

B TECH 1st YEAR (SEMESTER-I) COMMON FOR ALL BRANCHES

Sr. No.	Course No.	Course Title	L	T	P	Contact Hours	Marks	Credit
1	NC-MATH-101	Mathematics-I	3	1	--	4	100	4
2	NC-PHY-101	Physics-I	3	1	--	4	100	4
3	NC-CSE-101	Comp-I (Fundamentals of Computing)	3	1	--	4	100	4
4	NC-ME-101	Basics of Mechanical Engineering	3	1	--	4	100	4
	NC-HUM-101	Communication skills in English	3	1	--	4	100	4
5	NC-ESc-101	Basics of Environmental and Life Sciences	3	--	--	3	100	3
	NC-ME-102	Engineering Graphics and Drawing	1	--	2	3	100	2
6	NC-ECE-101	Basic of Electronics & Electrical Technology	3	1	--	4	100	4
	NC-CHM-101	Engineering Chemistry	3	1	--	4	100	4
7	NC-PHY-102	Physics Lab-I	--	--	2	2	100	1
8	NC-CSE-102	Comp Lab-I (Programming in C)	--	--	2	2	100	1
9	NC-ME-103	Workshop Practice	--	--	2	2	100	1
	NC-HUM-102	Language Lab	--	--	2	2	100	1
10	NC-CHM-102	Chemistry Lab	--	--	2	2	100	1
	NC-ECE-102	Basic of Electronics & Electrical Lab	--	--	2	2	100	1
11		Internet Lab	--	--	2	2		--
		Total				33		27/26

B. TECH 1st YEAR (SEMESTER-II) COMMON FOR ALL BRANCHES

Sr. No.	Course No.	Course Title	L	T	P	Contact Hours	Marks	Credit
1	NC-MATH-102	Mathematics-II	3	1	--	4	100	4
2	NC-PHY-103	Physics-II	3	1	--	4	100	4
3	NC-CSE-103	Data Structures	3	1	--	4	100	4
4	NC-ME-101	Basics of Mechanical Engineering	3	1	--	4	100	4
	NC-HUM-101	Communication skills in English	3	1	--	4	100	4
5	NC-ESc-101	Basics of Environmental and Life Sciences	3	--	--	2	100	3
	NC-ME-102	Engineering Graphics and Drawing	1	--	2	3	100	2
6	NC-ECE-101	Basic of Electronics & Electrical Technology	3	1	--	4	100	4
	NC-CHM-101	Engineering Chemistry	3	1	--	4	100	4
7	NC-PHY-104	Physics Lab-II	--	--	2	2	100	1
8	NC-CSE-104	Data Structures Lab	--	--	2	2	100	1
9	NC-ME-103	Workshop Practice	--	--	2	2	100	1
	NC-HUM-102	Language Lab	--	--	2	2	100	1
10	NC-CHM-102	Chemistry Lab	--	--	2	2	100	1
	NC-ECE-102	Basic of Electronics & Electrical Lab	--	--	2	2	100	1
11		Internet Lab	--	--	2	2		--
		Total				33		27/26

MATHEMATICS – I
NC-MATH-101

L	T	W
3	1	4

Time: 3hrs

Marks: 100

- Note: -**
1. There are NINE questions in a set of question-paper. All questions carry equal marks.
 2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.

UNIT-I

Geometrical Applications Of Differential Calculus: Successive differentiation. Leibnitz theorem (without proof) MacLaurin's and Taylor's expansion of functions. Asymptotes of Cartesian and polar curves. Curvature of curves in Cartesian, parametric and polar coordinates.

UNIT-II

Applications of Single & Multiple Integration: Applications of single integration to find volume of solids and surface area of solids of revolution. Double integral, change of order of integration. Double integral in polar coordinates, Applications of double integral to find area enclosed by plane curves and volume of solids of revolution. Triple integral, volume of solids, change of variables, Beta and gamma functions and relationship between them.

UNIT-III

Ordinary Differential Equations and its Applications: Exact differential equations. Equations reducible to exact differential equations. Applications of differential equations of first order and first degree to simple electric circuits, Newton's law of cooling, heat flow and orthogonal trajectories. Linear differential equations of second and higher order, Complete solution, complementary function and particular integral, method of variation of parameters to find particular integral, Cauchy's and Legendre's linear equations, Simultaneous linear equations with constant coefficients. Applications of linear differential equations to simple pendulum, oscillatory electric circuits.

UNIT-IV

Matrices and its Applications: Rank of a matrix, elementary transformations, elementary matrices, inverse using elementary transformations, normal form of a matrix, linear dependence and independence of vectors, consistency of linear system of equations, linear and orthogonal transformations, eigen values and eigen vectors, properties of eigen values, Cayley-Hamilton theorem and its applications

Text books:

1. Kresyzig, E., “Advanced Engineering Mathematics”, John Wiley and Sons. (Latest edition).
2. Ramana, B.V., “Higher Engineering Mathematics” Tata McGraw-Hill.
3. Jain, R. K. and Iyengar, S. R. K. “Advanced Engineering Mathematics”, Narcois, 2003 (2nd Ed.)
4. Mathur, A. B. Jaggi , V. P. , “Advanced Engineering Mathematics”, Khanna Publishers.
5. Grewal, B.S., “Higher Engineering Mathematics”, Khanna Publishers.

References:

1. Mitin, V. V.; Polis, M. P. and Romanov, D. A. “Modern Advanced Mathematics for Engineers”, John Wiley and Sons, 2001.
2. Wylie, R., “Advanced Engineering Mathematics”, McGraw-Hill, 1995.
3. Piskunov, “Differentials and Integral Calculus”.
4. Sastry , S. S. , “Engineering Mathematics Part-I” .
5. Michael D Greenberg, “Advanced Engg Mathematics”.

MATHEMATICS – II
NC-MATH-102

L	T	W
3	1	4

Time: 3hrs

Marks: 100

- Note: -**
- 1. There are NINE questions in a set of question-paper. All questions carry equal marks.**
 - 2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.**

UNIT-I

Partial Differentiation & its Applications: Functions of two or more variables; partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobians, Higher order partial derivatives. Homogenous functions, Euler's theorem, Taylor's series for functions of two variables (without proof), maxima-minima of function of two variables, Lagrange's method of undetermined multipliers, Differentiation under integral sign.

UNIT-II

Laplace Transforms and its applications: Laplace transforms of elementary functions, properties of Laplace transforms, existence conditions, transforms of derivatives, transforms of integrals, multiplication by t^n , division by t . Evaluation of integrals by Laplace transforms. Laplace transform of Unit step function, unit impulse function and periodic function. Inverse Laplace transforms, convolution theorem, application to linear differential equations and simultaneous linear differential equations with constant coefficient.

UNIT-III

Fourier Series And Fourier Integrals: Euler's Formulae, Conditions for Fourier expansions, Fourier expansion of functions having points of discontinuity, change of interval, Odd & even functions, Half-range series. Fourier integrals, Fourier transforms, Fourier cosine and sine transforms. Properties of Fourier transforms, Convolution theorem, Parseval's identity, Relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of a function, Application to boundary value problems

UNIT-IV

Vector Calculus: Differentiation of vectors, scalar and vector point functions Gradient of a scalar field and directional derivative, divergence and curl of a vector field and their physical interpretations, Integration of vectors, line integral, surface integral, volume integral, Green, Stoke's and Gauss divergence theorems (without proof) and their simple applications.

Textbooks:

1. Kresyzig, E., “Advanced Engineering Mathematics”, John Wiley and Sons. (Latest edition).
2. Ramana, B.V., “Higher Engineering Mathematics” Tata McGraw-Hill.
3. Jain, R. K. and Iyengar, S. R. K. “Advanced Engineering Mathematics”, Narcois, 2003 (2nd Ed.)
4. Mathur, A. B. Jaggi , V. P. , “Advanced Engineering Mathematics”, Khanna Publishers.
5. Grewal, B.S., “Higher Engineering Mathematics”, Khanna Publishers.

References:

1. Mitin, V. V., Polis, M. P. and Romanov, D. A., “Modern Advanced Mathematics for Engineers”, John Wiley and Sons, 2001.
2. Wylie, R., “Advanced Engineering Mathematics”, McGraw-Hill, 1995.
3. Sastry , S. S. , “Engineering Mathematics Part-II” .
4. Michael D Greenberg, “Advanced Engg Mathematics”.

PHYSICS-I
NC-PHY-101

L T W
3 1 4

Time: 3hrs

Marks: 100

- Note: -**
- 1. There are NINE questions in a set of question-paper. All questions carry equal marks.**
 - 2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.**

UNIT-I

Interference of light:- Introduction, Types of Interference, Division of Wave front and Division of amplitude, Fresnel's Biprism, Newton Rings, Michelson Interferometer, Applications.

Diffraction of light:- Introduction, difference between Fresnel's and Fraunhofer's Diffraction, Fraunhofer's Diffraction at a single slit, Diffraction Grating, difference between Interference and Diffraction.

UNIT-II

Polarization of light:- Introduction, Polarization of Light, Double Refraction, types of crystals, Nicol's prism, theory for production of plane, circular and elliptical polarized light, quarter and half wave plate.

Laser:- Basic ideas of laser, laser beam characteristics, laser action (Einstein's coefficient), pumping, population inversion, types of laser-He-Ne Laser, Ruby Laser, application of laser. Elementary idea of Holography.

UNIT-III

Fiber Optics:- Introduction, propagation of light through a fiber, numerical aperture, types of fiber, modes of propagation (simple idea), V-number, advantages and application of fiber.

Electromagnetic Wave Theory:- Review of basic ideas, Maxwell's equations (derivation), plane wave equation, Poynting vector, boundary conditions for interfacing media.

UNIT-IV

Dielectrics:- Introduction, absolute permeability, electrical susceptibility, Dielectric constant, relation between three electric vectors (**E, D, P**), polarization – an atomic view, types of polarization, Gauss's law in presence of dielectric.

Elements of thermodynamics:-Introduction, thermodynamics terminology, concepts of temperature and heat, Zeroth Law of thermodynamics, heat capacity, specific heat, latent heat, ratio of molar heat capacity, First law of thermodynamics and its physical significance, Adiabatic Process, Isothermal Process, Isobaric Process, Isochoric Process, Concept of Entropy, Reversible and Irreversible process, Second law of thermodynamics.

TEXT BOOKS: -

1. Engineering Physics, S.P.Taneja (S. Chand)
2. Engineering Physics, Satya Prakash (Pragati Prakashan).
3. Engineering Physics, Avadhnulu & Khrishsagar

REFERENCE BOOKS: -

1. Optics, A.Ghatak.
2. Laser Fundamental, W.T.Silfvast, Cambridge Univ. Press.
3. Fiber Optics, R.Allen Shotwel.PHI.
4. Electrodynamics, D.J.Griffith

PHYSICS-II
NC-PHY-103

L	T	W
3	1	4

Time: 3hrs

Marks: 100

- Note: -**
- 1. There are NINE questions in a set of question-paper. All questions carry equal marks.**
 - 2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.**

UNIT-I

Crystal Structure: Introduction, general terminology of Crystallography, symmetry operation, unit cell and primitive cell, three dimensional Bravais lattice, calculation of no. of atoms per unit cell, atomic radius, co-ordination no. and packing fraction for cubic structure, Miller indices, planes and interplanar spacing, NaCl, CsCl and diamond structure, diffraction of X-rays, Bragg's law, general idea of different types of bonding, point defects and their types (introduction only), X-rays, origin of X-rays, properties and applications of X-rays.

UNIT-II

Quantum Physics: Difficulties with Classical Physics, qualitative ideas: Black body radiation, Rayleigh-Jean's law, Planck's Radiation law, Photoelectric effect, Compton effect. Heisenberg uncertainty principle, group velocity and phase velocity- various relations between them, time dependent and time independent Schrödinger wave equations, properties and physical significance of wave function, elementary ideas of Classical and Quantum statistics.

UNIT-III

Free Electron Theory: Introduction, Drude's model, Weidemann-Franz law, limitations of classical free electron theory, quantum theory of free electron (particle in a box), concept of Fermi energy, density of states, Thermionic emission (basic idea only).

Band Theory of Solids: Introduction to band theory of solids. Kroning-Penney model (qualitative idea), origin of energy bands and energy gap, E-K diagram, Brillouin Zones classification of metals, semiconductors and insulators, Hall's effect and its applications.

UNIT-IV

Semiconductor Physics: Introduction, types of semiconductors, doping, n-type and p-type semiconductors, electron and hole concentration of pure semiconductor, mechanism of flow of charge through p-n junction diode, biasing (introduction).

Superconductivity: Introduction, factors affecting superconductivity, types of superconductors, Meissner's effect, London's equation, penetration depth, Introduction of B.C.S. theory, applications of superconductivity.

TEXT BOOKS:

1. Engineering Physics, S.P. Taneja (S. Chand)
2. Engineering Physics, Satya Prakash (Pragati Prakashan)

REFERENCE BOOKS:

1. Solid State Physics, S.O. Pillai, (New Age).
2. Semiconductor Physics, S.M.Seze.
3. Quantum Mechanics, Satya Prakash, (Pragati Prakashan).
4. Solid State Physics, M.A.Wahab, (Narosa Puublications).

PHYSIC LAB-I
NC-PHY-102

P **W**
2 1

Note: At least ten experiments are to be performed by the students.

LIST OF EXPERIMENTS

1. To verify Newton Formula and hence to find the focal length of Convex lens.
2. To find the wavelength of monochromatic light by using Diffraction Grating.
3. To find the low resistance by Carey Foster Bridge.
4. To find the wavelength of light by using Newton Rings.
5. To find the thermal conductivity of non metallic solid by Lee's Disc method.
6. To find the wavelength of Sodium light by Michelson's Interferometer.
7. To Convert Galvanometer into an Ammeter.
8. To find frequency of A.C. mains by using Sonometer.
9. To find value of high resistance by Substitution method.
10. To find value of resistance of Galvanometer by P.O. Box.
11. To find resolving power of Telescope.
12. To compare the capacitance of two capacitor by De-Sauty's bridge.

SUGGESTED BOOKS:

1. Engineering Practical Physics, Satya Prakash, (Pragati Prakashan).

PHYSIC LAB-II
NC-PHY-104

P **W**
2 1

Note: At least ten experiments are to be performed by the students.

LIST OF EXPERIMENTS

1. To find a wavelength of Semiconductor laser by Young's double slit method.
2. To measure the wavelength of He-Ne laser using a vernier calliper meter scale.
3. To find the ionization potential of Argon/Mercury using a thyratron tube.
4. To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus.
5. To study the characteristics of (Cu-Fe, Cu-Constantan) thermo couple.
6. To find the value of Hall Co-efficient of semiconductor.
7. To study V-I characteristics of P-N Diode.
8. To find the energy band gap of intrinsic semiconductor using four probe method.
9. To find the flashing and quenching potential of Argon and to find the capacity of Unknown capacitor.
10. To find temp coefficient of resistance by using Pt resistance thermometer by post office box.
11. To find the value of coefficient of self-inductance by using Rayleigh bridge.
12. To verify Richardson's equation.

SUGGESTED BOOKS:

1. Engineering Practical Physics, Satya Prakash, (Pragati Prakashan).

ENGINEERING CHEMISTRY

NC-CHM-101

L	T	W
3	1	4

Time: 3hrs

Marks: 100

- Note: -**
- 1. There are NINE questions in a set of question-paper. All questions carry equal marks.**
 - 2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.**

UNIT-1

WATER TREATMENT I: Hardness, Types of hardness, Units and interconversions of units, Estimation of hardness by EDTA method, Alkalinity & Its determination, Numerical problems based on EDTA method & Alkalinity, Scale and sludge formation, Disadvantages and its prevention.

WATER TREATMENT II : Water softening methods-Lime-Soda Process, Ion-exchange method, Zeolite method, Method of treatment of water for domestic use- sedimentation, coagulation, filtration, chlorination, breakpoint chlorination, Desalination of water - reverse osmosis and electro dialysis, Disinfections of water and Related numerical problems based on Lime-Soda Process

UNIT-II

CORROSION & ITS CONTROL: Introduction & types of corrosion, Mechanism of corrosion – dry or chemical corrosion, wet or electrochemical corrosion, differential aeration corrosion, pitting corrosion, waterline corrosion, stress corrosion, galvanic corrosion, Factors influencing corrosion, Control of corrosion - cathodic protection, anodic protection, proper designing, protective coating (metallic coatings).

PHASE RULE: Definition, Terminology- phase, component, degree of freedom, equilibrium, Merits and demerits of phase rule, Phase diagram of one component system- H₂O system, two component- eutectic system (Ag-Pb system), desilverisation of lead, congruent system (Zn-Mg system) and incongruent system (Na-K system), Application of eutectic system- freezing mixtures, solders, safety fuses, Numerical problems based on Phase rule.

UNIT-III

THERMODYNAMICS: Introduction, First law and its limitations, Second law of thermodynamics, Concept of Entropy, Entropy change for an ideal gas, Chemical potential and its applications, Gibb's Helmholtz equation, Clausius- Clapeyron equation, Related numerical problems with above topics.

LUBRICANT: Introduction and functions of Lubricant, Mechanism of lubrication- thick film or hydrodynamic lubrication, thin film or boundary line lubrication and extreme pressure lubrication, Types of lubricants- solid, semisolid or greases, liquid and emulsion lubricants, Properties of lubricants and their significance-viscosity and viscosity index, iodine value, flash and fire point, saponification value, cloud and pour point, properties of semi solid lubricants and their significance-drop point test and penetration test.

UNIT-IV

POLYMER SCIENCES AND TECHNOLOGY: Introduction, Basic concepts, Types of polymerization- addition & condensation polymerization, Mechanism of polymerization- Free radical, cationic & anionic polymerization, Preparation, properties and technical application of thermoplastic (PVC, Teflon), thermosetting plastic (nylon, UF resin), inorganic polymer (silicone), Elastomer (GR-S, GR-N), Polymer composites.

ANALYTICAL TECHNIQUES: Thermal method of analysis-Thermogravimetric analysis (TGA), Differential thermal analysis (DTA), Introduction of volumetric analysis, Conductometric titration-strong acid and strong base, strong acid and weak base, weak acid and strong base, & weak acid and weak base, Flame Photometry and their applications.

TEXT BOOKS:

1. Engineering Chemistry, P.C. Jain, Monica Jain (Dhanpat Rai & Co.).
2. Chemistry in Engineering & Tech., Vol. I & II, Rajaram, Kuriacose (TMH).
3. Engineering Chemistry, Raghupati Mukhopadhyay, Sriparna Datta (New Age)

REFERENCE BOOKS:

1. Instrumental methods of Chemical Analysis, MERITT & WILLARD (East-West Press).
2. Physical Chemistry, P.W. Atkins (ELBS, Oxford Press).
3. Physical Chemistry, W.J. Moore (Orient-Longman).

CHEMISTRY LAB

NC-CHM-102

P	W
2	1

Note: At least ten experiments are to be performed by the students.

LIST OF EXPERIMENTS:

1. Determination of Temporary and Permanent hardness of water using EDTA solution.
2. Determination of alkalinity of water sample.
3. Determination of dissolved oxygen (DO) in the given water sample.
4. Determination of viscosity of lubricant by Red Wood viscometer (No. 1 & No. 2).
5. To determine flash point & fire point of an oil by Pensky -Marten's flash point apparatus.
6. To prepare Phenol-formaldehyde and Urea formaldehyde resin.
7. To find out saponification No. of an oil.
8. To find the Iodine value of an oil sample.
9. Determination of strength of HCl solution by titrating it against NaOH solution conductometrically.
10. Estimation of total iron in an iron ore solution by using potassium permanganate method.
11. Estimation of total iron in an iron ore solution by internal indicator method.

SUGGESTED BOOKS:

1. A Text Book on Experimental and Calculation – Engineering Chemistry, S.S. Dara, S. Chand & Company (Ltd.)
2. Essential of Experimental Engineering Chemistry, Shashi Chawla, Dhanpat Rai Publishing Company.
3. Theory & Practice Applied Chemistry – O.P. Virmani, A.K. Narula (New Age)

COMMUNICATION SKILLS IN ENGLISH

NC-HUM-101

L	T	W
3	1	4

Time: 3hrs

Marks: 100

- Note:**
1. There are **NINE** questions in a set of question-paper. All questions carry equal marks.
 2. Attempt five questions in all. **FIRST** question is compulsory which covers the whole syllabus. Attempt **ONE** question from each of the other four Units.

UNIT I

Structure of English Language: Sentence Formation (with the High Frequency Wordlist of GRE and SAT), Remedial Grammar, Vocabulary - Use of Thesaurus, Word Derivation (affixes), Words Often Confused, One-word Substitutes.

UNIT II

Creative Writing: Idiomatic Expressions, Dialogue Writing, Developing Outlines and Writing Presentation.

UNIT III

Technical Writing: Letters (Business Letters), Reports: Formal Reports (Laboratory Reports, Press Reports), Register Specific Requirements of B.Tech. Students (Agenda and Minutes of a Meeting).

UNIT IV

English for Professional Purposes: Personal Profile/Self-Introduction, Resume Preparation, Job Interviews (Definition and Types), Body Language and Soft Skills.

Books:

1. B. R. Sharma (2009) Communication Skills in English, Bharti Publications: Yamuna Nagar, Haryana.
2. A. L. Madan, Mehta and Dua (2009) Communication Skills in English, VK India Enterprises: New Delhi.
3. Sadhana Gupta (2009) Communication Skills and Functional Grammar, University Science Press: New Delhi.
4. Sandra Stevens (2001) Teach Yourself: English as a Foreign Language, McGraw Hill: UK
5. Daniel Jones (2007) English Pronouncing Dictionary, CUP: UK.
6. Ivor Williams (2008) English for Science and Engineering, Cengage: New Delhi.

LANGUAGE LAB
NC-HUM-102

P	W
2	1

Topics of sessions:

1. Speech sounds
2. Phonetic Transcription
3. Word Accent
4. Intonation
5. Weak Forms
6. Teach Yourself English (Self-learning CD)
7. Educational Software:
 - English in Daily Life
 - TOEFL
 - IELTS
 - GRE
 - GMAT

BASICS OF ENVIRONMENTAL AND LIFE SCIENCES

NC- ESc-101

L T W
3 1 4

Time: 3hrs

Marks: 100

- Note: - 1.** There are **NINE** questions in a set of question-paper. All questions carry equal marks.
- 2.** Attempt five questions in all. **FIRST** question is compulsory which covers the whole syllabus. Attempt **ONE** question from each of the other four Units.

UNIT I

ENVIRONMENTAL POLLUTION: Air pollution, Water pollution, Soil Pollution & Noise Pollution, Nuclear hazards.

SOCIAL ISSUES AND ENVIRONMENT: Sustainable use of environmental resources Water conservation, Global warming, Acid rain, Ozone layer depletion, various acts for the protection of environment and living systems.

UNIT II

INTRODUCTION TO ECOSYSTEM: Various types of ecosystem - Grassland, Desert and Aquatic ecosystem. Structures of ecosystems - Energy flow, Food chain, Food web and ecological pyramid.

BIODIVERSITY AND ITS CONSERVATION: Introduction & Definition of Biodiversity. Threats to Biodiversity: habitat loss, illegal poaching of wildlife. Threatened species of India, Methods of conservation of biodiversity.

UNIT III

CELL: Hierarchy of organization and the cell concept, structure of prokaryotic and Eukaryotic cells, plant cells and animal cells.

BIOMOLECULES: General classification and important functions of Carbohydrates lipids, amino acids, proteins, nucleic acids, Vitamins and Enzymes.

GENETICS AND EVOLUTION: Theories of evolution, Mendel's laws of inheritance, Central Dogma

UNIT IV

INTRODUCTION TO GENETIC ENGINEERING: Elementary knowledge of Recombinant DNA Technology, Tools and Vectors used in genetic engineering,

FUNDAMENTALS OF BIOCHEMICAL ENGINEERING: Principle of microbial growth, Bioreactor, Types of Bioreactors, fermentation process.

SCOPE OF BIOTECHNOLOGY: Application in industry, agriculture, food science, Biopharmaceutical and Bioengineering.

TEXT BOOKS/ REFERENCE BOOKS:

1. Introductory basics of Biotechnology. By A.S. Yadav & D.D. Sharma.
2. Basics of Biotechnology by Surinder Deswal & Anupama Deswal
3. An Introduction to Environmental Sciences by Surinder Deswal & Anupama Deswal.
4. Basics of Biotechnology by Dr. A.J. Nair.

BASICS OF ELECTRONICS & ELECTRICAL TECHNOLOGY

NC-ECE-101

L	T	W
3	1	4

Time: 3hrs

Marks: 100

- Note: -**
- 1. There are NINE questions in a set of question-paper. All questions carry equal marks.**
 - 2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.**

UNIT 1

D.C. CIRCUITS: Ohm's Law, Kirchoff's Laws, D.C. Circuits, Nodal and Loop methods of analysis. **A.C. CIRCUITS:** Sinusoidal signal, instantaneous and peak values, RMS and average values, phase angle, polar & rectangular, exponential and trigonometric representations; R, L and C components, behaviors of these components in A.C. circuits.

UNIT II

TRANSIENT RESPONSE: transient response of RL, RC and RLC Circuits with step input. **NETWORK THEOREMS:** Thevenin's theorem, Norton's theorem, superposition theorem.

TRANSFORMERS: Principle, construction & working of transformer, Efficiency and regulation.

UNIT III

SEMICONDUCTOR DIODES:- Semiconductor materials- intrinsic and extrinsic types, Ideal Diode, Terminal characteristics of diodes:-p-n junction under open circuit condition, p-n junction under forward bias and reverse bias conditions, p-n junction in breakdown region. LED its characteristics.

UNIT IV

BIPOLAR JUNCTION TRANSISTORS (BJTs): - Input and output characteristics of NPN transistor, Active region operation of transistor, D.C.analysis of transistor circuits, Transistor as an amplifier, Basic BJT amplifier configuration: common emitter, common base and common collector amplifiers, Biasing the BJT: voltage divider bias, Transistor as a switch.

Differential amplifier and its transfer characteristics. IC Op-Amps, its ideal & practical specifications and measurement of parameters. Op-Amp in different modes as inverting amplifier, non-inverting amplifier, scale changer, differentiator & integrator, qualitative concept of sensors and transducers.

TEXT BOOKS/REFERENCES

1. Electronic Devices & Circuits – Boylestad & Nashelsky (Person Education)
2. Integrated Electronics By Millman & Halkias (TMH)
3. Basic Electrical Engg (2nd Edition): Kothari & Nagarath, TMH
4. Electrical Technology (Vol-I): B.L.Theraja & A K Theraja, S.Chand.

BASIC OF ELECTRONIC & ELECTRICAL TECHNOLOGY LAB
NC-ECE-102

P **W**
2 1

LIST OF EXPERIMENTS:

1. To verify KCL and KVL.
2. To verify Superposition theorems.
3. To perform O.C. and S.C. tests on transformer and determine equivalent circuit parameters as referred to primary.
4. To perform direct load test on a transformer and plot efficiency VS load characteristic.
5. Generalized use of CRO and Multimeter and To perform the V-I characteristics of a p-n junction diode in forward and reverse bias.
6. To study the half wave & full wave rectifier with and without filter and to calculate it's ripple factor, and PIV rating.
7. To study the I/P and O/P characteristics of NPN transistor in common emitter configuration.
8. To determine the A_v , A_i of RC coupled CE transistor amplifier.
9. To perform the experiment using Op-Amp as Inverting & Non Inverting Amplifier and integrator and differentiator.

BASICS OF MECHANICAL ENGINEERING

NC- ME- 101

L	T	W
3	1	4

Time: 3hrs

Marks: 100

- Note: -**
- 1. There are NINE questions in a set of question-paper. All questions carry equal marks.**
 - 2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.**

UNIT I

Simple Lifting Machines: Definition of machine, Velocity ratio, Mechanical advantage, Efficiency, Laws of machines, Reversibility of machine, Wheel and axle, Differential pulley block, Single, double and triple start worm and worm wheel, Single and double purchase winch crabs, Simple and compound screw jacks.

Stresses and Strains: Introduction, Concept & types of Stresses and strains, Poisson's ratio, stresses and strains in simple and compound bars under axial loading **and related numerical**, Stress-strain diagrams, Hooks law, Elastic constants & their relationships

Definitions, SF and BM diagrams for cantilever and simply supported beam under point load and UDL **and numerical**.

UNIT II

Fundamental Concepts of Thermodynamics : System, surrounding and universe, Phase, Macroscopic & microscopic point of view. Density, specific volume, pressure, temperature, Thermodynamic Equilibrium, Property, state, Path, Process, Cyclic Process, Energy and its form, work and heat, Enthalpy.

Laws of Thermodynamics: Zeroth Law of thermodynamics, Concept of temperature First law of Thermodynamics, C.O.P. of Heat Pump and Refrigerator **and related numerical**, Second law of Thermodynamics Kelvin- Planks Statement, Clausius Statement, Equivalence of two statements, Reversible and Irreversible Process.

UNIT III

Introduction to I.C. Engines: Two & Four stroke, S.I. and C.I. engines, Otto cycle, Diesel cycle.

Introduction to A/C: Basic cycle used in A/C, Window A/C, Split A/C.

Properties of Fluid: Density, Specific weight, specific volume, specific gravity, viscosity and its units, Newton's Law of viscosity, **and numerical related to Viscosity**, types of fluids. Surface tension, Universal gas constant.

UNIT IV

Introduction to Manufacturing Processes

- Introduction to cutting tool & cutting tool material, Signature of Single point cutting tool
- **Casting:** Basic Steps in Casting Process, Pattern, Types of Patterns, Pattern Allowances, Risers, Runners, Gates, Moulding Sand and its composition, Casting Defects and Remedies.
- **Welding:** Gas Welding: Oxy Acetylene Gas Welding, Arc Welding: Shielded metal arc Welding, TIG, MIG, Welding Defects and Remedies, Soldering & Brazing.

Text Books:

1. Strength of Materials - G.H. Ryder, Pub.- ELBS.
2. Hydraulic and Fluid Mechanics – Modi and Seth, Pub. – Standard Book House, New Delhi
3. Engineering Thermodynamics – C.P. Arora, Pub. - TMH, New Delhi
4. Thermal Engineering – A.S. Sarad, Pub. - Satya Prakashan, New Delhi.
5. Engineering Mechanics – K.L. Kumar, Pub. - TMH, New Delhi.
6. Mechanics of Solids- Dr. V.S. Prasad, Galgotia Publication, New Delhi.
7. Manufacturing Process – P.N Rao, Pub.- TMH, New Delhi.
8. Introduction to Workshop technology – R.S Raghuvanshi ,Dhanpat Rai publications, New Delhi

Reference Books:

1. Strength of Materials – Popov, Pub. - PHI, New Delhi.
2. Hydraulic Machines – Jagdish Lal, Pub.- Metropolitan, Allahbad.
3. Thermal Science and Engineering – D.S. Kumar, Pub. – Kateria & Sons, New Delhi.
4. Thermal Engineering – A.S. Sarad, Pub. - Satya Prakashan, New Delhi.
5. Engineering Mechanics – K.L. Kumar, Pub. - TMH, New Delhi.

ENGINEERING GRAPHICS & DRAWING

NC-ME-102

L	T	W
3	1	4

Time: 3hrs

Marks: 100

- Note: -**
- 1. There are NINE questions in a set of question-paper. All questions carry equal marks.**
 - 2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.**

UNIT-I

Dimensioning & Standard as per BIS. , various types of projections, 1st & 3rd angle systems of orthographic projections. Projections of points in different quadrants
Orthographic views-orthographic projections from the isometric views of the given solids.
Isometric Views, Missing views

UNIT-II

Projections of straight lines-parallel to one or both reference planes, contained by one or both planes, perpendicular to one of the planes, inclined to one plane & parallel to other plane, inclined to both planes, true length of a line & line & its inclination with reference planes, traces of a line.

UNIT-III

Projection of polyhedra solids & solids of revolution-in-simple positions with axis perpendicular to a plane, with axis parallel to both planes, with axis parallel to one plane & inclined to other, Introduction to curves, Method to draw the Ellipse, Parabola, Hyperbola etc.

UNIT-IV

Sectioning of Solids, Cutting Planes – Auxiliary horizontal, vertical and Inclined planes.
Development of surfaces of various simple solids such as Cubes, Cylinders, Prisms, Pyramids, etc. Development of cut solids.

Text books and Reference:

1. Engineering graphics and drawing - P.S. Gill., Kataria Publication, New Delhi.
2. Engineering graphics and drafting - P.S. Gill, Millennium Edition, S.K. Kataria and Sons.
3. Engineering Drawing Plane and Solid Geometry: N.D. Bhatt and V.M.Panchal, Forty-Fourth Edition 2002, Charotar Publishing House.
4. Engineering graphics and drawing - Reddy & Kannaiah., New Age International Publishers, New Delhi.

WORKSHOP PRACTICE

NC-ME-103

List of Experiments

1. To study different types of measuring tools used in metrology and determine least counts of vernier calipers, micrometers and vernier height gauges.
2. To study different types of machine tools (lathe, shape or planer or slotter, milling, drilling machines)
3. To prepare a job on a lathe involving facing, outside turning, taper turning, step turning, radius making and parting-off.
4. To study different types of fitting tools and marking tools used in fitting practice.
5. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.
6. To prepare joints for welding suitable for butt-welding and lap welding.
7. To perform pipe welding.
8. To study various types of carpentry tools and prepare simple types of at least two wooden joints.
9. To prepare simple engineering components/ shapes by forging.
10. To prepare mold and core assembly, to put metal in the mold and fettle the casting.
11. To prepare horizontal surface/ vertical surface/ curved surface/ slots or V-grooves on a shaper/ planner.
12. To prepare a job involving side and face milling on a milling machine.

Students are required to perform at least 10 experiments from the above list

COMP-I (FUNDAMENTALS OF COMPUTING)

NC-CSE-101

L	T	W
3	1	4

Time : 3 Hours

Marks : 100

Note :

- 1. There are Nine questions in a set of question-paper. All questions carry equal marks.**
- 2. Attempt five questions in all, First question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.**

UNIT-I

History & Generations of computer, Components of a Digital Computer.

Introduction to Computer Languages: Machine Level Languages, Assembly Language, High Level Languages (e.g. C, C++), Translators and Interpreters, Representation of information inside the computer.

UNIT-II

Number Systems: Binary, Octal, Hexadecimal, Algorithms, Flowcharts.

Introduction to Operating System: Disk O.S., Windows O.S., Linux O.S.

Programming Fundamental and C: Data types, Keywords, Variables, Constants, Expressions, Formatted I/O, Unformatted I/O.

UNIT-III

Control Statements:-Selection , Loops, Switch-case, Break and Continue , Storage classes , Functions, Argument passing, Call by Value & Call by reference, Recursive function, Pointer and Functions.

Arrays: 1-D, 2-D, 3-D Arrays, Processing of arrays, Pointer and Arrays.

UNIT-IV

Sorting and Searching techniques, Strings, Array of strings, String Applications, Structures, Unions, Operations on structures.

Files in C: File handling, File operations and functions, Error handling.

Reference Books:

1. Lets Us C by Yashwant Kanitkar. BPB Publication
2. Computer Fundamentals and C Programming by E. Balagurusami, TMH Publication.

COMP-I LAB (PROGRAMMING IN C)
NC-CSE-102

P	W
2	1

NOTE: Make flow chart & write algorithm and C code for following programs.

1. Write a program to add two numbers.
2. Write a program to calculate simple interest.
3. Write a program to find the largest of three numbers. (Using if-then-else)
4. Write a program to find largest number out of ten numbers.(Using for-loop)
5. Write a program to find second largest number out of ten numbers. (Using arrays)
6. Write a program to find the average male height & average female height in the class. (Using while loop)
7. Write a program to print prime numbers between 2 to 100.
(Using modulus operator “%”)
8. Write a program to add two matrices. (Using 2-D arrays)
9. Write a program to multiply two matrices. (Using formatted I/O)
10. Write a program to find roots of quadratic equation. (Using function)
11. Write a program to calculate factorial. (Using recursive function call)
12. Write a program to implement call by reference function.
13. Write a program to ask user’s choice and print that on output screen. (Using switch-case-default statements)
14. Write a program to read a string and write it in reverse order. (Using only string length function “strlen”)
15. Write a program to concatenate two strings. (Using only string length function “strlen”)
16. Write a program to sort numbers using the Algorithm.
17. Write a program to check that the input string is a palindrome or not.
18. Write a program to implement file operations. (e.g. file read and write)
19. Write a program to make a record of students of a class including information Name, Roll No, Marks in Different Subjects and display percentage marks. (Using structures & files)
20. Write a program to implement error handling in files.

*** Practice atleast 5 more programs related to nested loop constructs.**

COMP-II (DATA STRUCTURES)

NC-CSE-103

L	T	W
3	1	4

Time: 3hrs

Marks: 100

- Note: -**
- 1. There are NINE questions in a set of question-paper. All questions carry equal marks.**
 - 2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.**

UNIT-I

INTRODUCTION:

Introduction to Data Structures: Definition & Abstract data types, Static and Dynamic implementations

Order analysis: Objectives of time and space algorithms, Big O Notation and theta notations

Arrays: Definition, Implementation, lower bound, upper bound, addressing an element at a particular index for one dimensional arrays, Two dimensional arrays and Multi-dimensional arrays.

UNIT-II

ELEMENTARY DATA STRUCTURES:

Stacks & Queues, Infix conversions, evaluations of expressions, stacks and queues, priority queues as heaps, deques, Implementation and applications of Stacks and Queues

LINKED LISTS:

Singly linked lists, linked stacks and queues, polynomial addition, sparse matrices, doubly linked lists and dynamic storage management, Applications of Linked Lists, garbage collection, Josephus Problem.

UNIT-III

TREES:

Basic terminology, binary trees, binary tree traversal, application of trees, set representation, decision tree, Binary Search Trees Tree, Height Balanced tree (AVL) and various rotations

UNIT-IV

GRAPH THEORY:

Graph representations, Graph Traversals: BFT & DFT, Dijkstra's algorithm for shortest path, Spanning trees, Prim Algorithm, Kruskal Algorithm

TABLES: Definition, Hash Functions, Implementation & Applications

SORTING AND SEARCHING:

Searching: Linear search, Binary search.

Sorting: Insertion sort, selection sort, bubble sort, merge sort, heap sort

Text Book:

- Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.

Reference Books:

- Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.
- Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983,AW
- Fundamentals of computer algorithms by Horowitz Sahni and Rajasekaran.
- Data Structures and Program Design in C By Robert Kruse, PHI,
- Theory & Problems of Data Structures by Jr. Symour Lipschetz, Schaum's outline by TMH
- Introduction to Computers Science -An algorithms approach , Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.
- Data Structure and the Standard Template library – Willam J. Collins, 2003, T.M.H

COMP-II LAB (DATA STRUCTURES)

NC-CSE-104

P	W
2	1

1. Write a program to search an element in two-dimensional array using linear search.
2. Using iteration and recursion concepts write a program for finding an element in the array using binary search method.
3. Write a program to perform following operation tables using functions only
 - a) Addition b) Subtraction c) Multiplication d) Transpose.
4. Write a program to implement queues.
5. Write a program to implement stack.
6. Write a program to implement various operations on string such as length of string, concatenation, reverse and copy of string to another.
7. Write a program for swapping of two numbers using call-by-value and call-by-reference strategies.
8. Write a program to implement binary search trees
9. Write a program to make a copy of a given list.
10. Write a program to determine whether two lists are identical or not.
11. Write a program to create a linked list and perform operations such as insert, delete, update and reverse the linked list.
12. Write a program that deletes the k-th element from a two-way circular header list.
13. Write a program for implementation of a file and performing operations such as insert, delete, update a record in file.
14. Create a linked list and perform following operations:
 - a) Add a node
 - b) Delete a node
15. Write a program to simulate various searching and sorting algorithms and compare their timings for a list of 1000 elements.
16. Write a program to simulate various graph traversing algorithms.
17. Write a program which simulates various tree traversal algorithms
18. Write a program for deleting a node from binary search tree.
19. Write a program to implement various searching techniques
20. Write a program to implement various sorting techniques.