, Pothishala Pvt. Ltd. Allahabad

Reference Books:

1. Gabriel Klaumber- Mathematical Analysis. Marcel Dekkar. Inc. New York. 1975
2. T. M. Apostol- Mathematical Analysis. Narosa Publishing House. New Delhi. 1985
3. D. Soma Sundaram and B. Choudhary- A first Course in mathematical Analysis. Narosa Publishing. House, New Delhi, 1997.
4. Murray R. Spiegel- Theory and problems of advance Calculus. Schauma Publishing Co. New York
5. O. E. Stanaitis- An Introduction to Sequences, Series and improper Integrals.

Department of Higher Education, Govt., of M. P.
B.Sc. Annual Examination System wise syllabus
Recommended by Central Board of studies

Session: 2018-19

Max. Marks	:	42.5
Class	:	B.Sc.
Year	:	Second
Subject	:	Mathematics
Paper	:	Third
Title	:	Differential Equations

Unit-1	Series solutions of differential equations. Power series method, Bessel and Legendre equations, Bessel's and Legendre's functions and their properties- recurrence and generating function. Orthogonality of functions.
Unit-2	Laplace Transformation. Linearity of the Laplace transformation. Existence theorem for Laplace transforms. Laplace transforms of derivatives and integrals. Shifting theorems. Differentiation and integration of transforms.
Unit-3	Inverse Laplace transforms. Convolution theorem. Application of Laplace transformation in Solving linear differential equations with constant coefficients.
Unit-4	Partial differential equations of the first order. Lagrange's solution. Some special types of equations which can be solved easily by methods other than the general method. Charpit's general method.

Unit-5	Partial differential equations of second and higher orders. Classification of partial differential equations of second order. Homogeneous and non-homogeneous equations with constant coefficients. Partial differential equations reducible to equations with constant coefficients.
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Text Book:

1. Sharma and Gupta- Integral Transform. Pragati Prakashan, Meerut.
2. Sharma and Gupta- Differential Equation. Pragati Prakashan, Meerut.
3. Raysinghania- Differential Equation. S. Chand & Company. New Delhi.

Reference Book:

1. D. A. Murray - Introductory course in differential equation. Orient Longman. India. 1967
2. G. F. Simmons- Differential Equations. Tata McGraw Hill. 1972.
3. E.A. Coddington - An introduction to Ordinary differential equations. Prentice Hall of India. 1961
4. H. T. H. Piaggio - Elementary Treatise on Differential equations and their applications. C. B. S. Publisher and Distributors, Delhi. 1985.
5. E. D. Rainville - Special Functions. The Macmillan Company. New York.

**Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies
and Approved by Governor of M.P.
(w. e. f. session 2018-2019)**

Class: B.Sc. Second Year

Max. Marks: 40 + (CCE) 10 = 50

Subject **Physics**

Paper : 1

Title of Paper: **Optics**

Unit-I Geometrical Optics

[15 Lectures]

Reflection and refraction. Fermat's Principle. Refraction at a spherical surface, Aplanatic points and its applications. Lens formula. Combination of thin lenses and equivalent focal length. Dispersion and dispersive power, chromatic aberration and achromatic combination, different types of aberration (qualitative) and their remedy. Need for multiple lenses in eyepieces, Ramsden and Huygens eye-piece.

Unit-II Interference of light

[15 Lectures]

The principle of superposition, two slit interference, coherence requirement for the sources, optical path retardations. Lateral shift of fringes, Rayleigh refractometer and other applications. Localised fringes, thin films, interference by a film with two nonparallel reflecting surfaces. Newton's rings. Haidinger fringes (Fringes of equal inclination), Michelson interferometer, its application for precision determination of wavelength, wavelength difference and the width of spectral lines. Intensity distribution in multiple beam interference, Fabry-Perot interferometer and Etalon.

Unit-III Diffraction

[15 Lectures]

Fresnel's theory of half period zone, diffraction at straight edge, rectilinear propagation. Diffraction at a slit, phasor diagram and integral calculus methods.

**Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies
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(w. e. f. session 2018-2019)**

Diffraction at a circular aperture and a circular disc. Rayleigh criterion of resolution of images. Resolving power of telescope and microscope. Outline of phase contrast microscopy. Diffraction at N-parallel slits, Intensity distribution, Plane diffraction grating, Resolving power of a grating and comparison with resolving power of prism and of a Fabry Parot etalon.

Unit-IV Polarisation

[15 Lectures]

Transverse nature of light waves. Polarization of electromagnetic waves. Plane polarised light - production and analysis. Description of Linear, circular and elliptical polarisation. Propagation of electro magnetic waves in anisotropic media, uniaxial and biaxial crystals, symmetric nature of dielectric tensor. Double refraction. Hygen's principal. Ordinary and extraordinary refractive indices, Fresnel's formula, light propagation in uniaxial crystal, Nicol prism. Production of circularly and elliptically polarized light, Babinet compensator and applications, Optical rotation, Optical rotation in liquids and its measurement through Polarimeter.

Unit-V Laser and Photo Sensors

[15 Lectures]

A brief history of lasers, characteristics of laser light, Einstein prediction. Relationship between Einstein's coefficients (qualitative discussion), Pumping schemes, Resonators, Ruby laser. He-Ne laser, Applications of lasers, Principle of Holography. Photodiodes, Phototransistors, and Photomultipliers.

1. **Fundamentals of Optics:** F.A. Jenkins and H. E. White, 1976, McGraw-Hill.
2. **Principles of Optics:** B. K. Mathur, 1995, Gopal Printing.
3. **University Physics:** F.W. Sears, M.W. Zemansky and H.D. Young, 13/e, 1986. Addison-Wesley.
4. **Optics:** A. K. Ghatak, McGraw Hill Publications.

**Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies
and Approved by Governor of M.P.
(w. e. f. session 2018-2019)**

Class: B.Sc. Second Year

Max. Marks: 40 + (CCE) 10 = 50

Subject : Physics

Paper : 2

Title of Paper Electrostatics, Magneto statics and Electrodynamics

Unit-1 Electrostatics

[15 Lectures]

Coulombs law in vacuum expressed in vector forms, calculations of electric field E for simple distributions of charge at rest, dipole and quadruple fields. Work done on a charge in an electrostatic field expressed as a line integral, conservative nature of the electrostatic field. Relation between electric field and electric potential ($E = - \nabla V$), torque on a dipole in a uniform electric field and its energy, flux of the electric field. Gauss's law and its application for finding E for symmetric charge distributions. Capacitors, conducting sphere in a uniform electric field, point charge in front of a grounded infinite conductor. Dielectrics, parallel plate capacitor with a dielectric, dielectric constant, polarization and polarization vector P, relation between displacement vector D, E and P. Molecular interpretation of Clausius-Mossotti equation.

Unit-2 Magnetostatics

[15 Lectures]

Force on a moving charge. Lorentz force equation and definition of B, force on a straight conductor carrying current in a uniform magnetic field, torque on a current loop, magnetic dipole moment, angular momentum and gyromagnetic ratio. Biot and Savart's law. calculation of H for simple geometrical situations such as Solenoid, Anchor ring. Ampere's Law, $\nabla \times B = \mu_0 J$, $\nabla \cdot B = 0$. Field due to a magnetic dipole, free and bound currents, magnetization vector (M), relationship between B, H and M. Derivation of the relation $\nabla \times M = J$ for non-uniform magnetization.

**Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies
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(w. e. f. session 201 8-2019)**

Unit-3 Current Electricity and Bio electricity

[15 Lectures]

Steady current, current density J , non-steady currents and continuity equation. Kirchoff's laws and analysis of multiloop circuits, growth and decay of current in LR and CR circuits, decay constants. LCR circuits. AC circuits, complex numbers and their applications in solving AC circuits problems, complex impedance and reactance, series and parallel resonance. Q-factor, power consumed by an A. C. circuit, power factor, Y and A networks and transmission of electric power. Electricity observed in living systems, Origin of bioelectricity.

Unit-4 Motion of Charged Particles in Electric and Magnetic Fields

[15 Lectures]

(Note: The emphasis here should be on the mechanical aspects and not on the details of the apparatus mentioned which are indicated as applications of principles involved.)

AE as an accelerating field, electron gun, discharge tube, linear accelerator, E as deflecting field - CRO, Sensitivity of CRO. Transverse B field; 180° deflection, Mass spectrograph and velocity selector. Curvatures of tracks for energy determination for nuclear particles: Principle and working of Cyclotron, Mutually perpendicular and parallel E & B fields: Positive ray parabolas, Discovery of isotopes. Elements of Mass Spectrographs. Principle of magnetic focusing (lenses).

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies
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(w. e. f. session 2018-2019)

Unit-5 Electrodynamics

[15 Lectures]

Electromagnetic induction, Faraday's Laws, Electromotive Force, Integral and differential forms of Faraday's Laws. Self and mutual inductance. Transformers, Energy in a static magnetic field, Maxwell's displacement current, Derivations of Maxwell's equations, Electromagnetic field energy density, Pointing vector, Electromagnetic wave equation, Plane electromagnetic waves in vacuum and dielectric media, reflection at a plane boundary of dielectrics, Fresnel's Laws, Polarization by reflection and total internal reflection, Waves in a conducting media, Reflection and refraction by the ionosphere.

References:

1. **Berkley Physics Course:** Electricity and Magnetism Ed. E. M. Purcell McGraw Hill
2. **Physics Volume 2:** D. Halliday and R. Resnick
3. **Introduction to Electrodynamics:** D. J. Griffiths, 4th Edition, Prentice Hall
4. **Electricity and Magnetism:** S. S. Atwood Dover
5. **Electrodynamics:** Emi Cossor and Bassin Lorraine, Asahi Shimbunsha Publishing Ltd.
6. **From Neuron to Brain:** Kuffler and Nicholas, Sinauer Associates, Inc. Pub. Sunderland, Massachusetts.
7. **Schaums Outline of Beginning Physics II: Electricity and Magnetism**

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies
and Approved by Governor of M.P.
(w. e. f. session 2017-2018)

Class: B.Sc. Second Year

Max. Marks: 50

Subject : **Physics**

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex-Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practicals:

1. Study of interference using biprism.
2. Study of diffraction at straight edge.
3. Use of plane diffraction grating to determine D1, D2 lines of sodium lamp.
4. Resolving power to telescope.
5. Polarization by reflection and verification of Brewster's Law.
6. Study of optical rotation in Sugar solution.
7. Refractive index and dispersive power of prism using spectrometer.
8. Absorption spectrum of material using constant deviation spectrograph.
9. Beam divergence of He-Ne Laser.
10. Determination of wavelength of laser by Diffraction.
11. Determination of radius of curvature of plano-convex lens by Newton's rings.
12. Characteristics of a Ballistic galvanometer.
13. Setting up and using an electroscopes or electrometer.
14. Measurement of low resistance by Carey-Foster bridge or otherwise.
15. Measurement of inductance using impedance at different frequencies.
16. Measurement of capacitance using impedance at different frequencies.
17. Response curve for LCR circuits and response frequencies.
18. Sensitivity of a cathode-ray oscilloscope.
19. Use of vibration magnetometer to study a field.
20. Study of magnetic field due to current using Tangent Galvanometer.
21. Study of decay of currents in LR and RC circuits.
22. Study of Lissajous figures using CRO.
23. Verification of networks theorem.

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies
and Approved by Governor of M.P.
(w. e. f. session 2017-2018)

Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and
Approved by Governor of M. P.
(w. e. f. session 2017-2018)
Academic Year (2017-2018)

B. Sc II

There will be Three sections of a Question Paper Section (A) Contains 5 Objective Question of ½ Mark each Section (B) Contains 5 Short answer type question of 02 Marks each section (c) contains 5 long answer type question of 06 marks each

Section (A)	Objective Questions	5	½	2.5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	6	30
		Total Marks		42.5

Section (A)	Objective Questions	5	1	5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	7	35
		Total Marks		50

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and
Approved by H E the Governor of M.P.
Session 2017-18
B.Sc. III YEAR COMPUTER SCIENCE
PAPER I: DATABASE MANAGEMENT SYSTEM

Max Marks: 50

Min Marks: 17

UNIT-I

Purpose of database system, views of data, data models: relation, network, hierarchical, instances and schemas, data dictionary, types of database languages:-DDL, DML, structure of DBMS, advantages and disadvantages of DBMS, 3-level architecture proposal:-external, conceptual & internal levels.

UNIT-II

Entity relationship model as a tool of conceptual design: entities & entities set, relationship and relationship set, attributes and mapping constraints, keys, ER diagram:-strong and weak entities, generalization, specialization & aggregation, reducing ER diagram to tables

UNIT-III

Fundamentals of set theoretical notations: relations, domains, attributes, tuples, concept of keys: primary key, super key, alternate key, candidate key, foreign key, fundamentals of integrity rules: entity & referential integrity extension and intention, relational algebra :select ,project, cartesian product, different types of joins: theta, equi, natural, outer joins, set operations.

UNIT-IV

Functional Dependencies, Good & Bad Decomposition and Anomalies as a database: A consequences of bad design, Universal relation, Normalization: 1NF, 2NF, 3NF &BCNF normal forms, Multivalued dependency, Join dependency, 4NF, 5NF.

UNIT-V

Basic concepts: -Indexing and Hashing, B-tree Index files, Hashing: Static & Dynamic hash function, Index definition in SQL: Multiple key accesses.

Text Books-

Database System Concepts by Henry Korth and A. Silberschatz.
Simplified approach to DBMS, Prateek Bhatia, Gurvinder Singh Kalyani Publication

Reference Books-

An Introduction to Database System by Bipin Desai
An Introduction to Database System by C. J. Date.

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
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Suggested list of programs for practical

Create the appropriate table and apply the following queries

1. WAQ to insert some new records in emp table.
2. WAQ to list the number of employees whose name is not 'ford', 'jams' or 'jones,
3. WAQ to list the name and salary and sort them in descending order of their salary
4. WAQ to list the details of employees whose name is starts from 'a'
5. WAQ to delete all records from emp table
6. WAQ to insert values in 3 fields.
7. WAQ to list the student name having 'd' as second character.
8. WAQ to list the name and salary and sort them in descending order of their salary
9. WAQ to list the name and salary and sort them in descending order of their salary
10. WAQ in employee table find all the manager who earns between 1000 and 2000.
11. Display record of employee who have salary between 1000 and 2000.
12. List the name salary and department number of the employee and order them by their salary in descending order.
13. In employee table change the city of employee from existing one to new one.
14. Add a column salary of datatype 'number' & having size '5' with default value 1000.

15. WAQ to find the employee who earns the lowest salary in each department. Display in ascending order of salary.
16. List the employee who earns maximum salary in their department. Find the name of all employee who works for 'first bank corporation'. Display the record of employee whose name start with 's' & age is greater than 18.
17. Find the name, street & city of residence of all employee who works for 'fbc'
18. WAQ to update the salary of employee number 1902 to Rs. 10,000
19. WAQ to find the name, street and city of all employee who works for 'fbc' and who earn more than 1000.

20. WAQ to increase the salary by 2000 and rename the column as "newsalary"
21. WAQ to find the name, street and city of all employee who works for 'fbc' and who earn more than 1000.
22. WAQ to find total of salaries of all employees from emp table
23. WAQ to decrease the salary of emp from 5000 and rename column as 'newsalary'
24. List the employee number of employee who belone to department 10,20,
25. List the employee no of employees who earn greater than 2000
26. Insert new field called category in emp table.
27. Display different jobs in departments 20,30
28. List the names of employees having two 'aa' in the name
29. Print the name, emp no, sal of employees in emp table.
30. List the names of employees who do the job of clerks or salesman.

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and
Approved by H E the Governor of M.P.
Session 2017-18
B.Sc. III YEAR COMPUTER SCIENCE
PAPER II: OPERATING SYSTEM CONCEPTS

Max Marks: 50

Min Marks: 17

UNIT I

Operating system definitions, its components, evolution of operating system, types of operating systems: batch, multiprogramming, multitasking, multiprocessor, real time, client-server, peer-to-peer, distributed, clustered, operating system services, system calls, protection of I/O, memory and CPU.

UNIT II

Process scheduling: concept of a process, process states, PCB, process life cycle, operations on processes, context switch, types of schedulers, CPU burst- I/O burst cycles, dispatcher, scheduling criteria, scheduling algorithms - FCFS, SJF, STRN, Round Robin, priority, event driven, multilevel queue. Performance evaluation of algorithms through deterministic modelling.

UNIT III

Memory Management: address binding, logical and physical address space, dynamic loading and linking. Contiguous memory allocation: static and dynamic partitioned memory, fragmentation, swapping relocation, compaction, protection. Non-contiguous memory allocation: Paging Segmentation. Virtual Memory: demand paging, page fault, page replacement algorithms- FIFO, LRU, optimal. Thrashing, page fault frequency.

UNIT IV

Interprocess communication need for synchronization, Deadlocks- definition, avoidance, prevention, detection and recovery. Disk organization, Directory structure, disk space management- contiguous and non-contiguous allocation strategies, disk address translation, disk caching, disk scheduling algorithms. Device Management: dedicated devices, shared devices. Security and protection: security threats and goals, penetration attempts. Security policies and mechanisms, authentication, protection and access control.

UNIT V

Linux: History and features of Linux, Linux architecture, file system of Linux, hardware requirements, Linux standard directories, Linux Kernel.

Working with Linux: KDE and Gnome graphical interface, various types of shells available in Linux. Vi editor, Linux commands. File security in Linux.

TEXT BOOKS AND REFERENCE BOOKS

1. Operating system Concepts: by Silberschatz, Galvin and Gagne.
2. Operating system Design and Concepts, by Milan Milenkovic
3. Operating system by Andrew Tanenbaum
4. Operating system by Peterson
5. Linux Bible by Christopher Negus
6. Linux by Sumitabh Das

Suggested Practical

Basic Linux Commands and vi editor

Department of Higher Education, Government of Madhya Pradesh
Yearly Syllabus for Undergraduates
As recommended by Central Board of Studies of Computer Science and
Approved by H E the Governor of M. P.
Session 2017-18

Class: B. Sc (Computer Science) for Regular Student

I Year	Three Months	Six Months	Total	Theory	Total	Practical	Grand Total
Fundamentals of Computers	5	10	15	42.5	85	50	150
Programming in C				42.5			
II Year							
Object Oriented Programming Concept using C++	5	10	15	42.5	85	50	150
Data structures				42.5			
III Year							
Database Management System	5	10	15	42.5	85	50	150
Operating System Concepts				42.5			
Grand Total							450

Remark: (i) Each theory paper will contain five objective type question of 1 mark and
(ii) Five short answer type question of 2.5 marks and
(iii) Five long answer type question of 5 marks, with internal choice in (ii) and (iii)

Department Of Higher Education, Govt., of M. P.
Scheme of Examination and Syllabus for Annual Exam System
B. Sc. III Year

Academic Session: 2019-2020

Recommended by Central Board of Studies

Paper Number & Title of the Paper	Paper-wise Maximum Marks	Total Theory Marks	Minimum Passing Marks in Theory	Internal Assessment Maximum Marks.	Minimum Passing Marks in Internal Assessment	Practical Maximum Marks	Practical Passing Marks	Total
I- Linear Algebra And Numerical Analysis	42.5	127.5	42	Ist term-(3 Months)	8	—	—	150
II- Real and Complex Analysis	42.5			7.5				
III- Optional Paper*	42.5			15 Total=22.5				

***III A Statistical methods, III B- Discrete Mathematics, III C- Mechanics. III D- Mathematical Modeling, III E- Financial Mathematics**

(Optional Paper should be different from main subject.)

Note: There will be three sections in each paper. All questions from each section will be compulsory.

Section A (5 Marks): This section will contain 5 objective type questions, one from each unit, with the weightage of 1 mark.

Section B (12.5 Marks): This section will contain 5 short answer type questions (each having internal choice), one from each unit, with the weightage of 2.5 marks.

Section C (25 Marks): This section will contain 5 long answer type questions (each having internal choice), one from each unit, with the weightage of 5 marks.

There should be 12 teaching periods per week for Mathematics like other Science Subjects

(6 Period Theory + 6 Period Practical)

Department of Higher Education, Govt., of M.F.
B.Sc. /B.A. Annual Examination System wise syllabus
Recommended by Central Board of studies

Session : 2019-20

Max. Marks	:	42.5
Class	:	B.Sc.
Year	:	Third
Subject	:	Mathematics
Paper	:	First
Title	:	Linear Algebra and Numerical Analysis

Note: - Scientific Calculator will be allowed in the examination of this paper.

Unit-1	Definition and examples of Vector spaces, subspaces, sum and direct sum of subspaces. Linear span, Linear dependence, independence and their basic properties. Basis, Existence Theorem for basis. Extension Theorem. Invariance of the number of elements of a basis. Dimension. Finite dimensional vector spaces. Existence of complementary subspaces of a subspace of a finite dimensional: vector space. Dimension of sum of subspaces. Quotient space and its dimension
Unit-2	Linear transformations and their representation as matrices. Algebra of linear transformations. Rank-Nullity theorem, change of basis, dual space, bi-dual space and natural isomorphism, Adjoint of a linear transformation, Eigen values and Eigen vectors of a linear transformation. Diagonalisation. Bilinear. Quadratic and Hermitian forms.
Unit-3	Inner Product Space- Cauchy-Schwartz inequality, orthogonal vectors, orthogonal complements, orthonormal sets and bases, Bessel's inequality for finite dimensional spaces. Gram- Schmidt orthogonalization process

Unit-4	Solution of Equations: Bisection. Secant. Regular Falsi. Newton's Methods. Roots of second degree Polynomials. Interpolation: Lagrange interpolation. Divided differences. Interpolation formula using Differences. Numerical Quadrature. Newton- Cote's formulae. Gauss Quadrature formulae
Unit-5	Linear equations direct methods for solving systems of linear equations (Gauss elimination. LU decomposition. Cholesky decomposition). Iterative methods (Jacobi, Gauss- Seidel reduction methods). Ordinary differential equations: Euler method. Single step method, Runge- Kutta's method, Multistep methods. Milne Simpson method. Methods based on Numerical integration, methods based on numerical differentiation

Text Books:-

1. K. B. Dalia- Matrix and Linear Algebra. Prentice hall of India Pvt. Ltd. New Delhi. 2000.
2. S. S. Sastry- Introductory Methods of Numerical Analysis. Pill Learning Pvt. Ltd.

Reference Books:

1. K. Hoffiman and R. Kunze- Linear Algebra. 2nd Edition. Prentice Hall Englewood Cliffs. New Jersey, 1971.
2. S. K. Jain. A Gunawardena& P. B. Bhattacharya- Basic Linear Algebra with MATLAB Key College Publishing(Springer- Verlag) 2001
3. S. Kumarsaran- Linear Algebra, A BermetricApproac Prentice- Hall of India, 2000
4. Balaguruswamy- Numerical Methods, Tata McGraw Hill Publication. New York.

Department of Higher Education, Govt., of M. P.

B.Sc. Annual Examination System wise syllabus

Recommended by Central Board of studies

Session: 2019-20

Max. Marks	:	42.5
Class	:	B.Sc.
Year	:	Third
Subject	:	Mathematics
Paper	:	Second
Title	:	Real and Complex Analysis

Unit-1	Riemann integral, Integrability of continuous and monotonic functions. The fundamental theorem of integral calculus. Mean value theorems of integral calculus. Partial derivatives and differentiability of real-valued functions of two variables. Schwarz's and Young's theorem. Implicit function theorem,
Unit-2	Improper integrals and their convergence. Comparison tests. Abel's and Dirichlet's tests. Frullani's integral as a function of a parameter. Continuity, derivability and integrability of an integral of a function of a parameter. Fourier series of half and full intervals.
Unit-3	Definition and examples of metric spaces. Neighborhoods. Limit points. Interior points. Open and closed sets. Closure and interior. Boundary points. Subspace of metric space, Cauchy sequences, Completeness. Cantor's intersection theorem. Contraction principle, Real number as a complete ordered field. Dense subsets. Baire Category theorem. Separable, second countable and first countable spaces.
Unit-4	Continuous functions. Extension theorem. Uniform continuity. Compactness. Sequential compactness. Totally bounded spaces, finite intersection property. Continuous functions and compact sets. Connectedness.

Unit-5	Complex numbers as ordered pairs. Geometric representation of complex numbers. Continuity and differentiability of complex functions. Analytic functions. Cauchy-Reimann equations. Harmonic functions. Mobius transformations. Fixed points. Cross ratio. Inverse points, Conformal Mappings.
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Text Books:

1. Mathematical analysis by S. C. Malik and Savita Arora. New Age Publication. Delhi.
2. G.F. Simmons - Introduction to Topology and Modern Analysis. McGraw Hill. New York 1963
3. L. V. Ahlfors, complex Analysis McGraw Hill. New York

Recommend Books

1. Walter Rudin- Real and Complex Analysis. McGraw Hill. New York
2. Ponnuswamy- Complex Analysis. Narosa Publication. New Delhi.
3. R. V. Churchill & J.W. Brown. Complex Variables and Application. 5th Edition. McGraw Hill, New York. 1990

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Max. Marks	:	42.5
Class	:	B.Sc.
Year	:	Third
Subject	:	Mathematics
Paper	:	Third Optional
Title	:	Statistical methods

Note: - Simple Calculator will be allowed in the examination of this paper.

Unit-1	Frequency distribution- Measures of central tendency. Mean. Median, Mode, G.M, H.M. Partition values. Measures of dispersion- Range. Interquartile range. Mean deviation. Standard deviation. Moments. Skewness and kurtosis.
Unit-2	Probability- Event, Sample space. Probability of an event. Addition and multiplication theorems, Baye's theorem. Continuous probability- probability density function and its applications for finding the mean, mode, median and standard deviation of various continuous probability distributions. Mathematical expectation. Expectation of sum and product of random variables. Moment generating function.
Unit-3	Theoretical distribution-Binomial. Poisson, rectangular and exponential distributions, their properties and uses.

Unit-4	Methods of least squares. Curve fitting, co-relation and regression, partial and multiple correlations (up to three variables only).
Unit-5	Sampling- Sampling of large samples. Null and alternative hypothesis. Errors of first and second kinds. Level of significance. Critical region. Tests of significance based on chi-square. T. F. and Z-statistics.

Text Books:

1. H. C. Saxena and J, N. Kapoor. Mathematical Statistics, S. Chand and Company.
2. M. Ray Statistical Methods.

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B.Sc. Annual Examination System wise syllabus
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Session: 2019-20

Max. Marks : 42.5
 Class : B.Sc.
 Year : Third
 Subject : Mathematics
 Paper : Third Optional-B
 Title : Discrete Mathematics

Unit-1	Boolean functions-disjunctive & conjunctive normal forms (canonical & dual canonical), Bool's expansion theorem. Relations- Binary relation. Inverse relation, Composite relation. Equivalence relation, Equivalence classes & its properties Partition of a set.
Unit-2	Partial order relation, Partially ordered sets, totally ordered sets. Hasse diagram, maximal and minimal element, first and last element Lattice- definition and examples, dual lattice, bounded lattice, distributive lattice, complemented lattice. _ _
Unit-3	Graph- Definition, types of graphs. Subgraphs, walk, path. circuit, connected and disconnected graphs. Euler graph. Hamiltonian path and circuit, shortest path in weighted graph. Dijkstra's Algorithm for shortest paths.

Unit-4	Trees and its properties, Rooted tree. Binary tree. Spanning tree, Rank and nullity of a graph. Kruskal's Algorithm and Prim's Algorithm.
Unit-5	Matrix representation of graphs--Incidence and Adjacency matrix. Cutset and its properties. Planar graphs (definition) Kuratowski's two graphs.

Text Books:

1. C. L. Liu.- Elements of Discrete Mathematics , McGraw Hill New-York
2. NarsinghDeo- Graph Theory, Prentice Hall.

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B.Sc. Annual Examination System wise syllabus

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Session: 2019-20

Max. Marks	:	42.5
Class	:	B.Sc. /B.A.
Year	:	Third
Subject	:	Mathematics
Paper	:	Third Optional
Title	:	Mechanics

Unit-1	Analytical conditions of Equilibrium of Coplanar forces. Virtual work. Catenary.
Unit-2	Forces in three dimensions, Poinsot's central axis, Null lines and Planes. Stable and unstable Equilibrium.
Unit-3	Velocites and accelerations along radial and transverse directions and along tangential and normal directions. Simple Harmonic motion. Elastic Strings, Projectile.
Unit-4	Motion on smooth and rough plane curves. Motion in a resisting medium. Motion of particles of varying mass. Central orbits. Kepler's Law of motion.
Unit-5	Motion of a particle in three dimensions. Moments and Product of inertia

Text Books:

1. R.S. Verma - Statics
2. S. L. Loney- An elementary Treatise on the dynamics of particle of rigid bodies.

Reference Books:

1. M. Ray- Dynamics
2. M. Ray and H. S. Sharma- Dynamics of rigid bodies

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B.Sc. Annual Examination System wise syllabus

Recommended by Central Board of studies

Session: 2019-20

Max. Marks	:	42.5
Class	:	B.Sc.
Year	:	Third
Subject	:	Mathematics
Paper		Third Optional-D
Title	:	Mathematical Modelling

Unit-1	Mathematical modelling through ordinary differential equations of first order: Linear Growth and Decay models. Non-linear Growth and Decay Models. Dynamic problems, Geometrical problems.
Unit-2	Mathematical modelling through system of ordinary differential equations of first order: Population Dynamics, Epidemics. Compartment models. Economic medicine. Arms Race. Battles and International Trade. Dynamics models.
Unit-3	Mathematical modelling through ordinary differential equations of second order: Planetary Motions. Circular Motions and Motion of Satellites. Mathematical modelling through Linear differential equations of second order and miscellaneous mathematical models.
Unit-4	Mathematical modelling through difference equations: Simple Models. Basic theory of linear difference equations with constant coefficients, economic and finance-population dynamics and genetics, probability theory.
Unit-5	Mathematical modelling through Graphs: Solutions that can be modelled through graph, mathematical modelling in terms of directed graphs, signed graphs, weighted digraphs and un-oriented graphs.

Text Books:

1. J. N. Kapur- Mathematical Modelling. New Age International Publishers

Reference Books:

1. Stefan Heinz- Mathematical Modelling. Springer.
2. Heilio. M. Lahivaara, T. Lannen- Mathematical Modelling. Springers Nature.
3. Dr. V. P. Saxena- Bio-Mathematics.
4. Belinda Barnes and Glenn Robert Fulford- Mathematical Modelling with Case Studies. CRC Press

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Max. Marks : 42.5
Class : B.Sc.
Year : Third
Subject : Mathematics
Paper : Third Optional-E
Title : Financial Mathematics

Unit-1	Financial Management- Nature and Scope of Financial Management. Goals of financial Management and main decisions of financial management. Difference between Risk, Speculation and Gambling.
Unit-2	Time value of Money-Interest rate and Discount Rate. Present value and future value, discrete case as well as continuous compounding case. Annuities and its kinds.
Unit-3	Meaning of return. Return as Internal Rate of Return (IRR). Numerical methods like Newton Raphson Method to calculate IRR. Measurement of returns under uncertainty situations.
Unit-4	Meaning of Risk, Difference between risk and uncertainty. Types of Risks. Measurements of Risk. Calculation of security and portfolio risk and Return- Markowitz Model. Sharpe's Single Index Model- Systematic Risk and Unsystematic Risk.
Unit-5	Taylor series and Bond Valuation. Calculation of Duration and Convexity of Bonds, financial Derivatives- futures, forward. Swaps and options. Call and Put Option, Call and Put Parity theorem.

Text Books:

1. Sheldon M. Ross- An Introduction to Mathematical Finance. Cambridge University Press.
2. Mark S. Dorfman- Introduction to Risk Management and Insurance. Prentice Hall Englewood Cliffs. New Jersey.

Reference Books:

1. Aswath Damodaran, Corporate finance- Theory and Practice. John Wiley & Inc.
2. John C. Hull- Options. Futures and Other Derivatives. Prentice Hall of India Private Ltd.
3. C. D. Daykin, T. Pentikainen and M. Pesonen- Practical Risk Theory for Actuaries. Chapman & Hall.

**Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies
and Approved by Governor of M.P.
(w.e.f. session 2019-2020)**

**Class : B.Sc. Third Year
Subject: Physics**

Max. Marks: 5

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex-Student

Practical	Sessional	Viva	Total
35	00	15	50

1. Specific resistance and energy gap of a semiconductor.
2. Study of half wave and full wave rectification.
3. Characteristics of Zener diode.
4. Characteristic of a tunnel diode.
5. Characteristics of JFET.
6. Characteristic of a transistor.
7. Study of regulated power supply.
8. Study of RC coupled amplifiers
9. Determination of Planck's constant.
10. Determination of e/m using Thomson's method,
11. Determination of e by Millikan's method.
12. Study of spectra of hydrogen and deuterium (Rydberg constant and ratio of masses of electron to proton).
13. Absorption spectrum of iodine vapour.
14. Study of Zeeman effect for determination of Lande g-factor.
15. Study of Raman spectrum using laser as an excitation source

16. To draw B-H curve of ferro-magnetic material with the help of CRO
17. Hysteresis curve a transformer core.
18. Hall Probe method for measurement of resistivity

**Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies and
Approved by Governor of M. P.
(w.e.f. session 2017-2018)**

**Academic Year (2017-2018)
B. Sc III**

There will be Three sections of a Question Paper Section (A) Contains 5 Objective Question of 1/2 Mark each Section (B) Contains 5 Short answer type question of 02 Marks each section (c) contains 5 long answer type question of 06 marks each

1. For Regular students:

Section (A)	Objective Questions	5	1/2	2.5
Section (B)	Short Questions	5	2	10
Section (C)	1 Main Question	5	6	30
		Total Marks		42.5

2. For Private students:

Section (A)	Objective Questions	5	1	5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	7	35
		Total Marks		50

**Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies
and Approved by Governor of M.P.
(w. e. f. session 2019-2020)**

Class: B.Sc. Third Year

Max. Marks: 40 + (CCE) 10 = 50

Subject : **Physics**
Paper : **1**
Title of Paper : **Quantum Mechanics and Spectroscopy**

Unit-I: Quantum Mechanics-1 [15 Lectures]

Particles and Waves: Photoelectric effect. Black body radiation. Compton effect. De Broglie hypothesis. Wave particle duality. Davisson-Germer experiment. Wave packets. Concept of phase and group velocity. Two slit experiment with electrons. Probability. Wave amplitude and wave functions. Heisenberg's uncertainty principle with illustrations. Basic postulates and formalism of Schrodinger's equation. Eigenvalues. Probabilistic interpretation of wave function. Equation of continuity. Probability current density. Boundary conditions on the wave function. Normalization of wave function.

Unit-II: Quantum Mechanics-2 [15 Lectures]

Time independent Schrodinger equation: One dimensional potential well and barrier. Boundary conditions. Bound and unbound states. Reflection and transmission coefficients for a rectangular barrier in one dimension. Explanation of alpha decay. Quantum phenomenon of tunneling. Free particle in one-dimensional box, eigen functions and eigen values of a free particle. One-dimensional simple harmonic oscillator, energy eigenvalues from Hermite differential equation, wave function for ground state. Particle in a spherically symmetric potential. Rigid rotator.

Unit-III: Atomic Spectroscopy [15 Lectures]

Atoms in electric and magnetic fields: Quantum numbers, Bohr model and selection rules. Stern-Gerlach experiment. Spin as an intrinsic quantum number. Incompatibility of spin with classical ideas. Orbital angular momentum. Fine structure. Total angular momentum. Pauli exclusion principle. Many particles in one dimensional box. Symmetric and anti-symmetric wave functions. Atomic shell model. Spectral notations for atomic states. Spin-orbit coupling, **L-S** and **J-J** coupling. Zeeman effect. Continuous and characteristic X-rays. Mossley's law.

Unit-IV: Molecular Spectroscopy [15 Lectures]

Various types of spectra. Rotational spectra. Intensity of spectral lines and determination of bond distance of diatomic molecules. Isotope effect. Vibrational energies of diatomic molecules. Zero point energy. Anharmonicity. Morse potential. Raman effect, Stokes and anti-Stokes lines and their intensity difference. Electronic spectra. Born-Oppenheimer approximation. Frank-Condon principle, singlet and triplet states. Fluorescence and phosphorescence.

Unit-V: Nuclear Physics [15 Lectures]

Basic properties of nucleus: Shape, Size, Mass and Charge of the nucleus. Stability of the nucleus and Binding energy. Alpha particle spectra - velocity and energy of alpha particles. Geiger-Nuttall laws Nature of beta ray spectra. The neutrino. Energy levels and decay schemes. Positron emission and electron capture. Selection rules. Beta absorption and range of beta particles. Kurie plot. Nuclear reactions, pair production. Q-values and threshold of nuclear reactions. Nuclear reaction cross-sections. Examples of different types of reactions and their characteristics. Compound nucleus. Bohr's postulate of compound nucleus reaction Semi empirical mass formula, Shell model. Liquid drop model, Nuclear fission and fusion (concepts).

References:

1. **Quantum Mechanics:** V. Devanathan, Narosa Publishing House, New Delhi, 2005
2. **Quantum Mechanics:** B. H. Bransden, Pearson Education, Singapore, 2005
3. **Quantum Mechanics:** Concepts and Applications. Nouredine Zettili, Jacksonville State University, Jacksonville, USA, John Wiley and Sons, Ltd, 2009
4. **Physics of Atoms and molecules:** B.H. Bransden and C. I. Joachaim. Pearson Education. Singapore, 2003
5. **Fundamentals of Molecular Spectroscopy:** C.M. Ban we 11 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.**

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Annual Syllabus as Recommended by Central Board of Studies
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Subject : **Physics**
Paper : **2**
Title of Paper : **Solid State Physics**
Unit-I: Solid state Physics-1

[15 Lectures]

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: Du long Petit, Einstein and Debye theories of specific heats of solids. Elastic and atomic force constants. Dynamics of a chain of similar atoms and chain of two types of atoms. Optical and acoustic modes. Electrical resistivity. Specific heat of electron. Wiedemann-Franz law. Hall effect. Response 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 potential, 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.

Unit-IV: Semiconductor devices-2

[15 Lectures]

Amplifiers (only bipolar junction transistor). 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 (frequency response). Class B push-pull amplifier. Feedback 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

[15 Lectures]

Nanostructures: Introduction to nanotechnology, structure and size dependent properties. 3D, 2D, 1D, 0D nanostructure materials and their density of states, Surface and Interface effects. Modelling of quantum size effect. Synthesis of nanoparticles - Bottom Up and Top Down approach, Wet Chemical Method. Nanolithography. Metal and Semiconducting nanomaterials. Essential differences in structural

and properties of bulk and nano materials (qualitative description). Naturally occurring nano crystals. Applications of nanomaterial.

References:

1. **Introduction to Solid State Physics**, C. Kittel, VIIIth Edition, John Wiley and Sons, New York, 2005.
2. **Intermediate Quantum theory of Crystalline Solids**. A. O. E. Animalu. Prentice-Hall of India private Limited, New Delhi 1977
3. **Solid State Electronic devices**. B. G. Streetman, II Edition Prentice Hall, India.
4. **Microelectronics**, J. Millman and A. Grabel McGraw Hill New York
5. **The Physics and Chemistry of Nanosolids**: Frank J. Owens, and Charles P. Poole Jr., Wiley Inter Science, 2008
6. **Physics of Low Dimensional Semiconductors**: An introduction: J.H. Davies. Cambridge University Press, U.K., 1998
7. **Electronic Fundamentals and applications**: J.D.Ryder, Prentice Hall India.

Department of Higher Education, Government of Madhya Pradesh
Under Graduate (UG) Syllabus as Recommended by Central Board of Studies and
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(w. e. f. session 2019-2020)

Class: B.Sc. Third Year

Max. Marks: 50

Subject: Physics

For Regular Students

Practical	Sessional	Viva	Total
25	10	15	50

For Ex-Student

Practical	Sessional	Viva	Total
35	00	15	50

List of Practical's

1. Specific resistance and energy gap of a semiconductor.
2. Study of half wave and full wave rectification.
3. Characteristics of Zener diode.
4. Characteristic of a tunnel diode.
5. Characteristics of JFET.
6. Characteristic of a transistor.
7. Study of regulated power supply.
8. Study of RC coupled amplifiers
9. Determination of Planck's constant.
10. Determination of e/m using Thomson's method.
11. Determination of e by Millikan's method.
12. Study of spectra of hydrogen and deuterium (Rydberg constant and ratio of masses of electron to proton).
13. Absorption spectrum of iodine vapour.
14. Study of Zeeman effect for determination of Lande g -factor.
15. Study of Raman spectrum using laser as an excitation source
16. To draw B-H curve of ferro-magnetic material with the help of CRO
17. Hysteresis curve a transformer core.
18. Hall probe method for measurement of resistivity.

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Academic Year (2017-2018)

B. Sc III

There will be Three sections of a Question Paper Section (A) Contains 5 Objective Question of 1/2 Mark each Section (B) Contains 5 Short answer type question of 02 Marks each section (c) contains 5 long answer type question of 06 marks each

1. For Regular students:

Section (A)	Objective Questions	5	1/2	2.5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	6	30
		Total Marks		42.5

2. For Private students:

Section (A)	Objective Questions	5	1	5
Section (B)	Short Questions	5	2	10
Section (C)	Main Question	5	7	35
		Total Marks		50