

PROGRAMME GUIDE

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SESSION 2018-2019

- **Scheme of Examination**
- **Detailed Syllabus**



DR. C.V. RAMAN UNIVERSITY

KARGI ROAD, KOTA, BILASPUR, CHATTISGARH

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DR. C.V.RAMAN UNIVERSITY
KARGI ROAD, KOTA, BILASPUR (C.G.)

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

Duration - 36 Months

(3 Years)

Eligibility – 12th in any discipline

SCHEME OF EXAMINATION

Course Code	Nature of the Course	Name of the Course	Credit				Total Marks	Theory		Practical Marks		Assignments	
			L	P	T	Total		Max	Min	Max	Min	Max	Min
First Semester													
3010113801	Ability Enhancement	Hindi Bhasha Aur Sanrachna	3	-	1	4	100	70	23	-	-	30	15
3010112901	Ability Enhancement	Entrepreneurship Development-I	3	-	1	4	100	70	23	-	-	30	15
3010111503	Core	Physics-I	3	1	-	4	100	70	23	30	15	-	-
3010112205	Core	Computer Science- I	3	1	-	4	100	70	23	30	15	-	-
3010111405	Core	Mathematics-I	3	-	1	4	100	70	23	-	-	30	15
Total			15	2	3	20	500	350	115	60	30	90	45
Second Semester													
3010214601	Ability Enhancement	English Language an Indian Culture	3	-	1	4	100	70	23	-	-	30	15
3010212901	Ability Enhancement	Entrepreneurship Development-II	3	-	1	4	100	70	23	-	-	30	15
3010211503	Core	Physics-II	3	1	-	4	100	70	23	30	15	-	-
3010212205	Core	Computer Science - II	3	1	-	4	100	70	23	30	15	-	-
3010211405	Core	Mathematics-II	3	-	1	4	100	70	23	-	-	30	15
Total			15	2	3	20	500	350	115	60	30	90	45
Third Semester													
3010313801	Ability Enhancement	Hindi Bhasha Avam Samvedna	3	-	1	4	100	70	23	-	-	30	15
3010311102	Ability Enhancement	Environmental Study-I	3	-	1	4	100	70	23	-	-	30	15
3010311503	Core	Physics-III	3	1	-	4	100	70	23	30	15	-	-
3010312205	Core	Computer Science - III	3	1	-	4	100	70	23	30	15	-	-
3010311405	Core	Mathematics-III	3	-	1	4	100	70	23	-	-	30	15
Total			15	2	3	20	500	350	115	60	30	90	45
Fourth Semester													
3010414601	Ability Enhancement	English Language and Scientific Temper	3	-	1	4	100	70	23	-	-	30	15
3010411102	Ability Enhancement	Environmental Study-II	3	-	1	4	100	70	23	-	-	30	15
3010411503	Core	Physics-IV	3	1	-	4	100	70	23	30	15	-	-
3010412205	Core	Computer Science - IV	3	1	-	4	100	70	23	30	15	-	-
3010411405	Core	Mathematics-IV	3	-	1	4	100	70	23	-	-	30	15
Total			15	2	3	20	500	350	115	60	30	90	45

Fifth Semester													
3010513801	Ability Enhancement	Bhasha Kaushal Avam Sanchar Sadhan	3	-	1	4	100	70	23	-	-	30	15
3010512101	Skill Enhancement	Computer & Information Technology Basics	3	-	1	4	100	70	23	-	-	30	15
	Discipline Specific Elective	Physics-V (Elective-I)	3	1	-	4	100	70	23	30	15	-	-
	Discipline Specific Elective	Computer Science - V (Elective-I)	3	1	-	4	100	70	23	30	15	-	-
	Discipline Specific Elective	Mathematics-V (Elective-I)	3	-	1	4	100	70	23	-	-	30	15
Total			15	2	3	20	500	350	115	60	30	90	45
Six Semester													
	Discipline Specific Elective	Physics-VI (Elective-II)	3	1	-	4	100	70	23	30	15	-	-
	Discipline Specific Elective	Computer Science - VI (Elective-II)	3	1	-	4	100	70	23	30	15	-	-
	Discipline Specific Elective	Mathematics-VI (Elective-II)	3	-	1	4	100	70	23	-	-	30	15
3010632201	Research Component	Project Work	-	8	-	8	200	-	-	200	100	-	-
Total			9	10	1	20	500	210	69	260	130	30	15

Evaluation Scheme

- Minimum marks required to pass in each theory paper in a semester shall be 33% .
- Minimum marks required to pass in a semester shall be 50% in each Practical/Assignments/Fieldwork Project /Dissertation.

GROUPS WITH LIST OF ELECTIVE

***Note** - Students need to select any one group and choose any two subjects from selected group for fifth and one subject for sixth semester.

Electives for Fifth Semester			Electives for Sixth Semester		
Codes	Nature of the Course	List of Electives	Codes	Nature of the Course	List of Electives
Subject: Computer Science					
3010542204	Discipline Specific	Operating System	3010642204	Discipline Specific	Digital Electronics
3010542205	Discipline Specific	Computer Networks	3010642205	Discipline Specific	R.Programming
Subject: Physics					
3010541504	Discipline Specific	Quantum Mechanics, Atomic, Molecular & Nuclear Physics	3010641504	Discipline Specific	Solid State Physics, Devices, Electronics & Lasers
3010541505	Discipline Specific	Astro Physics & Atmospheric Science	3010641505	Discipline Specific	Nano-Technology & Material Science
Subject: Mathematics					
3010541404	Discipline Specific	Real Analysis, Linear Algebra & Discrete Mathematics	3010641404	Discipline Specific	Metric Spaces & Numerical Analysis
3010541405	Discipline Specific	Boolean Algebra & Graph Theory	3010641405	Discipline Specific	Fuzzy Set Theory & Fuzzy Logic



DR. C.V.RAMAN UNIVERSITY
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SEMESTER- 1st
Course: B.A.
SUBJECT:- Foundation Course
Hindi Bhasha Aur Sanrachana

Subject Code: 3010113801
Theory Max. Marks: 70
Theory Min. Marks: 23

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SEMESTER- 1st

Course: B.Sc. Computer Science

SUBJECT: Foundation Course

Entrepreneurship Development -I

Subject Code: 3010112901

Theory Max. Marks: 70

Theory Min. Marks: 23

Unit-I

Entrepreneurship-Definition, Characteristics and importance, Types and functions of an entrepreneur, merits of a good entrepreneur motivational factors of entrepreneurship.

Unit-II

Motivation to achieve targets and establishment of ideas. Setting targets and facing challenges. Resolving problems and creativity. Sequenced planning and guiding capacity, Development of self confidence. Communication skills, Capacity to influence, leadership.

Unit-III

Project Report- Evaluation of selected process. Detailed project report - Preparation of main part of project report pointing out necessary and viability. Selecting the form of Organization: Meaning and characteristics of sole Proprietorship, Partnership and cooperative committees, elements affecting selection of a form of an organization. Economic management -Role of banks and financial institutions banking, financial plans, working capital-evaluation and management, keeping of accounts.

Unit IV

Production management - Methods of purchase. Management of movable assets/goods. Quality management. Employee management. Packing. Marketing management Sales and the art of selling. Understanding the market and market policy. Consumer management. Time management.

Unit-V

Role of regulatory institutions - district industry centre, pollution control board, food and drug administration, special study of electricity development and municipal corporation. Role of development organizations, khadi & village Commission/ Board, State Finance Corporation, scheduled banks, MP Women's Economics Development Corporation. Self-employment-oriented schemes, Prime Minister's Employment schemes, Golden Jubilee Urban environment scheme, Rani Durgavati Self-Employment scheme, Pt. Deendayal Self-employment scheme. Various grant schemes - Cost-of-Capital grant, interest grant, exemption from entry tax, project report, reimbursement grant, etc. Special incentives for women entrepreneurs, prospects & possibilities. Schemes of Tribal Finance Development Corporation, schemes of Antyavasai Corporation, schemes of Backward Class and Minorities Finance Development Corporation.

Text & Reference Books

Amrit Tiwana ,The Knowledge Management tool kit, Pearson Education.
Lunlin Conlson, Knowledge Entrepreneur, Thomas Press.
Catheriue L Mann, Knowledge entrepreneurship, Oxford
Heinke Robkern ,Knowledge entrepreneurship,.
Bonnie Montano,Knowledge Management, , IRM Press, London



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SEMESTER- 1st

COURSE: B.Sc. Mathematics /C.S

SUBJECT: Physics – I

Mechanics, Oscillations and Properties of Matter

SUBJECT CODE: 3010111503

Theory Max. Marks: 70

Theory Min. Marks: 23

Unit-I

Mechanics: Laws of motion, centripetal acceleration, Coriolis force and its applications. Kepler's laws. Gravitational law and field, Gauss & Poission's Equation of Gravitational self-energy System of particles, centre of mass, equation of motion, conservation of linear and angular, momentum, conservation of energy, single stage and multistage rockets, elastic and inelastic collisions.

Unit-II

Oscillations: differential equation and its solution, kinetic and potential energy, simple harmonic oscillations and its examples, spring and mass system, Vibrations of a magnet, moments of inertia and their products, principal moments and axes, Euler's equations simple and compound pendulum torsional pendulum, Helmholtz resonator, LC circuit.

Unit-III

Superposition of Harmonic Motion: Superposition of two simple harmonic motions of the same frequency along the same line, interference, superposition of two mutually perpendicular simple harmonic vibrations of the same frequency, Lissajous figures, damped harmonic oscillators, power dissipation, quality factor and their examples, driven harmonic oscillator.

Unit-IV

Properties of matter: Elasticity, Hook's Law, elastic constants for an isotropic solid beams supported at both the ends, cantilever, torsion of a cylinder bending moments and shearing forces. Kinematics of moving fluids, equations of continuity Euler's equation, Bernoulli's theorem, viscous fluids, streamline and turbulent flow, Poiseuille's law, Capillary tube flow, Reynold's number, Stokes law Surface tension and surface energy. surface wetting.

Unit-V

Motion of charged Particles in Electric and Magnetic Fields: E as an accelerating field, electron gun, case of discharge tube, linear accelerator. E as deflecting field- CRO, sensitivity of CRO. Transverse B field; 180° deflection, mass spectrograph. principles of cyclotron. discovery of isotopes, elements of mass spectrographs, principle of magnetic focusing (lenses).

TEXT AND REFERENCE BOOK

- "Mechanics" J.C. Upadhyay, (Prgati Prakasan meerut)
- "Mechanics" D.S. Mathur, S. Chand & co. Delhi
- "Vibration and Waves" K.K. Srivastava, Anusandhan Prakashan Kanpur
- "Oscillations and Waves" Satya Prakash, Prgati Prakasan meerut
- "Sound". Khanna and Bedi
- "Unified Physics" R. P. Goyal, Shiv Lal Agrawal & co. Agra
- "Properties of Matter" N. Subramanayam, S. Chand & co. Delhi
- "Prabodh Bhoutiki" Kher, Choube & Upadhyay Yugbodh offset Pvt. Ltd. Raipur
- "A text book of sound" N. Subramanayam, & Brijlal, Vikash publishing House Pvt. Ltd. Delhi
- "Yugbodh Physics Patel & Verma" Yugbodh Prakashan Raipur



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SEMESTER- 1st

COURSE: B.Sc. (CS)

SUBJECT: Practical Physics – I

Practical Max. Marks: 30

Practical Min. Marks: 15

1. To determine the acceleration due to gravity (g) at a place with the help of Bar pendulum. (Compound Pendulum).
2. To determine the acceleration due to gravity (g) at a place with the help of Kater's reversible pendulum.
3. To determine the modulus of rigidity of given wire by Torsional Pendulum.
4. To determine the moment of inertia of a flywheel about its own axis of rotation.
5. To determine the moment of inertia of given body by using inertia table.
6. To determine the moment of inertia of given body by using inertia table with lamp and scale arrangement.
7. To study and prove the perpendicular axis theorem of moment of inertia by using inertia table.
 $I_z = I_x + I_y$
8. To determine the surface tension of a liquid by the capillary rise method.
9. To determine the co-efficient of viscosity of glycerine or castor oil by falling sphere method.
10. To determine the density of liquid by using steel balls and Teflon spheres.
11. To determine the fall time of different size spheres of same material.
12. To determine the Young's Modulus of elasticity of the given sample material by bending. (Bending of Beam)
13. To study and verify the truth table of Basic, Universal & Compound Logic Gates.

Note:-

- ❖ **One experiment will be asked in the semester practical examination.**



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SEMESTER- 1st
Course: B.Sc. (C.S.)
SUBJECT: Mathematics – I
(Algebra, Trigonometry & Geometry)

Subject Code: 3010111405
Theory Max. Marks: 70
Theory Min. Marks: 23

OBJECTIVES;

- Apply the concepts of matrices in solving a system of linear equations.
- Be familiar with the theory of equations.
- Expand trigonometric functions and also find the summation of T-series.
- To have knowledge about Cone and Cylinder with conicoides.
- Be familiar with group theory, ring, integral domain, field and make their fundamental strong.

UNIT-1

Rank of a matrix. Eigen values, eigen vectors. Characteristic equation of a matrix. Cayley Hamilton theorem and its use in finding inverse of matrix. Application of matrix to a system of linear (both homogeneous and non-homogeneous) equations. Theorems on consistency and inconsistency of a system of linear equations. Solving the linear equations with three unknowns. Relation between the roots and coefficients of a general polynomial equation in one variable. Transformation of equations, Descartes's rule of signs.

Unit-2

De Moivre's theorem and its application. Direct and inverse circular and hyperbolic functions, Expansion of trigonometrical function. Gregory's Series, Summation of Series,

Unit-3

Definition and basic properties of group. Order of an element of a group. Subgroups, algebra of subgroups. Cyclic groups and their simple properties. Coset decomposition and related theorems. Lagrange's theorem and its consequences, Normal sub groups, quotient groups.

Unit-4

Homomorphism and isomorphism of groups, kernel of Homomorphism and fundamental theorem of Homomorphism of groups. Permutation groups (even and odd permutations) Alternating groups A_n , Cayley's theorem. Introduction to rings, subrings, integral domains and fields, simple properties and examples.

Unit-5

General equation of second degree. Tracing of conics. Equation of cone with given base, generators of cone, condition for three mutually perpendicular generators, Right circular cone. Equation of Cylinder and its properties. Right circular cylinder, enveloping cylinder and their properties. Central conicoids, Paraboloids. Plane sections of Conicoids.

OUTCOMES;

- Understanding the ideas of matrices and ability to solve system of linear equations.
- The student will be able to acquire sound knowledge of matrices and techniques in solving equations with the help of theory of equations
- Fluency in solving equations.
- Understanding the concepts of algebra, trigonometry and geometry

TEXT AND REFERENCE BOOK

- H.K. Pathak Algebra & Trigonometry, Geometry; Shiksha Sahitya a Prakashan, Meerut.
- P.B. Bhattacharya, S.K. Jain & S.R. Nagpaul Abstract algebra, Cambridge University.
- K.B. Dutta, Matrix & Linear algebra, Pvt. Lmt.
- B.R. Thakur, Algebra & Geometry.



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SEMESTER- 1st

Course: B.Sc. Computer Science

SUBJECT: Fundamental of Computing

Subject Code: 3010112205

Theory Max. Marks: 70

Theory Min. Marks: 23

Objective:-

- To familiar student world of information technology, components of computer system,.
- To understand concept of software and hardware.
- To understand the use of office automation tool and various operating system.

To familiar student with world wide web and create web pages using HTML and front page

UNIT-I Introduction to Information Technology: Basic concepts of IT, Data Processing: Data and Information. Introduction to Computers: Classification, History, Types of Computers. Elements of a Computer System: Block Diagram of The Computer System,

UNIT -II Introduction to various units. Hardware: CPU, Memory, Input and Output devices, Auxiliary storage devices. Software: System and Application Software, Utility packages, Configuration of Computer System Applications of Information Technology: Wide range of applications in: Home, Education and Training, Entertainment, Science, Medicine, Engineering etc.

UNIT-III Introduction to Information Technology Tools : Operating System, Programming Languages, Features and trends. Introduction to MS-DOS/WINDOWS/LINUX/UNIX Office Automation Tools: MS-Office, Word, Powerpoint, Excel, Access, Working with PC PACKAGES. Translators: Assembler, Compiler and Interpreter.

UNIT-IV Business Files: Concept of Character, Field, Record and File. Types of Data Files: Master File, Transaction File, Archival File. Keys: Primary Key, Secondary key, Foreign key etc. File Organization: Sequential file, Indexed Sequential file, Random files. Comparison of various type of file organization. Choice of Files Organization, Design of Computer Data Files, Files Security and Back-Up.

UNIT-V Computers and Communication: Introduction to Computer Networks, Internet and World Wide Web, FTP, Electronic Mail. Web Development Tools : FrontPage, HTML. Information Security and Integrity: Basic Concepts, Perverse Software, Preventive Measures and treatments. Laboratory : Working with DOS, Linux/Unix and Windows O.S., MS-Office, Web Design using HTML and FrontPage.

Outcomes:-

After the completion of the course student are able to:-

- Easy interact with computer world.
- Known the memory hierarchy of computer.
- Create and execute web pages.

Text Books:

1. Sanders, D.H., "Computer Today ", Mc-Graw Hill, 1988.
2. Suresh K. Basandra, "Computers Today", Galgotia Publications Pvt. Ltd.
3. Microsoft Web Publishing Step by Step, Active Education.
4. Bokhari & Ahmad "UNIX Operating System", Dhanpat Rai & Co.

Reference Books:

1. Raja Raman V., "Fundamental of Computers" (4th edition.), Prentice Hall of India, New Delhi.
2. Trainer T., et al, "Computers", McGraw Hill.
3. Norton, Peter, "Introduction to Computers, Mc-Graw-Hill.
4. B. Ram, "Computer Fundamentals", New Age International Pvt. Ltd.
5. S. Jaiswal, "Fundamental of Computer & IT", Wiley dreamtech India.



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SEMESTER- 1st

Course: B.Sc. Computer Science

SUBJECT: Fundamental of Computing Lab

Practical Max. Marks: 30

Practical Theory Min. Marks: 15

LIST OF PRACTICAL'S

- [MS-WORD] Creating, opening, closing, saving and editing a word Document.
- [MS-WORD] Insert header and footer in the document.
- [MS-WORD] Create a link between two files using Hyperlink.
- E- mail-merge and add data of 5 recipients.
- [MS-WORD] Protect a document.
- [MS-WORD] Implement macro.
- [MS-POWERPOINT] Create duplicate slides in PowerPoint. Give an example.
- [MS-POWERPOINT] Make a master slide.
- [MS-POWERPOINT] Design a chart of population.
- [MS-POWERPOINT] Insert Animation.
- [MS-POWERPOINT] Insert a background in PowerPoint.
- [MS-EXCEL] How you can filter your data.
- [MS-EXCEL] Sort data in ascending and descending order.
- [MS-EXCEL] To show the use of goal seek
- [MS-EXCEL] To show the use of scenarios.
- [MS-EXCEL] Perform any 5 Date and Time functions.
- [MS-EXCEL] Perform any 5 Math & Trig functions.

TEXT AND REFERENCE BOOK

- Computer Fundamentals 6th Edition Pradeep Ku. Sinha & Priti Sinha, BPB Publications
- MS-Office 2010 Training Guide Paperback, by Prof. Satish Jain (Author), M. Geetha (Author)



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SEMESTER- 1st

Course: B.Sc. Computer Science

SUBJECT: List of Practical's – Physics-I

Theory Max. Marks: 30

Theory Min. Marks: 15

1. To determine the moment of inertia of fly-wheel about its own axis of rotation.
2. To determine the frequency of an electrically maintained tuning fork by Melde's method.
3. To study the variation of time t with length l for a compound pendulum (Bar pendulum) and estimate the value of acceleration due to gravity.
4. To determine the value of acceleration due to gravity at a particular place by means of Kater's reversible pendulum.
5. To determine the surface tension of given liquid by using capillary rise method.
6. To verify the truth tables of various logic gates.
7. To determine the coefficient of viscosity of glycerin by falling sphere method.
8. Determination of moment of inertia using inertia table.
9. Determination of modulus of rigidity of given wire by torsional pendulum.
10. Study of Lissajous figures using cathode ray oscilloscope (CRO).

Text books/ references:

1. Practical Physics, Dr. S.L. Gupta & Dr. V. Kumar, Pragti Prakashan Meerut
2. Degree level practical Physics, Sharma, Singh & Prashad, Bharti Bhawan Publication Patna-6.
3. Experiment in Engineering Physics-M.N. Awadhanulu, A.A. Dani & P.M. Pokle, S.Chand Pub. New Delhi.
4. Prabodh Prayogik Bhoutiki, Dr. P.K.Upadhayay, Yugbodh offset Pvt. Ltd. Raipur
5. A text book of Engineering Physics Practical Das, Robinson & Kumar University Science press New Delhi
6. Practical Physics, Chattopadhyay



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SEMESTER- 2nd

Course: B.Sc. Computer Science

SUBJECT: Foundation Course - Paper I
(English Language and Indian Culture)

Subject Code: 3010214601

Theory Max. Marks: 70

Theory Min. Marks: 23

UNIT – I

1. Amalkanti : Nirendranath Chakrabarti
2. Sita : Toru Dutt
3. Tryst with Destiny : Jawaharlala Nehru
4. Delhi in 1857 : Mirza Ghalib
5. Preface to the Mahabharata : C., Rajagopalachari
6. Where the Mind is Without Fear : Rabindranath Tagore
7. A Song of Kabir : Translated by Tagore
8. Satyagraha : M.K. Gandhi
9. Toasted English : R.K. Narayan
10. The Portrait of a Lady : Khushwant Singh
11. Discovering Babasaheb : Ashok Mahadevan

Unit – II Comprehension

Unit – III Composition and Paragraph Writing (Based on expansion of an idea).

Unit – IV Basic Language Skills: Vocabulary – Synonyms, Antonyms, Word Formation, Prefixes and Suffixes, Words likely to be confused and Misused, Words similar in Meaning or Form, Distinction between Similar Expressions, Speech Skills.

Unit – V Basic Language Skills: Grammar and usage – The Tense Forms, Propositions, Determiners and Countable/Uncountable Nouns, Verb, Articles, Adverbs.

Prescribed Book:

1. English Language and Indian Culture, published by M. P. Hindi Granth Academy

Reference Books:

1. Essentials of English Grammar by Sultan Chand & Sons
2. English Grammar and Composition by Wren & Martin
3. Scholar's Senior English Grammar and Composition, T.R. Bhanot, H. Martin, Scholar Publishing House (P) Ltd.



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SEMESTER- 2nd

Course: B.Sc. Computer Science

SUBJECT: Foundation Course - Paper II
(Entrepreneurship Development-II)

Subject Code: 3010212901

Theory Max. Marks: 70

Theory Min. Marks: 23

Unit - I

Entrepreneurship – Meaning, Concept, Characteristics of entrepreneur.

Unit – II

Types of entrepreneurship, importance and views of various thinkers (Scholars).

- Formation of goals, How to achieve goals.
- Problems in achieving targets and solution.
- Self motivation, elements of self motivation and development
- Views of various scholars, evaluation, solutions.

Leadership capacity : Its development and results.

Unit – III

Projects and various organizations (Govt., non-Govt), Govt. Projects, Non-Govt.projects.
Contribution of Banks, their limitations, scope.

Unit – IV

Functions, qualities, management of a good entrepreneur.
Qualities of the entrepreneur (Modern and traditional).
Management skills of the entrepreneur.
Motive factors of the entrepreneur.

Unit – V

Problems and Scope of the Entrepreneur:

- Problem of Capital
- Problem of Power
- Problem of registration
- Administrative problems
- Problems of Ownership.



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SEMESTER- 2nd

3010211503

Course: B.Sc. Computer Science

SUBJECT: PHYSICS – II

(Mathematical Background, Electrostatics, and Steady Currents)

Subject Code:

Theory Max. Marks: 70

Theory Min. Marks: 23

Unit-1

Mathematical Background: Scalars and vectors, dot and cross products, triple vector product, flux of a vector field, Gauss's divergence theorem. Green's theorem and Stoke's theorem. Functions of two and three variables, partial derivatives, definition of a double and triple integral, evaluation of double and triple integrals as repeated integrals, change of variables of integration, Jacobian applications.

Unit-2

Electrostatics: Coulombs law in vacuum expressed in vector forms, calculations of E for simple distributions of charge at rest, dipole and quadrupole fields. torque on a dipole in a uniform electric field and its energy, flux of the electric field, Gauss's law and its application. Capacitors, electrostatic field energy,. Dielectrics, parallel plate capacitor with a dielectric, dielectric constant, polarization and polarization vector, and displacement vector D, molecular interpretation of Claussius-Mossotti equation.

Unit-3

Electric Currents: Steady current, current density J, non-steady currents and continuity equation, Kirchoff 's laws and analysis of multiloop circuits, rise and decay of current in LR and CR circuits, decay constants, transients in LCR circuits. AC circuits, complex numbers and their applications solving AC circuits Problems, complex impedance and reactance, series and parallel resonance., Q factor, power consumed by an A.C. circuit, power factor,

Unit-4

Magneto-statics: 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, Ampere's Law, $\vec{N} \times \vec{B} = \mu_0 \vec{J}$, $\vec{N} \cdot \vec{B} = Q$; Field due to a magnetic dipole magnetization current magnetization vector, Half order field, magnetic permeability (linear cases).

Unit-5

Time Varying Fields : Electromagnetic induction, Faraday's Laws, electromotive force $\mathcal{E} = \oint \vec{E} \cdot d\vec{l}$, integral and differential forms of Faraday's laws. self and mutual inductance, transformers,. Maxwell's displacement current, Derivations of Maxwell's equations, electromagnetic field energy density,. Poynting's vector. The wave equation satisfied by E and B, plane electromagnetic waves in vacuum, polarization by reflection and total internal reflection. Faraday effect, reflection and refraction by the ionosphere.

Text book:

1. Electromagnetic Fields". A.M. Portis
2. "Principles of Electricity and Magnetism" Pugh and Pugh, India Book House, Delhi.
3. "Unified Physics" R. P. Goyal
4. Prabodh Bhoutiki" Kher, Choube & Upadhyay.Yugbodh Offset Pvt. Ltd. Raipur.
5. Electricity and Magnetism , Mahajan & Rangwala TMH New Delhi
6. Electricity and Magnetism, JC Upadhyay, H.P. Sinha & S Upadhyay, Ram Prasad & Sons
Agra
7. Foundation of magnetism & Electricity, DN Vashudeva S. Chand & Co. Delhi
8. Elements of Physics-Electrostatics, DP Singh & K Rai , Scientific book co. Patna.
9. Elements of Physics-Electricity, DP Singh & K Rai , Scientific book co. Patna
10. Elements of Vector Calculus, N. Sharma & R Prasad, Pothywala Pvt. Ltd. Allahabad
11. Electricity and Magnetism, Arora, Saxena & Prakash, Pragati Prakashan Meerut.



DR. C.V.RAMAN UNIVERSITY
KARGI ROAD, KOTA, BILASPUR (C.G.)

SEMESTER- 2nd

3010212205

Course: B.Sc. Computer Science

SUBJECT: Programming With C

Subject

Code:

Theory Max. Marks: 70

Theory Min. Marks: 23

Objectives:

1. To differentiate and understand low-level and high-level programming languages
2. To understand the use of rich set of data types in C appropriate to specific programming problems.
3. Demonstrate the use of various operators
4. Demonstrate the use of the various control flow constructs.

UNIT - 1 ELEMENTS OF C LANGUAGE

Algorithm and Programming Development steps in development of a program, Flow charts, Algorithm development, Program Debugging. Program Structure:-I/o statements, assign statements. Constants, variables and data types, Operators and Expressions, Standards and Formatted, Use of Header & Library files.

UNIT- 2 CONTROL STRUCTURES

Introduction, Decision making with IF – statement, IF – Else and Nested IF, While and do-while, for loop, Break and switch statements. Functions:-Introduction to functions, Global and Local Variables, Function Declaration, Standard functions, Parameters and Parameter Passing, Call – by value/reference, Recursion.

UNIT - 3 INTRODUCTION TO ARRAYS

Array Declaration and Initialization, Single and Multidimensional Array. Arrays of Characters.

UNIT - 4 POINTERS

Introduction to Pointers, Address operator and pointers, Declaring and Initializing pointers, Assignment through pointers. Structures and Unions:-Declaration of structures, Accessing structure members, Structure Initialization, Unions.

UNIT- 5 STRINGS

Introduction, Declaring and Initializing string variables, Reading and writing strings, String handling functions, Array of strings Files:- Introduction, File reading/writing in different modes, File manipulation using standard function types.

OUTCOMES:

After completion of the course study, students will be able to-

1. Describe the concept of c language and designing approach.
2. Read, understand and trace the execution of programs written in C language
3. Write C program for a given algorithm using modular approach

TEXT BOOKS:

1. Salaria RS, *Application Programming in C*, Khanna Book Publishing Co (P) Ltd. New Delhi.
2. Schaum Series, *Programming in C*, McGraw Hills Publishers, New York.

REFERENCES BOOKS:-

1. Yashwant Kanetkar, *Exploring* – BPB Publications, New Delhi.



DR. C.V.RAMAN UNIVERSITY
KARGI ROAD, KOTA, BILASPUR (C.G.)

SEMESTER- 2nd

3010211405

Course: B.Sc. Computer Science

SUBJECT: Mathematics – II

Calculus, Differential Equations & Vector Calculus

Subject Code:

Theory Max. Marks: 70

Theory Min. Marks: 23

UNIT-I

Concept of Partial differentiation, Successive differentiation, Leibnitz theorem, Maclaurin and Taylor series expansions, Asymptotes and Curvature, Tests for concavity and convexity, Points of inflexion. Multiple points. Tracing of curves in cartesian and polar co-ordinates

Unit-2

Integration of irrational algebraic functions and transcendental functions. Reduction formulae. Definite Integrals. Quadrature, Rectification, Volumes and Surfaces of solids of revolution of curves.

Unit-3

Linear equations and equations reducible to the linear form, Exact differential equation First order higher degree equations for x , y , p , Clairaut's form and singular solutions. Linear differential equations with constant coefficients.

Unit-4

Homogenous linear ordinary differential equations, linear differential equations of second order. Transformation of the equation by changing the dependent variable and the independent Variable, Method of variation of parameters, Ordinary simultaneous differential equations.

Unit-5

Vector differentiation. Gradient, Divergence and Curl. Vector integration, Theorem of Gauss (without proof) and problems based on it. Theorem of Green (without proof) and problems based on it. Stoke's theorem (without proof) and problems based on it.

Text book:

1. H.K. Pathak Calculus.
2. Gorakh Prasad, Differential calculus, Pothishala Pvt. Ltd.

Recommended Book

1. P.K. Jain & S.K. Kaushik, An introduction to Real Analysis. New Delhi.
2. Shanti Narayan, Vector Calculus, X.Chand & Co. New Delhi
3. N., Sharan & S.N. Nigam, Introduction to Vector Analysis, Pvt. Ltd. Alahabad.



DR. C.V.RAMAN UNIVERSITY
KARGI ROAD, KOTA, BILASPUR (C.G.)

SEMESTER- 2nd

Course: B.Sc. Computer Science
SUBJECT: Programming with C Lab

Practical Max. Marks: 30
Practical Min. Marks: 15

LIST OF PRACTICALS:

1. Write a Program (WAP) to calculate temperature in Fahrenheit to Celsius using formula $C = (F - 32) / 1.8$.
2. WAP to calculate Sum & average of N numbers.
3. WAP to convert integer arithmetic to a given number of day and month.
4. WAP to find maximum and minimum out of 3 numbers a, b & c.
5. WAP to find factorial of positive integer.
6. WAP to find sum of series up to n number, $2 + 5 + 8 + \dots + n$.
7. WAP to print all the number between 1 to 100 which are dividing by 7.
8. WAP to generate Fibonacci series up to n.
9. WAP to find position in class first = 360, second = 240, third = 120 otherwise fail. Read marks of 3 subjects.
10. Write an iterative function to calculate factorial of given number.
11. Write a recursive function to calculate factorial of given number.
12. WAP to find whether number is prime or not.
13. WAP to find even & odd up to a given limit.
14. WAP to find addition of two matrix of $n \times n$ order.
15. WAP to find multiplication of two matrix of $n \times n$ order.

REQUIRED SOFTWARE/ SOFTWARE TOOL:

1. Linux Operating System and/ or Windows Operating System
2. Turbo C/C++ IDE.

RECOMMENDED BOOK

1. C Programming Laboratory by Dr. Nandini S. Sidnal, Wiley India, 2012



DR. C.V.RAMAN UNIVERSITY
KARGI ROAD, KOTA, BILASPUR (C.G.)

SEMESTER- 2nd

Course: B.Sc. Computer Science

SUBJECT: PHYSICS PRACTICALS

Practical Max. Marks: 30

Practical Min. Marks: 15

1. To plot graphs showing the variation of magnetic field with distance along the axis of a circular coil carrying current and to estimate from it the radius of the coil.
2. To determine the mechanical equivalence of heat J by callender and Barnes method.
3. Calculation of Impedance, Phase angle and power factor using LCR impedance circuit kit.
4. To determine the resistance per unit length of the Carey-foster bridge wire.
5. Study of charge conduction in electrostatics.
6. Study and verification of inverse square law by using photo cell kit.
7. Verification of Coulomb's law.
8. Study and analysis of Ballistic galvanometer.
9. Measurement of dielectric constant of different materials.
10. Verification of Biot-Savert's law.

Text books/ references:

2. Practical Physics, Dr. S.L. Gupta & Dr. V. Kumar, Pragti Prakashan Meerut
3. Degree level practical Physics, Sharma, Singh & Prashad, Bharti Bhawan Publication Patna-6.
4. Experiment in Engineering Physics-M.N. Awadhanulu, A.A. Dani & P.M. Pokle, S.Chand Pub. New Delhi.
5. Prabodh Prayogik Bhoutiki, Dr. P.K.Upadhayay, Yugbodh offset Pvt. Ltd. Raipur
6. A text book of Engineering Physics Practical Das, Robinson & Kumar University Science press New Delhi
Practical Physics, Chattopadhyay



Dr. C.V. RAMAN UNIVERSITY
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 3rd
Course: B.Sc. Computer Science
SUBJECT: Foundation Course - Paper I
Hindi Bhasha Avam Samvedna

Subject Code: 3010313801
Theory Max. Marks: 70
Theory Min. Marks: 23

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Dr. C.V. RAMAN UNIVERSITY
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 3rd
Course: B.Sc. Computer Science
SUBJECT: Foundation Course
Environmental Study-I

Subject Code: 3010311102
Theory Max. Marks: 70
Theory Min. Marks: 23

UNIT – I Study of Environmental and ecology :

- (a) Definition and Importance.
- (b) Environmental Pollution and problems.
- (c) Public participation and Public awareness.

UNIT – II Environmental Pollution :

- (a) Air, water, noise, heat and nuclear pollution.
- (b) Causes, effect and prevention of pollution.
- (c) Disaster management – Flood, Earthquake, cyclones and landslides.

UNIT – III Environment and social problems :

- (a) Development – non-sustainable to Sustainable.
- (b) Energy problems of cities.
- (c) Water preservation – rain-water collection.

UNIT – IV Role of mankind in conserving natural resources :

- (a) Food resources – World food problem.
- (b) Energy resources – increasing demand for energy.
- (c) Land resources – Land as resources.

UNIT – V Environment conservation laws :

- (a) Conservation laws for air and water pollution.
- (b) Wildlife conservation laws.
- (c) Role of information technology in protecting environment & health.

Reference Books:

1. Environmental Science & Engineering, R.Anandan R. Kumaravelan, Scitech Publication (India) Pvt. Ltd.
2. Environment & Ecology, Dr. J.P.Sharma, Laxmi Publication.



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 3rd

Course: B.Sc. Computer Science

SUBJECT: Physics-III

Subject Code: 3010311503

Theory Max. Marks: 70

THEORY MIN. MARKS: 23

Kinetic Theory of Gases, Thermo-dynamics and Statistical Mechanics

Unit-1 Kinetic Theory of Gases: Ideal Gas: Kinetic model, deduction of Boyle's law, interpretation of temperature, estimation of rms speeds of molecules. Brownian motion, estimation of the Avogadro number. Law of Equipartition of energy, specific heat of monatomic gas, extension to di- and tri- atomic gases, behavior at low temperatures. Adiabatic expansion of an ideal gas, applications to atmospheric physics. Real Gas: Van der Waals gas, Equation of state, nature of Van der Waals forces, comparison with experimental P-V curves. The critical constants; gas and vapour. Joule expansion of ideal gas and Vander Waals gas, Joule coefficient, estimates of J-T cooling. Liquefaction of gases: Boyle temperature and inversion temperature. Principle of regenerative cooling, liquefaction of hydrogen and helium. Refrigeration cycle, meaning of efficiency.

Unit-2 Thermodynamics: The laws of thermodynamics: The Zeroth law, first law of thermodynamics, internal energy as a state function and other applications. Reversible and irreversible changes, Carnot cycle and its efficiency, Carnot theorem and the second law of thermodynamics, Entropy,. The thermodynamic scale of temperature; its identity with the perfect gas scale. Impossibility of attaining the absolute zero; third law of thermodynamics. Thermodynamic relationships: Thermodynamic variables: Maxwell's general relationships, application to Joule – Thomson cooling and adiabatic cooling in a general system, Clausius-Clapeyron Latent heat equation. Cooling due to adiabatic demagnetization, Production and measurement of very low temperatures.

Unit-3 Statistical Physics: The statistical basis of thermodynamics: Probability and thermodynamic probability, principle of equal a priori probabilities, probability distribution and its narrowing with increase in number of particles. The expressions for average properties. Constraints, accessible and inaccessible states, distribution of particles with a given total energy into a discrete set of energy states. Some universal laws: The μ space representation, division of μ space into energy states and into phase cells of arbitrary size, applications to one-dimensional harmonic oscillator and free particles. Equilibrium between two systems in thermal contact, bridge with macroscopic physics. Probability and entropy, Boltzmann entropy relation. Statistical interpretation of second law of thermodynamics. Boltzmann canonical distribution law and its applications; Rigorous form of equipartition of energy.

Unit-4 Maxwellian distribution of speeds in an ideal gas: Distribution of speeds and velocities, experimental verification, distinction between mean, rms and most probable speed values. Doppler broadening of spectral lines. Black Body Radiation :Pure temperature dependence, Stefan-Boltzmann law, pressure of radiation, Spectral distribution of Black Body radiation. Wien's displacement law, Rayleigh-Jean's law, the ultraviolet catastrophe, Planck's quantum postulates, Planck's law, complete fit with experiment. Interpretation of behaviour of specific heats of gases at low temperature .

Unit-5 Quantum Statistics: Transition to quantum statistics; "h" as a natural constant and its implications, cases of particle in a one dimensional box and one-dimensional harmonic oscillator. Indistinguishability of particles and its consequences, Bose- Einstein and Fermi-Dirac conditions; applications to liquid helium, Free electrons in a metal, and photons in blackbody chamber. Fermi level and Fermi energy. Transport Phenomena : Transport phenomena in gases; Molecular collisions, mean free path and collision cross sections. Estimates of molecular diameter and mean free path. Transport of mass, momentum and energy and interrelationship, dependence on temperature and pressure.

TEXT AND REFERENCE BOOK

1. "Thermal Physics" G.G. Agarwal and H.P. Sinha, Ram Prasad & Sons , Agra.
2. "Heat and Thermodynamics" Satya Prakash and Singhal, Pragati Prakashan Meerut.
3. "Unified Physics" R. P. Goyal ,Shivlal, Agrawal & Co. Agra.
4. "Introduction to Statistical Mechanics" B. B. Laud (MacMillan, 1981).
- 5.
6. "Statistical Physics" F. Reif (Tata McGraw-Hill, 1988).
7. "Statistical Physics" K. Huang (Wiley Eastern K. Huang, 1988).
8. "Praboth Bhoutiki" Kher, Choube , & Upadhyay, Yugboth Offset Pvt. , Ltd, Raipur.
9. Statistical Physics " S.K.Sinha , Narosa Pub. Kolkatta.



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 3rd

Course: B.Sc. Computer Science

SUBJECT: Data Structure

Subject Code: 3010312205

Theory Max. Marks: 70

Theory Min. Marks: 23

Course Objectives

1. To teach efficient storage mechanisms of data for an easy access.
2. To design and implementation of various basic and advanced data structures.
3. To introduce various techniques for representation of the data in the real world.
4. To develop application using data structures.
5. To teach the concept of protection and management of data.
6. To improve the logical ability

Unit 1

Data Structure and Algorithms- Introduction, Data Structures, Fundamentals of DS, Operations on Data Structure Arrays – Introduction, Memory/Storage Representation of One and Two Dimensional Array, Sorting- Definition of Sorting, Comparison of Sorting Method, Bubble Sort, Insertion Sort, Selection Sort, Merging. Searching- Definition, Type of Searching (Binary Search, Linear Search.)

Unit 2

Stacks- Introduction & Definition, Application of Stack, Various Representation of Stack, Operation on stack (Push and Pop) Hierarchy of Operation, Representation of Arithmetic Expression (Infix, Postfix, Prefix) Multiple Stack. Evaluation of postfix expressions and their conversions Queues- Introduction, Applications of Queue, Various Representations of Queue, Operation on queue. Concept of Deque, Priority Queues, Circular Queue.

Unit 3

Recursion- Introduction, Recursion Properties, Applications of Recursion (Factorial, Addition of Two Number, Power of A Number, Fibonacci Series, Multiplication of Two Number, Tower of Hanoi.) Advantages and Disadvantages of Recursion. Linked List- Introduction, Application of Linked List, and Representation of Linked List, Operation on Linked List (Inserting, Removing, Reversing, Searching, Sorting). Concept of Double Linked List.

Unit 4

Trees- Introduction, Definition of Trees, Binary Tree, Type of Binary Tree, Operation on Binary Tree, Traversal of Binary Tree, Binary Search Tree (BST), Expression Trees, Memory Representation of Binary Tree

Unit 5

Graphs: - Definition of Graph, Various Terminology Used in Graph, Sequential Representation of Graph, Path Matrix, Spanning Tree, and Minimum Spanning Tree (Kruskal Algorithm, PRIM'S Algorithm), Traversing a Graph.

Course Outcomes

1. Student will be able to choose appropriate data structure as applied to specified problem definition.
2. Student will be able to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
3. Students will be able to apply concepts learned in various domains like DBMS, compiler construction etc.
4. Students will be able to use linear and non-linear data structures like stacks, queues, linked list etc

Books:

- 1) LipschutzSchaum's "Data Structure" Outline Series [TMH].ISBN-0-07-060168-2
- 2) D. Samanta, "Classical Data Structure", Prentice Hall India, ISBN: 8120318749
- 3) Dr. S.B. Kishor, "Data Structures", Das Ganu ,4th Edition, 2011, ISBN-978-81-921757-4- 4

References:

- 1) Tenenbaum," Data Structures Using C and C++", Second Edition, Prentice Hall India, New Delhi. ISBN-81317-0328-2
- 2) Deshpande and Kakade, "C and Data Structure", Dramatic Pub..ISBN-81-7722424-7



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 3rd

Course: B.Sc. Computer Science

SUBJECT: Mathematics-III

Calculus, Differential Equation and Mechanics

Subject Code: 3010311405

Theory Max. Marks: 70

THEORY MIN. MARKS: 23

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, Ratio test. Raabe's test ,logarithmic test. Leibnitz's theorem. Absolute and conditional convergence.

Unit-2

Continuity of functions of one 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. Limit and continuity of functions of two variables.

Unit-3

Series Solution of Differential Equations-Power series Method, Bessel's Equation Bessel's function and its properties, recurrence and generating relations. Legendre's

Unit-4

Laplace transformations, Linearity of the Laplace transformation, Existence theorem of Laplace transforms, Laplace transforms of derivatives and integrals. Shifting theorem . Differentiation and integration of transforms. Inverse Laplace transforms, Convolution theorem. Applications of Laplace transformation in solving linear differential equations with constant coefficients.

Unit-5

Analytical conditions of equilibrium of Coplanar forces. Catenary. Forces in three dimensions. Velocities and accelerations along Radial and transverse direction

TEXT AND REFERENCE BOOK

1. H.K.Pathak, Calculus & Differential equation & Mechanics.
2. B.R. Thakur, Differential equation.
3. Erwin Kreyzing, Advanced Engineering Mathematics, New York.
4. S.C.Malik, mathematical Analysis, Wiley esterm, Ltd New Delhi.
5. P.K.Jain & S.K.Kaushik, An introduction to Real Analysis, Chand & Co. New Delhi



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 3rd

Course: B.Sc. Computer Science

SUBJECT: Practical-Physics

Practical Max. Marks: 30

Practical Min. Marks: 15

List of Experiments:

1. To determine the grid voltage plate current characteristics of a triode valve (6C5) and then to find the triode constants.
2. To measure the dynamic constants of triode valve.
3. To draw and study the static plate characteristics of a triode valve.
4. Study and verification of universal gates.
5. Study and verification of additional gates ie. EX-OR and EX-NOR..
6. To determine the value of mechanical equivalent J of heat by Searls's method.
7. To determine the value of mechanical equivalent J of heat by using Callender & Barnes apparatus.
8. Study of Brownian motion.
9. Study of Stefan's law.
10. Determination of thermal conductivity of dielectric materials.

Text books/ references:

1. Practical Physics, Dr. S.L. Gupta & Dr. V. Kumar, Pragti Prakashan Meerut
2. Degree level practical Physics, Sharma, Singh & Prashad, Bharti Bhawan Publication Patna-6.
3. Experiment in Engineering Physics-M.N. Awadhanulu, A.A. Dani & P.M. Pokle, S.Chand Pub. New Delhi.
4. Prabodh Prayogik Bhoutiki, Dr. P.K.Upadhayay, Yugbodh offset Pvt. Ltd. Raipur
5. A text book of Engineering Physics Practical Das, Robinson & Kumar University Science press New Delhi
6. Practical Phywsics, Chattopadhyay



Dr. C.V. RAMAN UNIVERSITY
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 3rd

Course: B.Sc. Computer Science

SUBJECT: Practical-Data Structure Lab

Practical Max. Marks: 30

Practical Min. Marks: 15

1. To insert an element item at Kth position of Array.
2. To insert an element Item in Sorted Array.
3. To implement the operation of Push, Pop and to know the status of stack.
4. An algorithm to check the status of stack.
5. To find factorial of a number using Recursion.
6. To find multiplication of two number using Recursion.
7. To simulation the game of Tower of Hanoi using recursion.
8. To implement the operation of insertion and deletion on Queue.
9. A menu driven program to implement the operation of addition, deletion, searching, traversing, reversion, sorting,
10. Implementation of stack using linked list.
11. Implementation of Queue using linked list.
12. To create binary search tree, traverse it and find number of leaves and total nodes in the Tree.
13. To arrange the list of number in a Sorted order using Bubble sort.
14. To arrange the list of number in the Sorted order using Quick sort.
15. To check all the element of list is in sorted order or not.
16. To search an element using sequential or linear search .At the end display time required to search an element including number of comparison.
17. To search an item position in sorted list (Binary search).

Books:

- 1) LipschutzSchaum's "Data Structure" Outline Series [TMH].ISBN-0-07-060168-2
- 2) D. Samanta, "Classical Data Structure", Prentice Hall India, ISBN: 8120318749



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 4th

Course: B.Sc. Computer Science

SUBJECT: Foundation Course

English Language and Scientific Temper

Subject Code: 3010414601

Theory Max. Marks: 70

Theory Min. Marks: 23

UNIT – I

1. Tina Morris : Tree
2. Nissim Ezekiel : Night of the Scorpion
3. C.P. Snow : Ramanujan
4. Roger Rosenblatt : The Power of WE
5. George Orwell : What is Science?
6. C.Rajagopalachari : Three Questions
7. Desmond Morris : A short extract from the Naked Ape
8. A.G. Gardiner : On the rule of the road

UNIT – II Comprehension of an unseen passage.

UNIT – III Letter Writing : Formal Letters, Informal letters, Applications.

UNIT – IV Report Writing.

UNIT – V Language Skills

Correction of common errors in sentence structure : usage of pronouns, subject/ verb agreement word order, gender; compound nouns, collective nouns, possessives, articles and prepositions. (advanced)

Prescribed Book:

1. English Language and Scientific Temper- Madhya Pradesh Hindi Granth Academy

Reference Books:

2. Essentials of English Grammar by Sultan Chand & Sons
3. English Grammar and Composition by Wren & Martin
4. Scholar's Senior English Grammar and Composition, T.R. Bhanot, H. Martin, Scholar Publishing House (P) Ltd.



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 4th

Course: B.Sc. Computer Science

SUBJECT: Foundation Course

Environmental Study -II

Subject Code: 3010411102

Theory Max. Marks: 70

Theory Min. Marks: 23

UNIT – I Problem of natural resources

- (a) Problem of water resources – Utilization of surface and ground water, over utilization, flood, drought, conflicts over water, dams-benefits and problem.
- (b) Problems of forest resources – uses and over utilization, deforestation, utilization of timber, dams and its effect on forests and tribes.
- (c) Problems of land resources – Land as a source, erosion of land, man-induced landslides and desertification.

UNIT – II Bio-diversity and its protection –

- (a) Value of bio-diversity – Consumable use : Productive use, Social, alternative, moral aesthetic and values.
- (b) India as a nation of bio-diversity and multi-diversity at global, national and local levels.
- (c) Threats to bio-diversity – Loss of habitat, poaching of wildlife, man-wildlife conflicts.

UNIT – III Human Population and Environment

- (a) Population growth, disparities between countries.
- (b) Population explosion, family welfare Programme.
- (c) Environment and human health.

UNIT – IV Multidisciplinary nature of environmental studies :

- (a) Natural resources
- (b) Social problems and the environment
- (c) Eco system.

UNIT – V Environmental Wealth :

- (a) Rivers, ponds, fields and hills.
- (b) Rural, Industrial, Agricultural fields.
- (c) Study of common plants, insects and birds.

Book:

1. Environment & Ecology, P.K.Pandey, Goel Publication.
2. Environment & Ecology, Dr.J.P.Sharma, Laxmi Publication.



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 4th

Course: B.Sc. Computer Science

SUBJECT: Physics-IV

Group Waves, Acoustics and Optics

Subject Code: 3010412205

Theory Max. Marks: 70

Theory Min. Marks: 23

Unit-1 Waves: Waves in Media ; Speed of transverse waves on a uniform string, speed of longitudinal waves in a fluid, gravity waves and ripples. Group velocity and phase velocity, their measurements. **Superposition of waves** : Linear homogeneous equations and the superposition principle, Standing waves harmonics and the quality of sound , examples. Chladni's figures and vibrations of a drum. Production and detection of ultrasonic and infrasonic waves and applications.

Unit-2 Acoustics: Noise and Music , The human ear and its responses , limits of human audibility, intensity and loudness, bel and decibel, the musical scales, temperament and musical instrument. Reflection, refraction and diffraction of sound; Acoustic impedance of a medium, percentage reflection and refraction at a boundary, impedance matching for transducers, diffraction of sound, principle of a sonar system, sound ranging. **Applied acoustics** : Transducers and their characteristics. Recording and reproduction of sound, various systems, measurements of frequency, waveform, intensity and velocity. The acoustics of halls, reverberation period, Sabine's formula.

Unit-3 Geometrical Optics: Fermat's Principle of extremum path, the aplanatic points of a sphere and other applications. General theory of image formation: cardinal points of an optical system, general relationships for thick lens and lens combinations,. Optical instruments: Entrance and exit pupils, need for a multiple lens eyepiece, common types of eyepieces.

Unit-4 Interference: Interference of light; The principle of superposition, twoslit interference, coherence requirement for the sources, thin films, interference by a film with two non-parallel reflecting surfaces, Newton's rings. Haidinger fringes (Fringes of equal inclination). Michelson interferometer, its application for precision determination of wavelength, Intensity distribution in multiple beam interference, Fabry-Perot interferometer and etalon.

Unit-5 Fresnel Diffraction : Fresnel half period zones, plates, straight edge, rectilinear propogation. Fraunhofer Diffraction: Diffraction at a slit, phasor diagram and integral calculus methods, the intensity distribution, diffraction at a circular aperture and a circular disc, Rayleigh criterion, resolving power of telescope and microscope. **Diffraction & Polarization** : Diffraction gratings: Diffraction at N parallel slits, plane diffraction grating, reflection grating and blazed gratings. Concave grating and different mountings. Resolving power of a grating. Double refraction and optical rotation: Refraction in uniaxial crystals. Phase retardation plates.

1. **TEXT AND REFERENCE BOOK**

2. "Physical Optics". A.K. Ghatak, TMH, New Delhi.
3. "Optics and Atomic Physics" (D.P. Khandelwal Himalaya Publishing House, Bombay, 1988).
4. "Fundamental of Optics" Jankins and white(Tata McGraw – Hill)
5. Praboth Bhoutiki , "Kher , Choube & Upadhyay", Yugbodh Publication, Raipur.
6. "Optics". B.K. Mathur.
7. "Vibration and Waves" K K. Srivastava, Anusandhan Publication, Kanpur.
8. "Oscillations and Waves" Satya Prakash, Pragati Publication Agra.
9. "Sound". Khanna and Bedi
10. "Unified Physics" R. P. Goyal, Shivilal, Agrawal & Co. Agra.
11. "A Text Book of Sound" N. Subrahmanyam & Brij Lal ,Vikash Pub.New Delhi.
12. Acoustics , Durga Prasad,Student Friends Pub. Patna.
13. Optics , P.K.Shrivastava , Epsilon Publishing House Kanpur.



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 4th

Course: B.Sc. Computer Science

SUBJECT: Introduction to Database

Subject Code: 3010412205

Theory Max. Marks: 70

Theory Min. Marks: 23

Objective:

1. To understand the role of a database management system and its users in an organization.
2. To understand database concepts, including the structure and operation of the relational data model.
3. Can successfully apply logical database design principles, including E-R diagrams and other types of Database.

Unit 1

Basic Concepts – Data, Information, Records and files. Traditional file –based Systems-File Based Approach- Limitations of File Based Approach, Database Approach-Characteristics of Database Approach, Database Management System (DBMS), Components of DBMS, Environment, DBMS Functions and Components, Advantages and Disadvantages of DBMS. Roles in the Database Environment - Data and Database Administrator, Database, Designers, Applications Developers and Users.

Unit 2

Database System Architecture – Three Levels of Architecture, External, Conceptual and Internal Levels, Schemas, Mappings and Instances. Data Independence – Logical and Physical Data Independence.

Unit 3

Classification of Database Management System, Centralized and Client Server architecture to DBMS. Data Models: Records- based Data Models, Object-based Data Models, Physical Data Models and Conceptual Modeling.

Unit 4

Entity-Relationship Model – Entity Types, Entity Sets, Attributes Relationship Types, Relationship Instances and ER Diagrams. Basic Concepts of Hierarchical and Network Data Model.

Unit 5

Relational Data Model:-Brief History, Relational Model Terminology-Relational Data, Structure, Database Relations, Properties of Relations, Keys, Domains, Integrity Constraints over Relations, Base Tables and Views.

Outcomes:

After completion of this course, students will be able to -

1. Describe the basic concepts of RDMBS and relational data model
2. Be familiar with the relational database theory & be able to write relational algebra expressions for queries
3. Be familiar with the basic design issues of Data model.

TEXT BOOKS:

1. Elmasri & Navathe, "Fundamentals of Database Systems", 5th edition, Pearson Education.

REFERENCE BOOKS:

1. Thomas Connolly Carolyn Begg, "Database Systems", 3/e, Pearson Education
2. C. J. Date, "An Introduction to Database Systems", 8th edition, Addison Wesley N. Delhi.



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 4th

Course: B.Sc. Computer Science

SUBJECT: Mathematics-IV

**Advanced Calculus, Partial Differential Equations,
Complex Analysis and Abstract Algebra**

Subject Code: 3010411405

Theory Max. Marks: 70

Theory Min. Marks: 23

Unit -1 Partial differentiation. Change of variables. Euler's Theorem on homogeneous function, Taylor's theorem for functions of two variables. Jacobians, Envelopes, Evolutes.

Unit -2 Maxima, minima and saddle points of functions of two variables. Beta and Gamma functions. Double and triple integrals. Dirichlet's integrals.

Unit -3 Partial Differential equations of the first order. Lagrange's solution. Some special types of equations which can be solved easily by methods other than general methods. Charpit's general method of solution, Partial differential equations of second and higher orders. Homogeneous and non- Homogeneous equations with constant coefficients. Partial differential equations reducible to equations with constant coefficients.

Unit -4 Complex numbers as ordered pairs. Geometric representation of Complex numbers, Continuity and differentiability of Complex functions. Analytical function, Cauchy Riemann equation, Harmonic function, Mobius transformations, fixed point, cross ratio.

Unit -5 Group-Automorphisms, inner automorphism. Group of Automorphism, Conjugacy relation and centraliser. Normaliser. Counting principle and the class equation of a finite group. Cauchy's theorem for finite abelian groups and non abelian groups. Ring homomorphism. Ideals and Quotient Rings.

TEXT AND REFERENCE BOOK

1. H.K.Pathak, Advanced Calculus, Partial Differential Equation, Complex analysis & Abstract Algebra.
2. B.R. Thakur, Advanced Calculus, Partial Differential Equation, Complex analysis & Abstract Algebra.
3. S.C. Malic, mathematical Analysis, Wiley Eastern Ltd New Delhi.
4. P.K.Jain & S.K.Kaushik, An introduction to Real Analysis.
P.B. Bhattacharya, Abstract Algebra.



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 4th

Course: B.Sc. Computer Science

SUBJECT: Practical-Physics

Practical Max. Marks: 30

PRACTICAL Min. Marks: 15

List of Experiments:

1. Determination of wavelength of sodium light by Newton' Ring method.
2. To determine the wave length of prominent spectra-lines of Hg light using plane transmission grating.
3. To determine the focal length of the combination of two thin convergent lenses separated by a distance, with the help of a nodal slid assembly and to verify the formula.
4. Determination of resolving power of telescope.
5. Determination of Refractive index and dispersive power of prism using spectrometer.
6. Measurement of sound intensities with different situation.
7. Characteristics of a microphone & loudspeaker system.
8. Study and analysis human ear (On the basis of Physical concept).
9. Study of Ultrasonic waves.
10. Study of polarization of light by using polarimeter.

Text books/ references:

1. Practical Physics, Dr. S.L. Gupta & Dr. V. Kumar, Pragati Prakashan Meerut
2. Degree level practical Physics, Sharma, Singh & Prashad, Bharti Bhawan Publication Patna-6.
3. Experiment in Engineering Physics-M.N. Awadhanulu, A.A. Dani & P.M. Pokle, S.Chand Pub. New Delhi.
4. Prabodh Prayogik Bhoutiki, Dr. P.K.Upadhayay, Yugbodh offset Pvt. Ltd. Raipur
5. A text book of Engineering Physics Practical Das, Robinson & Kumar University Science press New Delhi
6. Practical Phywsics, Chattopadhyay



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 4th

Course: B.Sc. Computer Science

SUBJECT: Introduction to Database Lab

Max. Marks: 30

Min. Marks: 15

LIST OF PRACTICALS:

- 1 Data Definition Language Commands
- 2 Data Manipulation Language Commands
- 3 Data Control Language, Transfer Control Language Commands
- 4 In Built Functions
- 5 Nested Queries And Join Queries
- 6 Set operators
- 7 Views
- 8 Control Structure
- 9 Procedure and Function
- 10 Trigger
- 11 Front End Tools
- 12 Form
- 13 Menu Design
- 14 Report Generation
- 15 Database Design And Implementation

TEXT BOOKS:

1. Elmasri & Navathe, "Fundamentals of Database Systems", 5th edition, Pearson Education.

REFERENCE BOOKS:

1. Thomas Connolly Carolyn Begg, "Database Systems", 3/e, Pearson Education
2. C. J. Date, "An Introduction to Database Systems", 8th edition, Addison Wesley N. Delhi.



Dr. C.V. RAMAN UNIVERSITY
Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 5th

3010513801

Course: B.Sc. Computer Science

SUBJECT: Foundation Course

Hindi Language (Bhasha Kaushal aur Sanchar Sadhan)

Subject Code:

Theory Max. Marks: 70

Theory Min. Marks: 23

fgUnh Hkk'kk ¼ vk/kkj ikB~;Øe ½
ch-,-]ch-dkWe-ch-,l-lh-]ch-ch-,- lHkh esa ,d lkFk ykxw& iape
lsesLVj iw.kkZad&50

इकाई -1

lqfe=kuanu iar & Hkkjr ekrk

10

vad

jke/kkjh flag fnudj & ij'kqjke dh çfrKk
eksgu jkds'k & cgqr cMk loky
;ksx'k vVy & laLd`r vkSj jk"Vªh; ,dhdj.kA

इकाई -2

dFku dh 'kSfy;kj & jpukXkr mnkgj.k vkSj ç;ksx
10 vad

इकाई -3

fodkl'khy ns'kksa dh leL;k;sa fodklRed iqfZoZpkj vkSj çkS|ksfxdh ,oa
uxjhdj.kA 10 vad

इकाई -4

NRrhIx<+h yksd laLd`r ¼u`R;½ xhr] R;kSgkjA
10 vad

इकाई -5

vk/kqfud rduhdh lH;rk] rFkk lkekpkj i=[nwjn"KZu]
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10 vad

lanHkZ iqLrdsa &
iqLrdsaA

1- Hkkjrh; fgUnh xzaFk Hkksiky ls izdkf"kr

izdkf"kr iqLrdsaA

2- e-iz- fgUnh xazFk vdkneh ¼izdk"ku Hkksiky½ ls

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Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 5th

Course: B.Sc. Computer Science

SUBJECT: Foundation Course

Computer and Information Technology Basics

Subject Code: 3010512101

Theory Max. Marks: 70

Theory Min. Marks: 23

Unit I Computer Architecture

CPU Organization, Data Representation, Fixed - Point Numbers, Floating Point Numbers, Instruction Formats, Instruction Types. Addressing modes. Fixed Point Arithmetic, Addition, Subtraction, Multiplication and Division, Combinational and Sequential ALUs, Carry look ahead adder, Robertson algorithm, booth's algorithm, non-restoring division algorithm, Floating Point Arithmetic, Coprocessor, Pipeline Processing, Pipeline Design, Modified booth's Algorithm
Network architecture – layers – Physical links – Channel access on links – Hybrid multiple access techniques - Issues in the data link layer - Framing – Error correction and detection – Link-level Flow Control, UDP – TCP

Unit II Medium Access

Medium access – CSMA – Ethernet – Token ring – FDDI - Wireless LAN – Bridges and Switches

Unit III Protocols

Email (SMTP, MIME, IMAP, POP3) – HTTP – DNS- SNMP – Telnet – FTP – Security – PGP – SSH

Unit IV Cyber Law

Need for Cyber Law• Cyber Jurisprudence at International and Indian Level• Cyber Law - International Perspectives UN• & International Telecommunication Union (ITU) Initiatives Council of Europe - Budapest Convention on Cybercrime• Asia-Pacific Economic Cooperation (APEC)• Organization for Economic Co-operation and Development (OECD)• World Bank• Commonwealth of Nations•

Unit V: Cyber Crimes & Legal Framework

Constitutional & Human Rights Issues in Cyberspace Freedom of Speech and Expression in Cyberspace• Right to Access Cyberspace – Access to Internet• Right to Privacy• Right to Data Protection•

Books:

REFERENCES:

1. John P. Hayes, 'Computer architecture and Organisation', Tata McGraw-Hill, Third edition, 1998.
2. V. Carl Hamacher, Zvonko G. Varanasic and Safat G. Zaky, "Computer Organisation", V edition, McGraw-Hill Inc, 1996.
3. James F. Kuross, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Third Edition, Addison Wesley, 2004.
4. Chris Reed• & John Angel, Computer Law, OUP, New York, (2007).
5. Justice Yatindra Singh, Cyber Laws, Universal Law Publishing Co, New Delhi, (2012).
6. Verma S, K, Mittal Raman, Legal Dimensions of Cyber Space, Indian Law Institute, New



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 5th

Course: B.Sc. Computer Science

SUBJECT: Physics-V

Relativity, Quantum Mechanics, Atomic, Molecular and Nuclear Physics

Subject Code: 3010541504

Theory Max. Marks: 70

Theory Min. Marks: 23

Unit-1 Theory of Relativity: Reference systems, inertial frames, Galilian Invariance and conservation laws, Michelson-Morley experiment; Postulates for the special theory of relativity, Lorentz transformations, length contraction, time dilation, variation of mass with velocity, mass - energy equivalence, particle with zero rest mass. **Origin of Quantum Theory:** photoelectric effect, Ritz combination principle in spectra. stability of an atom, Planck's radiation law, Einstein's explanation of photoelectric effect.

Unit-2 Quantum Mechanics: Wave-particle duality and uncertainty principle; de Broglie's hypothesis for matter waves; the concept of wave and group velocities, evidence for diffraction and interference of particles, experimental demonstrations of matter waves. Consequence of de Broglie's concepts; quantization in hydrogen atom; energies of a particle in a box, wave packets, Heisenberg's uncertainty relation for p and x , its extension to energy and time. Consequence of the uncertainty relation; gamma ray microscope, diffraction at a slit, particle in a box, position of an electron in a Bohr's orbit, Schrödinger's equation. Postulates of quantum mechanics; operators, expectation values.

Unit-3 Atomic Physics: natural occurrence of quantum numbers- n , l and m , the related physical quantities. Spectra of hydrogen, deuteron and alkali atoms spectral terms, doublet fine structure. screening constants for alkali spectra for s, p, d and f states, selection rules, Singlet and triplet fine structure in alkaline earth spectra. L-S and J-J couplings. **Weak Spectra:** Continuous X-ray spectrum and its dependence on voltage, Duane and Hundt's law. Characteristic X-rays. Moseley's law; doublet structure of X-ray spectra. X-ray absorption spectra.

Unit-4 Molecular Spectra : quantization of vibrational and rotational energies, pure rotational and rotation-vibration spectra Dissociation limit for the ground and other electronic states, transition rules for pure vibration and electronic vibration spectra. **Spectroscopy :** Raman Effect, Stokes and anti-stokes lines, experimental arrangements for Raman Spectroscopy. Spectroscopic techniques: Sources of excitation, prism and grating spectrographs for visible, UV and IR, absorption spectroscopy, double beam instruments, different recording systems.

Unit-5 Nuclear Physics: working of nuclear detectors, G-M counter, proportional counter, scintillation counter, cloud chamber, spark chamber and emulsions technique. Structure of nuclei, basic properties (I , μ , Q and binding energy), energy, p - p and n - p scattering and general concepts of nuclear forces. Beta decay, range of alpha particle, Geiger-Nuttall law. Gamow's explanation of alpha decay, beta decay, Nuclear reactions, compound nucleus, Shell model, Liquid drop model, Nuclear fission and fusion (concepts), energy production in stars by p - p and carbon - nitrogen cycles (concepts).

TEXT AND REFERENCE BOOK

1. Introduction to Modern Physics H. S. Mani and G. K. Mehta; (Affiliated East-West Press. 1989)".
2. "Prospective of modern physics". A. Belser.
3. "Introduction to atomic physics" H. E. White. TMH, Delhi.
4. "Introduction to Molecular Physics". Barrow;
5. "Optics and Atomic Physics" (D. P. Khandelwal Himalaya Publishing House, Bombay, 1988).
6. "Unified Physics" R. P. Goyal Shiv Lal Agrawal & Co. Agra
7. "Prabodh Bhoutiki (Physics)". Kher, Choube & Upadhyay Yugbodh offset raipur
8. "Nuclear Physics". D. C. Tayal, Himalaya Publishing House New Delhi
9. "Atomic Physics. J. B. Rajan
10. "Quantum Physics" Satya Prakash Sharma Pragati Prakasan meerut
11. "Introduction to Relativity" Gupta & Kumar, Pragati Prakasan meerut
12. Modern Physics, F.K. Richtmyer, E.H. Kennard & Jain Cooper TMH New Delhi



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 5th

Course: B.Sc. Computer Science

SUBJECT: Physics-V

Astro Physics & Atmospheric Science

Subject Code: 3010541505

Theory Max. Marks: 70

Theory Min. Marks: 23

Unit-1 Theory of Relativity: Reference systems, inertial frames, Galilian Invariance and conservation laws, Michelson-Morley experiment; Postulates for the special theory of relativity, Lorentz transformations, length contraction, time dilation, variation of mass with velocity, mass - energy equivalence, particle with zero rest mass. **Origin of Quantum Theory:** photoelectric effect, Ritz combination principle in spectra. stability of an atom, Planck's radiation law, Einstein's explanation of photoelectric effect..

Unit-2 Quantum Mechanics: Wave-particle duality and uncertainty principle; de Broglie's hypothesis for matter waves; the concept of wave and group velocities, evidence for diffraction and interference of particles, experimental demonstrations of matter waves. Consequence of de Broglie's concepts; quantization in hydrogen atom; energies of a particle in a box, wave packets, Heisenberg's uncertainty relation for p and x , its extension to energy and time. Consequence of the uncertainty relation; gamma ray microscope, diffraction at a slit, particle in a box, position of an electron in a Bohr's orbit, Schrödinger's equation. Postulates of quantum mechanics; operators, expectation values.

Unit-3 Atomic Physics: natural occurrence of quantum numbers- n , l and m , the related physical quantities. Spectra of hydrogen, deuteron and alkali atoms spectral terms, doublet fine structure. screening constants for alkali spectra for s, p, d and f states, selection rules, Singlet and triplet fine structure in alkaline earth spectra. L-S and J-J couplings. **Weak Spectra:** Continuous X-ray spectrum and its dependence on voltage, Duane and Hundt's law. Characteristic X-rays. Moseley's law; doublet structure of X-ray spectra. X-ray absorption spectra.

Unit-4 Molecular Spectra : quantization of vibrational and rotational energies, pure rotational and rotation-vibration spectra Dissociation limit for the ground and other electronic states, transition rules for pure vibration and electronic vibration spectra. **Spectroscopy :** Raman Effect, Stokes and anti-stokes lines, experimental arrangements for Raman Spectroscopy. Spectroscopic techniques: Sources of excitation, prism and grating spectrographs for visible, UV and IR, absorption spectroscopy, double beam instruments, different recording systems.

Unit-5 Nuclear Physics: working of nuclear detectors, G-M counter, proportional counter, scintillation counter, cloud chamber, spark chamber and emulsions technique. Structure of nuclei, basic properties (I , μ , Q and binding energy), energy, p - p and n - p scattering and general concepts of nuclear forces. Beta decay, range of alpha particle, Geiger-Nuttall law. Gamow's explanation of alpha decay, beta decay, Nuclear reactions, compound nucleus, Shell model, Liquid drop model, Nuclear fission and fusion (concepts), energy production in stars by p - p and carbon - nitrogen cycles (concepts).

TEXT AND REFERENCE BOOK

1. Introduction to Modern Physics H. S. Mani and G. K. Mehta; (Affiliated East-West Press. 1989)".
2. "Prospective of modern physics". A. Belser.
3. ; "Introduction to atomic physics" H. E. White. TMH, Delhi.
4. "Introduction to Molecular Physics". Barrow;
5. ; "Optics and Atomic Physics" (D. P. Khandelwal Himalaya Publishing House, Bombay, 1988).
6. " Unified Physics" R. P. Goyal Shiv Lal Agrawal & Co. Agra
7. "Prabodh Bhoutiki (Physics)". Kher, Choubé & Upadhyay Yugbodh offset raipur
8. "Nuclear Physics". D. C. Tayal, Himalaya Publishing House New Delhi
9. "Atomic Physics. J. B. Rajan
10. "Quantum Physics" Satya Prakash Sharma Pragati Prakasan meerut
11. "Introduction to Relativity" Gupta & Kumar, Pragati Prakasan meerut
12. Modern Physics, F.K. Richtmyer, E.H. Kennard & Jain Cooper TMH New Delhi



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 5th

Course: B.Sc. Computer Science

SUBJECT: Operating System

Subject Code: 3010542204

Theory Max. Marks: 70

Theory Min. Marks: 23

Objectives:

To study and apply concepts relating to operating systems, such as concurrency and control of asynchronous processes, deadlocks, memory management, processor and disk scheduling, parallel processing, and file system organization.

UNIT -1 INTRODUCTION: -

Operation System objective and function, The Evolution of operating Systems, Batch, interactive, time sharing and real time systems, Protection. Operating System Structure, System Components, operating system service, System structure. Distributed Computing, Parallel Computation.

UNIT- 2 CONCURRENT PROCESSES:-

Process concept:- Introduction, Definitions of "Process", Process States, Process State Transitions ,The process Control Block ,Operations on Processes, Suspend and Resume , interrupt Processing.Mutual Exclusion, the Producer / Consumer problem, the critical section problem,semaphores, Classical problems in concurrency, inter process communication.Asynchronous Concurrent Process:- introduction, parallel Processing ,A Control Structure for indicating parallelism,CPU scheduling: concepts, performance criteria, and scheduling algorithms. Algorithm evaluation, Multiprocessor scheduling.

UNIT- 3 DEAD LOCKS:-

System model, Deadlock characterization. Prevention, Avoidance and Detection,Recovery from deadlock, combined approach.

UNIT- 4 MEMORY MANAGEMENT:-

Base machine, resident Monitor, multiprogramming with fixed partition, Multiprogramming with variable partitions, Paging, Segmentation, paged - segmentation, virtual Memory concepts, Demand paging, performance, page Replacement algorithms, Allocation of frames, Thrashing.

UNIT-5 I/O MANAGEMENT &DISK SCHEDULING:-

I/O Device and the organization of the I/O function, I/O Buffering, Disk I/O, Operating system Design issues. File system: File Concepts – File organization and Access mechanism, File Directories, File sharing, Implementation issues .Case studies: Unix system, A virtual machine operating systems

Outcomes:

After completion of this course the students will be able –

1. To learn what is operating system and how it makes computers work .
2. To know how operating system manages complexity through appropriate abstraction of CPU, memory, files, semaphores etc.
3. To get knowledge about different components of operating system like Process Management, Concurrency mechanisms, Deadlock handling, Memory Management techniques, Virtual Memory, File System and Secondary Storage Management, Security & protection etc.

Text Books:

1. Operating System concepts, Silberschatz A and Peterson, J.L, PE- LPE.
2. Operating System Design & Implementation, Tanenbaum, A.S., PHI.
3. Operating system concepts Galvin, Silberschatz John Wiley & Sons
4. Operating systems H.M.Deital Pearson Education

Reference Books :

1. Operating System Concept & Design, Milenkovic M, McGraw Hill.
2. Operation System, Stalling William, Maxwell MCMillan International Edition



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 5th

Course: B.Sc. Computer Science

SUBJECT: Computer Networks

Subject Code: 3010542205

Theory Max. Marks: 70

Theory Min. Marks: 23

COURSE OBJECTIVES:

- Provide students with an enhanced base of knowledge in current and reflective practice necessary to support a career in Computer Networking at advanced professional level.
- Understanding concept of local area networks, their topologies, protocols and applications.
Understanding the different protocols, software, and network architectures

UNIT-I INTRODUCTION TO COMPUTER NETWORK: -

Uses of Computer Network, Network hardware, Layered Architecture, function of the layers, Network standardization, OSI & TCP/IP Reference model, Physical layer services & hardware protocols.

UNIT- II DATA LINK CONTROL: -

Framing, Flow Control : Stop and wait Protocols, Sliding Window Protocols. Error Detection & Error Control, High Level Data Link Control (HDLC), Other Data Link Control Protocols : Pure ALOHA & Slotted ALOHA , Markov chain model for S-ALOHA and delay in S-ALOHA , IEEE LAN Protocols, Ethernet, Ad Hoc network.

UNIT-III NETWORK LAYER & TRANSPORT LAYER:-

Network Layer Protocols: Design issues : Virtual Circuits and datagram's, Routing Algorithms: Optimality principle, Shortest path routing- Dijkstra's algorithms, Distance Vector routing, Link state routing, Flow and Congestion Control: packet discarding , Traffic shaping , Choke packets, Network layer performance model, Poisson model, M/M/1 Queue, Blocking probability, Little's formula, Transport Layer Protocols : Basic functions, Connection

UNIT-IV UPPER LAYERS: -

Session Layer Protocols: Dialog Management, Synchronization, Presentation layer functions: translation, encryption, compression, Cryptography : substitution and Transposition Ciphers, Data Encryption standards (DES), Application layer protocols & services : Email, World Wide Web, file transfer protocol, remote file server, internet telephony & chatting.

UNIT-V SPECIAL & HIGH SPEED NETWORKS & NETWORK DEVICES:

FDDI : access method , addressing, electrical specification, frame format, comparison of FDDI-I & FDDI-II . DQDB & WAN implementation. × .25 networks its features. Frame Relay: operation, congestion control & frame format. SONET / SDH : layers , frame & application. Networking devices: Repeaters, Bridge Routers & Gateways.

COURSE OUTCOME:

On completion of this unit the student should be able to:

- describe the basis and structure of an abstract layered Network protocol model
- identify and apply basic theorems and formulae for the information-theoretic basis of communication and the performance of TCP/IP network protocols.

Text Books:-

1. Computer networks", Second Ed., A.S. Tannenbaum, Prentice Hall India.
2. Data Communication, Computer Networks, Halsall, Pearson Education.

Reference Books :-

1. Data Networks, D.Bertsekas and R. Gallager, PHI Second Ed.
2. Internetworking with TCP/ P, Vol. 1, D.E. Comer, Prentice Hall India.
3. Computer Networking with IP, Stallings, Pearson Education.



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 5th

Course: B.Sc. Computer Science

SUBJECT: Mathematics-V

Real Analysis, Linear Algebra and Discrete Mathematics

Subject Code: 3010541404

Theory Max. Marks: 70

Theory Min. Marks: 23

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.

Unit -2 Schwarz and Young's theorem, Implicit function theorem, Fourier series of half and full intervals, Improper integrals and their convergence, Comparison test, Abel's and Dirichlet's tests, Frullani's integral, Integral as a function of a parameter.

Unit -3 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 -4 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.

Unit -5 Binary Relations, Equivalence Relations, Partitions and Partial Order Relation . Graphs, Multigraphs, Weighted Graphs, Paths and Circuits, Shortest Paths. Trees and their properties.

TEXT AND REFERENCE BOOK

1. H.K.Pathak, Real Analysis, Linear Algebra, Discrete Mathematics.
2. B.R.Thakur, Real Analysis, Linear Algebra, Discrete Mathematics.
3. M.K.Gupta, Discrete Mathematics.
4. P.K.Jain & S.K.Kaushik, An Introduction to Real Analysis.
5. K.B.Dutta, Matrix & Linear algebra.



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 5th

Course: B.Sc. Computer Science

SUBJECT: Mathematics-V

Boolean Algebra and Graph Theory

Subject Code: 3010541404

Theory Max. Marks: 70

Theory Min. Marks: 23

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.

Unit -2 Schwarz and Young's theorem, Implicit function theorem, Fourier series of half and full intervals, Improper integrals and their convergence, Comparison test, Abel's and Dirichlet's tests, Frullani's integral, Integral as a function of a parameter.

Unit -3 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 -4 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.

Unit -5 Binary Relations, Equivalence Relations, Partitions and Partial Order Relation . Graphs, Multigraphs, Weighted Graphs, Paths and Circuits, Shortest Paths. Trees and their properties.

TEXT AND REFERENCE BOOK

1. H.K.Pathak, Real Analysis, Linear Algebra, Discrete Mathematics.
2. B.R.Thakur, Real Analysis, Linear Algebra, Discrete Mathematics.
3. M.K.Gupta, Discrete Mathematics.
4. P.K.Jain & S.K.Kaushik, An Introduction to Real Analysis.
5. K.B.Dutta, Matrix & Linear algebra.



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 5th

Course: B.Sc. Computer Science

SUBJECT: Practical – Physics V

Practical Max. Marks: 30

Practical Min. Marks: 15

1. Determination of Planck's constant.
2. Determination of e/m using Thomson's method.
3. Determination of e/m by Millikan's method.
4. Study of Raman spectrum using laser as an excitation source.
5. Determination of percentage of absorption of light by photometer
6. To draw the plateau characteristics of a GM counter using radioactive source.
7. Study of twin paradox.
8. Study of β - decay.
9. Study of Balmer-series and Rydberg constant.
10. Study of Photo Cell.
11. To understand two beam interferometry by using Michelson interferometer.

Text books/ references:

1. Practical Physics, Dr. S.L. Gupta & Dr. V. Kumar, Pragti Prakashan Meerut
2. Degree level practical Physics, Sharma, Singh & Prashad, Bharti Bhawan Publication Patna-6.
3. Experiment in Engineering Physics-M.N. Awadhanulu, A.A. Dani & P.M. Pokle, S.Chand Pub. New Delhi.
4. Prabodh Prayogik Bhoutiki, Dr. P.K.Upadhayay, Yugbodh offset Pvt. Ltd. Raipur
5. A text book of Engineering Physics Practical Das, Robinson & Kumar University Science press New Delhi
6. Practical Phywsics, Chattopadhyay



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 5th

Course: B.Sc. Computer Science

SUBJECT: Software Engineering

Practical Max. Marks: 30

Practical Min. Marks: 15

NOTE for Students to Follow strictly:-

Every **three to four students** should form a group and should develop a software that could be developed within **two month** of time.

The groups should prepare a **softcopy as well as hardcopy** of the documentation as per phases given below.

Every student in the group should have a copy of the documentation

Every student should get his own copy of the documentation properly checked from the **Teacher In-charge**, after every phase of development given below.

Before the Final Practical examinations, every individual student should submit his own hardcopy of the documentation in a **Punched Cardboard File Only**.

One **CD** of the project and its documentation (softcopy), from every group should be submitted during **final submissions**.

During **Final Submissions**, every copy of the documentation should be accompanied by a **Submission Certificate** duly signed by the **Teacher In-charge and Head of Department**.

Planning Phase

1. Problem Statement :-

- a. Description of the present situation.
- b. Problem constraints (Manpower, Software and Hardware).
- c. Statement and brief description of Goals (Process and Product).
- d. Statement and brief description of Requirements (Functions, Hardware, Software and User interface) of the overall product.

2. Solution strategy :-

- a. List and brief description of all possible solutions.
- b. List and brief description of all accepted solutions
- c. List and brief description of all rejected solutions.

3. Development process :-

- a. Life cycle model for the project.
- b. Team structure for the project (Details of team members also needed).
- c. Software Configuration Management :-
 - i. List and brief description of non-changeable objects that would contribute to the software phase wise.
 - ii. List and brief description of changeable objects that would contribute to the software

phase wise.

d. Software Quality assurance :-

- i. List and brief description of quality attributed decided for evaluating the software product phase wise.
- ii. List and brief description of the validations (are we making the product right ?) and verifications (are we making the right product?) phase wise.

e. Risk management :-

- i. List and brief description of any kind of Risks that may occur phase wise.
- ii. List and brief description of any possible solutions for the above mentioned risks.

4. Software metrics :-

- a. Deciding the complexity category of the product under development.
- b. Estimating Lines of Code needed for the complete development of the product.
- c. Calculating Programmer months for the project.
- d. Calculating the development time for the project.
- e. Calculating the Average staffing level for the project.
- f. Using COCOMO model for performing cost estimation for the product.

5. Review of the Planning Phase :-

- a. Points and brief description of the reviews conducted and report of the results obtained.

Analysis and Design Phase

1. Analysis document for the product :-

- a. Data Dictionary :- List and brief description of all the components to be used in ERD, DFD and S
T
D.
- b. Data Object Description document :- Entity Relationship Diagram (ERD)
- c. Process Specification document :- Data Flow Diagram (DFD)
- d. Control Specification document:- State Transition Diagrams (STD)

2. Creating Designs document :-

- a. Data Design :- Description of the data objects and suggested algorithm.
- b. Architectural Design :- Description of how to encapsulate the data with data structures and modules.
- c. Interface Design :- Description of Interfaces to be created between various modules and between user and program.
- d. Procedural Design :- Using flow charts and decision tables the entire system is explained.

3. Preliminary design review :-

- a. Statements of Reviews done on the initial designs and comments for improvement, if necessary.

4. Test Plan document :-

- a. List and brief description of Functional Tests (Black-Box testing) to be conducted and results expected.
- b. List and brief description of Structural Tests (White-Box or Glass-Box testing) to be conducted and results expected.

- c. List and brief description of Performance Tests to be conducted and results expected.
- d. List and brief description of Stress Tests to be conducted and results expected.

5. Critical Design review :-

- a. Statements of reviews done on the final designs, listing out important points, if necessary, to be remembered during the implementation phase.

6. Milestones, Walkthroughs and Inspection document :-

- a. Setting up Milestones for the implementation and testing phases. b.

Setting up Walkthrough schedules for the implementation phase. c.

Setting up Inspection schedules for the implementation phase.

Implementation Phase

1. **Coding :-** Here the actual coding is done according to the designs created and standards decided.
2. **Coding standards :-** Standards need to be followed related to the variable declarations and use.
3. **Internal documentation:-** Here small descriptions in the form of comments in the program code is used, describing the meaning of the code, modules or operations performed.
4. **Error documentation :-** List and brief description of errors displayed with their meanings and causes.
5. **Unit testing :-** Testing of individual modules and required code areas are done by using coding that would display temporary results. Those results are evaluated for correctness of code. A table is created stating the test criteria and results.
6. **Validation and Verification :-** A table is created stating the validation and verification activities performed on the code and results found.
7. **Review document :-** According to the milestones set, the reviews, walkthroughs and inspections are done and a document describing the above process and results found, is created.

Testing Phase

1. **Testing table :-** The tests decided in Test plan document are conducted and a table is created showing the details of the test performed, expected results and actual found results.
2. **Test report :-** A summary of the Test report is created and suggestions for the steps to be taken further are listed with brief description.

User Manual

1. A document is created describing from the user point of view, how to use and trouble shoot the software product.
2. Different documents should be created for different category of users of the product.
3. A document describing the installation procedures.
4. Frequently Asked Questions and answers document is created from the user point of view.
5. Do's and Don'ts for the user.
6. List and brief description of Errors displayed and their meanings.
7. Contact details for further assistance.



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 6th

Course: B.Sc. Computer Science

SUBJECT: Physics-VI

Solid State Physics, Devices , Electronics and Lasers

Subject Code: 3010641504

Theory Max. Marks: 70

Theory Min. Marks: 23

Unit-1 Overview: Crystalline and glassy forms, liquid crystals, glass transition. Crystal structure: Periodicity, lattices and bases, unit cell, Wigner-Seitz cell, lattice types, lattice planes. Common crystal structures. Laue's theory of X-ray diffraction, Bragg's law, Laue patterns. Bonding: Potential between a pair of atoms; Lennard-Jones potential, concept of cohesive energy, covalent, Vander Waal, ionic and metallic crystals Magnetism: Atomic magnetic moment, magnetic susceptibility, Dia, Para and Ferromagnetism, Ferro magnetic domains

Unit-2 Thermal properties: Lattice vibrations, simple harmonic oscillator, Concept of phonons, density of modes (1-D). Debye model; Lattice specific heat low temperature limit, extension (conceptual) to 3-D. Band Structure: Electrons in periodic potential; nearly free electron model (qualitative), energy band, energy gap, metals, insulators, semiconductors. Motion of electrons: Free electrons, conduction electrons, electron collisions, mean free path, conductivity and Ohm's law. Fermi energy, Fermi velocity, Fermi-Dirac distribution.

Unit-3 Semiconductors: Semiconductors electrons and holes, Fermi Level , Temperature dependence of electron and hole concentrations. Doping: conductivity, mobility, Hall Effect, Hall Coefficient. Semiconductor devices: Metal-semiconductor junction, p-n junction, majority and minority carriers, diode, Zener and tunnel diodes, light emitting diode, transistor, solarcell. Power supply: Diode as a circuit element, load line concept, rectification, ripple factor, Zener diode, voltage stabilization, Transistors : Characteristics of a transistor in CB, CE and CC mode, thermal runaway. FETs: Field effect transistors, JFET volt-ampere curves, biasing JFETMOSFET, biasing MOSFET.

Unit-4 Amplifiers- I: Small signal amplifiers ; General Principle of operation, classification, distortion, RC coupled amplifier, input and output impedance, multistage amplifiers. Amplifier- II: Transformer coupled amplifiers, Noise in electronic circuits. OscillatorsHartley, Colpitt and Wein bridge oscillators.

Unit-5 Laser: Laser system: Purity of a spectral line, coherence length and coherence time, spatial coherence of a source, Einstein's A and B coefficients. Spontaneous and induced emissions, conditions for laser action, population inversion. Types of Lasers (gas and solid state), Pulsed lasers and tunable lasers, spatial coherence and directionality, estimates of beam intensity, temporal coherence and spectral energy density.

TEXT AND REFERENCE BOOK

1. "Solid State Eletronic Devices", B.G.Streetmann; IInd Edition (Prentice-Hall of India, New Delhi, 1986).
2. "Electronic Devices, Circuits and Applications W.D. Stanley;" (Prentice-Hall, New Jersey, USA, 1988).
3. "Electronics Fundamentals and Applications", J.D. Ryder; IInd Edition (Prentice-Hall of India, New Delhi, 1986).
4. "Microelectronics", Int J. Millman and A Grabal; ernational Edition (McGraw-Hill Book Company, New York, 1988).
5. "Unified Physics". R.P. Goyal, Shiv lal Agrawal & Co. Agra
6. "Prabodh Bhoutiki " Kher , Choube & Upadhyay Yogbodh offset Pvt. Ltd. Raipur
7. "Hand Book of Electronics". Gupta and Kumar, Pragati Prakashan Meerut
8. "Principle of Electronics". V. K. Mehta, S. Chand New Delhi
9. "Laser & Non Linear Optics" B.B.Loud



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 6th

Course: B.Sc. Computer Science

SUBJECT: Physics-VI

Nano Technology & Material Science

Subject Code: 3010641505

Theory Max. Marks: 70

Theory Min. Marks: 23

Unit-1 Overview: Crystalline and glassy forms, liquid crystals, glass transition. Crystal structure: Periodicity, lattices and bases, unit cell, Wigner-Seitz cell, lattice types, lattice planes. Common crystal structures. Laue's theory of X-ray diffraction, Bragg's law, Laue patterns. Bonding: Potential between a pair of atoms; Lennard-Jones potential, concept of cohesive energy, covalent, Vander Waal, ionic and metallic crystals Magnetism: Atomic magnetic moment, magnetic susceptibility, Dia, Para and Ferromagnetism, Ferro magnetic domains

Unit-2 Thermal properties: Lattice vibrations, simple harmonic oscillator, Concept of phonons, density of modes (1-D). Debye model; Lattice specific heat low temperature limit, extension (conceptual) to 3-D. Band Structure: Electrons in periodic potential; nearly free electron model (qualitative), energy band, energy gap, metals, insulators, semiconductors. Motion of electrons: Free electrons, conduction electrons, electron collisions, mean free path, conductivity and Ohm's law. Fermi energy, Fermi velocity, Fermi-Dirac distribution.

Unit-3 Semiconductors: Semiconductors electrons and holes, Fermi Level, Temperature dependence of electron and hole concentrations. Doping: conductivity, mobility, Hall Effect, Hall Coefficient. Semiconductor devices: Metal-semiconductor junction, p-n junction, majority and minority carriers, diode, Zener and tunnel diodes, light emitting diode, transistor, solar cell. Power supply: Diode as a circuit element, load line concept, rectification, ripple factor, Zener diode, voltage stabilization, Transistors: Characteristics of a transistor in CB, CE and CC mode, thermal runaway. FETs: Field effect transistors, JFET volt-ampere curves, biasing JFET/MOSFET, biasing MOSFET.

Unit-4 Amplifiers- I: Small signal amplifiers; General Principle of operation, classification, distortion, RC coupled amplifier, input and output impedance, multistage amplifiers. Amplifier- II: Transformer coupled amplifiers, Noise in electronic circuits. Oscillators Hartley, Colpitt and Wein bridge oscillators.

Unit-5 Laser: Laser system: Purity of a spectral line, coherence length and coherence time, spatial coherence of a source, Einstein's A and B coefficients. Spontaneous and induced emissions, conditions for laser action, population inversion. Types of Lasers (gas and solid state), Pulsed lasers and tunable lasers, spatial coherence and directionality, estimates of beam intensity, temporal coherence and spectral energy density.

TEXT AND REFERENCE BOOK

1. "Solid State Electronic Devices", B.G. Streetmann; IInd Edition (Prentice-Hall of India, New Delhi, 1986).
2. "Electronic Devices, Circuits and Applications W.D. Stanley;" (Prentice-Hall, New Jersey, USA, 1988).
3. "Electronics Fundamentals and Applications", J.D. Ryder; IInd Edition (Prentice-Hall of India, New Delhi, 1986).
4. "Microelectronics", Int J. Millman and A. Grabal; International Edition (McGraw-Hill Book Company, New York, 1988).
5. "Unified Physics". R.P. Goyal, Shiv Lal Agrawal & Co. Agra
6. "Prabodh Bhoutiki" Kher, Choubey & Upadhyay Yogbodh Offset Pvt. Ltd. Raipur
7. "Hand Book of Electronics". Gupta and Kumar, Pragati Prakashan Meerut
8. "Principle of Electronics". V. K. Mehta, S. Chand New Delhi
9. "Laser & Non Linear Optics" B.B. Loud



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 6th

Course: B.Sc. Computer Science

SUBJECT: Digital Electronics

Subject Code:3010642204

Theory Max. Marks: 70

Theory Min. Marks: 23

Course Objectives:

1. To study various number systems, knowledge of these number systems is essential in core computer science subjects.
2. To explore brief idea about the different digital circuits which are used to develop the digital devices.
3. Understand the concepts of Memories, Programmable Logic Devices & Digital ICs.
4. To motivate the students to develop their logic to design new digital circuits usable for hardware design.
5. To motivate our students to use these digital circuits in integrated circuit design using VLSI.

UNIT-I

Overview of Boolean Algebra AND Logic Gates : Number Systems and Codes, Binary Arithmetic, Boolean Algebra, Minimisation of Switching Function, Demorgan's Theorem, Karnaugh's Map Method (limited up to 4-variables), Quine McCluskey's Method, Cases with Don't care conditions and multiple output switching functions.

UNIT-II

Combinational Circuits : NAND / NOR gates, Realisation of switching functions, Half/full adders, Half / full subtractors, Series and parallel additions, BCD adders, Look ahead carry generators, Decoders and encoders, BCD to 7 segment decoders, Multiplexers and Demultiplexers, Parity bit generator and detector, Error detection.

UNIT-III

Sequential Circuits : Introduction to registers and Counters: Flip-Flops and their conversion, Excitation Tables, Synchronous and Asynchronous counters and Designing of sequential circuits: code converter and counters. Mode-k and divide by K Counters, Counter Applications.

UNIT-IV

Logic Families: RTL, DTL, all types of TTL circuits, ECL, Circuit, Operation & Features of 1^2 L and PMOS, NMOS and CMOS logic etc.

UNIT-V

Memories and Converters : Introduction to various semiconductor memories and designing of ROM and PLA, Introduction to analog to digital and digital to analog converters and their types (R-2R ladder network and successive approximation converters)

Name of Text Books

1. W H Gothman, "Digital Electronics" PHI
2. R. P. Jain : "Modern Digital electronics", TMH

Name of Reference Books :

1. R J Tocci, "Digital System principles and Applications"
2. Millman Taub, "Pulse, Digital and Switching Waveforms" TMH
3. M.M. Mano : "Digital logic and computer design", PHI.
4. Floyd : "Digital fundamentals", UBS.
5. B. Somanathan Nair, "Digital electronics & Logic Design", Prentice-Hall of India

COURSE OUTCOME:

After completion of this course, students will be able to -

1. Acknowledge about the fundamentals of digital circuit design.
2. Understand the operation of Latch circuits & Flip flops.
3. Take interest to designing & develop ICs in VLSI industries.
4. Learn operation of different Semiconductor Memories.



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 6th

Course: B.Sc. Computer Science

SUBJECT: R Programming

Subject Code:3010642205

Theory Max. Marks: 70

Theory Min. Marks: 23

COURSE OBJECTIVES:

- Provide students with an enhanced base of knowledge in current and reflective practice necessary to support a career in Data Analytics at advanced professional level.
- Understanding concept R Programming Data Analytics

UNIT-II INTRODUCTION: -

Introduction, How to run R, R Sessions and Functions, Basic Math, Variables, Data Types, Vectors, Conclusion, Advanced Data Structures, Data Frames, Lists, Matrices, Arrays, Classes.

UNIT- II IMPORTING OF DATA

Data frames, import of external data in various file formats, statistical functions, compilation of data.

UNIT-III CONTROL STATEMENTS AND OPERATORS

R Programming Structures, , Loops, - Looping Over Nonvector Sets,- If-Else, Arithmetic and Boolean Operators and values, Default Values for Argument, Return Values, Deciding Whether to explicitly call return-

UNIT-IV GRAPHICS

Graphics, Creating Graphs, The Workhorse of R Base Graphics, the plot() Function ♦ Customizing Graphs, Saving Graphs to Files.

UNIT-V DATA AND STRING OPERATION

Data management with display paste, split, find and replacement, manipulations with alphabets, evaluation of strings, data frames.

Text Books

1. The Art of R Programming, Norman Matloff, Cengage Learning
2. R for Everyone, Lander, Pearson

Reference Books

1. R Cookbook, Paul Teetor, Oreilly.
2. R in Action, Rob Kabacoff, Manning

COURSE OUTCOME:

On completion of this unit the student should be able to:

Can build project and can data analytics by using R programming



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 6th

Course: B.Sc. Computer Science

SUBJECT: Mathematics-VI

Metric Spaces, Numerical Analysis

(Unit V is optional)

Subject Code: 3010641404

Theory Max. Marks: 70

Theory Min. Marks: 23

Unit -1 Definition and examples of metric spaces. Neighbourhoods. Limit points. Interior points. Open and closed sets. Closure and interior. Boundary points. Subspace of a metric space. Cauchy sequences. Completeness, Cantor's intersection theorem, Contraction principle. Real numbers as a complete ordered field. Dense subsets. Baire Category theorem. Separable, first and second countable spaces.

Unit -2 Continuous functions. Extension theorem. Uniform continuity. Compactness, Sequential compactness. Totally bounded spaces, Finite intersection property. Continuous functions and compact sets. Connectedness

Unit -3 Solution of Equations: Bisection. Secant, Regula Falsi. Newton, Method. Roots of second degree Polynomials, Interpolation, Lagrange interpolation, Divided Differences, Interpolation formulae using Differences, Numerical Quadrature, Newton-Cote's Formulae, Gauss Quadrature Formulae.

Unit -4 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, Singlestep Methods, Runge-Kutta's Method, Multi-step Methods, Milne-Simpson Method. Methods Based on Numerical Integration, Methods Based on numerical Differentiation.

Unit -5 ELEMENTARY STATISTICS Measures of dispersion-range, inter quartile range, Mean deviation, Standard deviation, moments, skewness and kurtosis. Probability, 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. Theoretical distribution- binomial, Poisson distributions and their properties and use, Moment generating functions.

OR

Unit -5 PRINCIPLES OF COMPUTER SCIENCE Data Storage of bits Ram Memory. Mass storage. Coding Information of Storage. The Binary System Storing integers fractions, communication errors. Data Manipulation - The Central Processing Unit

The Stored Program concept. Programme Execution,. Arithmetic/Logic Instruction. Computer-Peripheral Communication. Operation System : The Evolution of Operating System.(Dos, Window) Operating System Architecture. Coordinating the Machine's Activities. Other Architectures.

OR

Unit -5 MATHEMATICAL MODELING The process of Applied Mathematics. Setting up first order differential equations. Qualitative solution sketching. Stability of solutions. Difference and differential equation models of growth and decay. Single species population model, Exponential and logistic population models.

TEXT AND REFERENCE BOOK

1. H.K.Pathak, Metric Spaces, Numerical Analysis.
2. B.R.Thakur, Metric Spaces, Numerical Analysis.
3. P.K.Jain & S.K.Kaushik, An introduction to Real Analysis.
4. P.K.Jain & K. Ahmad, Metric Spaces, Narosa Publishing, New Delhi.
5. B.S.Grewal, Numerical Method.



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 6th

Course: B.Sc. Computer Science

SUBJECT: Mathematics-VI

Fuzzy Set Theory & Fuzzy Logic

Subject Code: 3010641405

Theory Max. Marks: 70

Theory Min. Marks: 23

Unit -1 Definition and examples of metric spaces. Neighbourhoods. Limit points. Interior points. Open and closed sets. Closure and interior. Boundary points. Subspace of a metric space. Cauchy sequences. Completeness, Cantor's intersection theorem, Contraction principle. Real numbers as a complete ordered field. Dense subsets. Baire Category theorem. Separable, first and second countable spaces.

Unit -2 Continuous functions. Extension theorem. Uniform continuity. Compactness, Sequential compactness. Totally bounded spaces, Finite intersection property. Continuous functions and compact sets. Connectedness

Unit -3 Solution of Equations: Bisection. Secant, Regula Falsi. Newton, Method. Roots of second degree Polynomials, Interpolation, Lagrange interpolation, Divided Differences, Interpolation formulae using Differences, Numerical Quadrature, Newton-Cote's Formulae, Gauss Quadrature Formulae.

Unit -4 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, Singlestep Methods, Runge-Kutta's Method, Multi-step Methods, Milne-Simpson Method. Methods Based on Numerical Integration, Methods Based on numerical Differentiation.

Unit -5 ELEMENTARY STATISTICS Measures of dispersion-range, inter quartile range, Mean deviation, Standard deviation, moments, skewness and kurtosis. Probability, 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. Theoretical distribution- binomial, Poisson distributions and their properties and use, Moment generating functions.

OR

Unit -5 PRINCIPLES OF COMPUTER SCIENCE Data Storage of bits Ram Memory. Mass storage. Coding Information of Storage. The Binary System Storing integers fractions, communication errors. Data Manipulation - The Central Processing Unit

The Stored Program concept. Programme Execution,. Arithmetic/Logic Instruction. Computer-Peripheral Communication. Operation System : The Evolution of Operating System.(Dos, Window) Operating System Architecture. Coordinating the Machine's Activities. Other Architectures.

OR

Unit -5 MATHEMATICAL MODELING The process of Applied Mathematics. Setting up first order differential equations. Qualitative solution sketching. Stability of solutions. Difference and differential equation models of growth and decay. Single species population model, Exponential and logistic population models.

TEXT AND REFERENCE BOOK

1. H.K.Pathak, Metric Spaces, Numerical Analysis.
2. B.R.Thakur, Metric Spaces, Numerical Analysis.
3. P.K.Jain & S.K.Kaushik, An introduction to Real Analysis.
4. P.K.Jain & K. Ahamed, Metric Spaces, Narosa Publishing, New Delhi.
5. B.S.Grewal, Numerical Method.



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 6th

Course: B.Sc. Computer Science

SUBJECT: Practical – Physics VI

Practical Max. Marks: 30

Practical Min. Marks: 15

1. Study the characteristic of a transistor.
2. Study the characteristic of a tunnel diode.
3. Study the characteristics of P-N Jn.
4. Determination of Hall coefficient using Hall probe method.
5. Study of Energy Band Gap of semiconductor.
6. Study of Zener Diode.
7. Study of Lissajous figures using a CRO.
8. Study of VTVM.
9. Study of crystal faces & Structure by using given model.
10. Study of Solar cell.

TEXT AND REFERENCE BOOK

1. Practical Physics, Dr. S.L. Gupta & Dr. V. Kumar, Pragti Prakashan Meerut
2. Degree level practical Physics, Sharma, Singh & Prashad, Bharti Bhawan Publication Patna-6.
3. Experiment in Engineering Physics-M.N. Awadhanulu, A.A. Dani & P.M. Pogle, S.Chand Pub. New Delhi.
4. Prabodh Prayogik Bhoutiki, Dr. P.K.Upadhyay, Yugbodh offset Pvt. Ltd. Raipur
5. A text book of Engineering Physics Practical Das, Robinson & Kumar University Science press New Delhi
6. Practical Physics, Chattopadhyay



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 6th

Course: B.Sc. Computer Science

SUBJECT: Java Programming Lab

Practical Max. Marks: 30

Practical Min. Marks: 15

List of Experiment to be performed

1. Write a program to check whether a number is a Armstrong number or not.
2. Write a program to sort a stream of Strings.
3. Write a program to perform multiplication of two matrices.
4. Write a program to find the volume of a box having its side w,h,d means width ,height and depth. Its volume is $v=w*h*d$ and also find the surface area given by the formula $s=2(wh+hd+dw)$.use appropriate constructors for the above.
5. Develop a program to illustrate a copy constructor so that a string may be duplicated into another variable either by assignment or copying.
6. Create a base class called shape. It contains two methods getxyvalue() and showxyvalue() for accepting co-ordinates and to display the same. Create the subclass called Rectangle which contains a method to display the length and breadth of the rectangle called showxyvalue().Use overriding concept.
7. Write a program that creates an abstract class called dimension, creates two subclasses, rectangle and triangle. Include appropriate methods for both the subclass that calculate and display the area of the rectangle and triangle.
8. Write a program which throws Arithmetic Exception. Note the output, write another class (in a different file) that handles the Exception.
9. Create a user defined Exception class which throws Exception when the user inputs the marks greater than 100.
10. Write a program in which a Mythread class is created by extending the Thread class. In another class, create objects of the Mythread class and run them. In the run method print "CSVTVU" 10 times. Identify each thread by setting the name.
11. Write a program using InetAddress class and also show the utility of URL and URL Connection classes.
12. Write a program which illustrates capturing of Mouse Events. Use Applet class for this.
13. Write a program using RMI in which a simple remote method is implemented.
14. Write a servlet program using HttpServlet class. Also give the appropriate HTML file which posts data to the servlet.
15. Write a JDBC program for Student Mark List Processing.
16. Design a text editor which is having some of the features of notepad.

Reference Books:

1. Java complete reference - Naughton schildt (TMH)
2. Java programming – E Balagurusamy
3. Java 2 Black book – Steven Holzner
4. Java Examples in a nutshell – O' Reilly



Dr. C.V. RAMAN UNIVERSITY

Kargi Road, Kota, Bilaspur (C.G.)

SEMESTER- 6th

Course: B.Sc. Computer Science

SUBJECT: Project Work

Max. Marks: 200

Min. Marks: 100

1. Study the web site and make a project.
2. Study R programming and do Data analysis.
3. Develop a software using any language.