

Faculty of Engineering & Technology

Study and Evaluation Scheme

Of

Bachelor of Technology (I Year)

(CBCS)

B.Tech. (All Branches)

(Applicable w.e.f Academic Session 2016-20, till revised)



AKS UNIVERSITY, SATNA

Study and Evaluation Scheme

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B.TECH. (CBCS)**SCHEME**

(W.E.F. SESSION 2016-17)

SEMESTER-I

GROUP-A (Mechanical, Civil, Cement)						
S.NO.	PAPER CODE	SUBJECT	L	T	P	CREDIT
1	97MS101	ENGINEERING MATHEMATICS-I	4	1	0	5
2	97CH102	ENGINEERING CHEMISTRY	4	0	0	4
3	97SD103	COMMUNICATION ENGLISH	3	0	0	3
4	97ME104	ENGINEERING MECHANICS	3	0	0	3
5	97EV105	ECOLOGY & ENVIRONMENTAL STUDIES	3	0	0	3
6	97ME106	BASIC MECHANICAL ENGINEERING	3	1	0	4
1	97CH151	ENGINEERING CHEMISTRY (LAB)	0	0	2	1
2	97ME152	ENGINEERING MECHANICS (LAB)	0	0	2	1
3	97ME153	MANUFACTURING PRACTICES (WORKSHOP)	0	0	4	2
						26

GROUP-B (Electrical, Computer & Mining)						
S.NO.	PAPER CODE	SUBJECT	L	T	P	CREDIT
1	97MS101	ENGINEERING MATHEMATICS-I	4	1	0	5
2	97PH107	ENGINEERING PHYSICS	4	0	0	4
3	97CA108	FUNDAMENTALS OF COMPUTERS & PROGRAMMING	3	1	0	4
4	97EE109	BASIC ELECTRICAL & ELECTRONICS	4	0	0	4
5	97CE110	BASIC CIVIL ENGINEERING (FOR EE & CSE)	3	0	0	3
	97MI110	BASIC MINING ENGINEERING (FOR MINING)				
6	97ME111	ENGINEERING DRAWING & GRAPHICS	2	0	0	2
1	97PH154	ENGINEERING PHYSICS (LAB)	0	0	2	1
2	97EE155	BASIC ELECTRICAL & ELECTRONICS (LAB)	0	0	2	2
3	97ME156	ENGINEERING DRAWING & GRAPHICS (LAB)	0	0	4	2
						26

B.TECH. (CBCS)**SCHEME**

(W.E.F. SESSION 2016-17)

SEMESTER-II

GROUP-A (Mechanical, Civil, Cement)						
S.NO.	PAPER CODE	SUBJECT	L	T	P	CREDIT
1	97MS201	ENGINEERING MATHEMATICS-II	4	1	0	5
2	97PH202	ENGINEERING PHYSICS	4	0	0	4
3	97CA203	FUNDAMENTALS OF COMPUTERS & PROGRAMMING	3	1	0	4
4	97EE204	BASIC ELECTRICAL & ELECTRONICS	4	0	0	4
5	97CE205	BASIC CIVIL ENGINEERING	3	0	0	3
6	97ME206	ENGINEERING DRAWING & GRAPHICS	2	0	0	2
1	97PH201	ENGINEERING PHYSICS (LAB)	0	0	2	1
2	97EE202	BASIC ELECTRICAL & ELECTRONICS (LAB)	0	0	2	2
3	97ME203	ENGINEERING DRAWING & GRAPHICS (LAB)	0	0	4	2
						26

GROUP-B (Mining, Electrical, Computer)						
S.NO.	PAPER CODE	SUBJECT	L	T	P	CREDIT
1	97MS201	ENGINEERING MATHEMATICS-II	4	1	0	5
2	97CH207	ENGINEERING CHEMISTRY	4	0	0	4
3	97SD208	COMMUNICATION ENGLISH	3	0	0	3
4	97ME209	ENGINEERING MECHANICS	3	0	0	3
5	97EV210	ECOLOGY & ENVIRONMENTAL STUDIES	3	0	0	3
6	97ME211	BASIC MECHANICAL ENGINEERING	3	1	0	4
1	97CH204	ENGINEERING CHEMISTRY (LAB)	0	0	2	1
2	97ME205	ENGINEERING MECHANICS (LAB)	0	0	2	1
3	97ME206	MANUFACTURING PRACTICES (WORKSHOP)	0	0	4	2
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B.TECH.	ENGINEERING MATHEMATICS-I	SEMESTER-I	4+1+0
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UNIT-1 Differential Calculus

Successive differentiation: Maclaurin's series and Taylor's series for one variable function. Partial differentiation, Homogeneous function, Euler's theorem, Maxima and minima of function of one and two variables. Radius of curvature,

UNIT-2 Matrices

Definition and representation of matrix, types of matrices; Null matrix, identity matrix, Diagonal matrix, Triangular matrix, symmetric and Skew-symmetric, complex matrix, Hermitian and skew-Hermitian matrix, unitary matrix, and Orthogonal matrix. Elementary row and column transformation, Rank of matrix, Nullity of matrix, Echelon form, Normal form of matrix, Consistency of linear system of equations and their solution, Characteristic equation of matrix, Eigen values and Eigen vectors, Caley-Hamilton theorem, Inverse of matrix, Diagonalisation, Quadratic form of matrix.

UNIT- 3 Multiple Integrals

Definite integral: Its properties and its application in summation of series. Beta function, Gamma function, Relation between Beta and Gamma function, Multiple Integrals: Double integral and triple integral, Change of order of integration, Change of variables.

UNIT- 4 Vector Calculus

Scalar and vector : Definition and terminology, Vector and scalar point functions, Gradient of scalar function, Divergence of a vector point function, Curl of a vector point function Directional derivatives. Vector integrations: Line integral, surface integral and volume integrals. Green's Theorem (statement and related problems), Stoke's Theorem (statement and related problems), Gauss's divergence theorem (statement and related problems)

UNIT- 5 Differential Equations:

Solution of Ordinary differential equation of first order and first degree: Separation of variables, Homogeneous equation, linear differential equations, Bernoulli's equation, Exact differential equation, NASC for Exactness of ODE , Rules for finding integrating factor. Solution of Linear differential equations of nth order with constant coefficients: Complementary functions and particular integrals, Cauchy's Homogeneous linear differential equation, Simultaneous linear differential equations.

Text Books :

1. D. K. Jain., Engineering Mathematics-I
2. Sonendra Gupta , Engineering Mathematics-I, Dhanpat Rai Publishing Company(P) Ltd.
3. **H.K. Das** Engineering Mathematics-I, S.Chand & company Ltd.
4. D.C. Agrawal, Engineering Mathematics-I,Sai prakasan

Reference Books:-

1. B.S.Grewal, Engineering Mathematics, Khanna Publishers, 2004.
2. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, 2005.
3. Chandrika Prasad, Mathematic for Engineers, Prasad Mudranalaya,1996.
4. H.K.Das, Basic Engineering Mathematics, S.Chand & company Ltd.
- 5 . B.V.Ramana,Higher Engineering mathematics,Tata Mcgraw-Hills Publishing Company Limited.

B.TECH.	ENGINEERING CHEMISTRY	SEMESTER-I or II	4+0+2
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Objective- The role of chemistry and chemical production in every branch of engineering is expanding greatly now a day's various chemical products of chemical industries are playing important role in the field of engineering with increasing number of such products each successive years. The strength of materials the composition of substances, their behaviors when subjected to different treatment and environment and the laws of heat and dynamic energy have entered in almost every activity of modern life.

UNIT-I : Atomic Structure and chemical bonding

Atomic Structure: - Introduction to Electron, Proton and Neutron, Orbital and shapes of s,p and d orbitals. Quantum number and its types.

Rule for filling electrons in orbitals:- Aufbau's principle, Hund's rule and Pauli's principle. Brief history of development of periodic table.

Chemical bonding:- Ionic, covalent and co-ordinate bond. Hydrogen bond and its type. Hybridization (sp , sp^2 , sp^3 , d , sp^3d and sp^3d^2) VSEPER theory, MOT and Molecular energy level diagram for, N_2 , O_2 and F_2 molecules.

UNIT-II : Polymer and metallic corrosion

Polymer:- Definition, types and classification of polymer.

Mechanism of polymerization:- Free radical mechanism, cationic and anionic mechanism. Method of preparation and application of following polymers:- Polythene, PVC, PAN, Teflon, Buna-S, Buna-N Rubber, Nylon-6, Nylon-66, Nylon-610, Bakelite, Terylene and Glyptal.

Metallic corrosion:-

Definition, Mechanism of metallic corrosion, factor affecting rate of metallic corrosion, Types of metallic corrosion and corrosion control.

UNIT-III : Fuels, Cement and Lubricants

Fuels:- Definition, classification of fuel, characteristics of good fuel, calorific value of fuel, determination of calorific value of fuel by bomb calorimeter.

Analysis of Coal: - Proximate and ultimate analysis.

Cement:- Introduction of cement, composition of Portland cement and its manufacture, setting and hardening of cement.

Lubricants:- Introduction, Classification of lubricants.

Mechanism of Lubrication: - Thick film Lubrication, thin film lubrication and extreme pressure lubrication.

UNIT-IV : Water and its treatment

Introduction, Structure of water, source of water, specification for water, Impurities in water, Hardness of water, Types of Hardness:- Temporary hardness and permanent hardness.

Boiler feed water and Boiler troubles:-

- (i) Scale and sludge formation (ii) Boiler corrosion.

Water softening methods:- Carbonate conditioning, phosphate conditioning. Collidal conditioning and calgon conditioning, Lime-Soda process, zeolite or permutit process and Ion-exchange process. Municipal water treatment.

UNIT-V : Spectroscopy and chromatography:-

Spectroscopy:- Electromagnetic radiation, Types of spectra, Lambert's and Beer's law. Introduction, Principle, Instrumentation and application of UV-Visible, IR and NMR Spectroscopy
Chromatography:- Introduction, Types and application of chromatography.

Text Book:-

Author

Jain&Jain
Jain&Jain
B.K. Sharma
B.K. Sharma
S.S.Dara
Shashi Chawla

Name of the book

Engineering Chemistry
Engineering Chemistry
Industrial Chemistry
Engineering Chemistry
Engineering Chemistry
Engineering Chemistry

Publisher

Dhanpat Rai&sons
WileyIndiaEdition
Goel Publication
Krishna Publication
S.ChandPublication
Dhanpat Rai&sons

Reference Books:-

Ghosh

Polymer Science

Tata McGraw Hill

S.S. Kumar
O.P.Viramani, A.K.Narula

Applied Chemistry
Appl. Che. (Theory Practice)

Tata
McGrawHill2ndEdition2009
NEWAGE Publication

B.TECH.	COMMUNITATION ENGLISH	SEMESTER-I OR II	3+0+0
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Unit I - Languages and skills of communication

Linguistic techniques, Modern usages, Reading comprehension, English phonetic symbols/sings, Oral presentation, Audition Communication, Processes of Communication, Verbal and Non Verbal Communication, Barriers to Communication.

Unit II - Application of linguistic ability

Writing of definitions of Engineering terms, Objects, Processes and Principles (Listening) Topics of General Interest, Reproduction from business, daily life, travel, health, buying and selling, company structure, systems etc.

Unit III - Letter Writing:

Applications, Enquiry, Calling quotations, Tenders, Order and Complaint.

Unit IV

Precise Writing, Noting and drafting, Technical Description of simple engineering objects and processes (writing), Report writing, precise writing, Note writing, Slogan writing comment, Speech advertising.

Unit V

Writing Technical reports of the type of observation report, Survey report, Report of trouble, Laboratory Report and Project Report on the subjects of engineering. (Speaking) Vocabulary, Presentations, Demonstrations, Conversation – Telephone media, socializing, cultural events, debates, speech.

Additional Topics to be covered in the session :

1. Basic Grammar & Vocabulary (Synonyms /Antonyms, Analogies, sentence completion, correctly spelt words, idioms, proverbs, common errors).
2. phonetic symbols and pronunciation.
3. Listening skills (Including Listening Comprehension)
4. Reading Skills (Including Reading Comprehension)
5. Writing Skills (Including structuring resume and cover letter)
6. Speaking Skills
7. Body Language
8. Oral Presentation :

Reference Books :-

1. Business Correspondence and Report Writing - By Sharma; TMH.
2. Living English Structure – By W.S. Allen; Longmans.
3. English Grammar – Ehrlich, Schaum Series; TMH.
4. Spoken English for India – By R.K. Bansal and IB Harrison Orient
5. Longman. New International Business English – by Joans and Alexander; OUP.
6. Effective Technical Communication – Rizvi; TMH.

B.TECH.	ENGINEERING MECHANICS	SEMESTER-I or II	3+0+2
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Unit-I

Coplanar Concurrent Forces:

Introduction to Engineering Mechanics: What is Engineering Mechanics? Classification of Engineering Mechanics, Statics, Dynamics, Kinematics, Kinetics etc. Fundamental Laws of Mechanics.

Unit-II

Resolution and Composition of Forces:

Force, Pressure and Stress, Free Body Diagram, Bow's Notation, Characteristics and Effects of a Force, System of Forces, Resolution of a Force, Composition of Forces, Resultant / Equilibrant Force, Law of Parallelogram of Forces, Law of Triangle of Forces, Polygon Law of Forces, Lami's Theorem, Equilibrium of a Body Under Two / Three/More Than Three Forces. Law of Superposition of Forces.

Unit-III

Coplanar Non Concurrent Forces:

Moment of a Force, Principle of Moments/ Varignon's Theorem, Parallel Forces : Resultant of Parallel Forces, Couple: Moment of a Couple, Resolution of Force into a Couple. Coplanar Non Concurrent Forces: Resultant of Coplanar, Non-Concurrent Forces.

Unit-IV

Beams: Types of Beams: Simply Supported Beam, Overhanging Beam, Cantilever Beam. Types of Supports of a Beam or Frame: Roller, Hinged and Fixed Supports. Load on the Beam or Frame: Different Types of Loading. Support Reaction of a Beam or Frame: Analytical Method. Truss Analysis: Method of Joints & Sections.

Unit-V

Centroid and Centre of Gravity: Centroid, Centre of Gravity, Determination of Centroid of Simple Figures, Centroid of Composite Sections. Centre of Gravity of Solid Bodies. Area Moment of Inertia: Basic Concept of Inertia, Definition of Moment of Inertia, Theorems of Moment of Inertia, Radius of Gyration, Polar Moment of Inertia of Standard Sections, Moment of Inertia of Composite Section, Principal Moment of Inertia, Mass Moment of Inertia.

Introduction to Dynamics: Overview of Dynamics, Basic Concepts and Terms Used in Dynamics, Motion, Types of Motion, Newton's Laws of Motion, Newton's Law of Gravitation.

REFERENCES

KL Kumar, Engineering Mechanics, Tata McGraw- Hill Education
Ferdinand.P. Beer. E, Russell Johnston Jr., David Mazurek, Philip J Cornwell, "Vector Mechanics for Engineers: Statics and Dynamics", McGraw - Hill
Timoshenko, and Young, "Engineering Mechanics", Tata Mc-Graw Hill
P.N. Chanchandramouli, Engineering Mechanics, PHI Learning Private Limited.

B.TECH.	MANUFACTURING PRACTICE (WORKSHOP)	SEMESTER-I or II	0+0+4
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Unit I

Introduction: Manufacturing Processes and its Classification, Casting, Machining, Plastic deformation and metal forming, Joining Processes, Heat treatment process, Assembly process. Powder Metallurgy, introduction to computers in manufacturing. Black Smithy Shop Use of various smithy tools. Forging operations: Upsetting, Drawing down, Fullering, Swaging, Cutting down, Forge welding, Punching and drafting.

Suggested Jobs : Forging of chisel., forging of Screw Driver

Unit II

Carpentry Shop: Timber : Type, Qualities of timber disease, Timber grains, Structure of timber, Timber, Timber seasoning, Timber preservation .Wood Working tools: Wood working machinery, joints & joinery. Various operations of planning using various carpentry planes sawing & marking of various carpentry joints.

Suggested Jobs :Name Plate ,Any of the Carpentry joint like mortise or tennon joint

Unit III

Fitting Shop: Study and use of Measuring instruments, Engineer steel rule, Surface gauges caliper, Height gauges, feeler gauges, micro meter. Different types of files, File cuts, File grades, Use of surface plate, Surface gauges drilling tapping Fitting operations: Chipping filling, Drilling and tapping.

Suggested Jobs :Preparation of job piece by making use of filling, sawing and chipping , drilling and tapping operations.

Unit IV

Foundry: Pattern Making: Study of Pattern materials, pattern allowances and types of patterns. Core box and core print, .Use and care of tools used for making wooden patterns.

Moulding : Properties of good mould & Core sand, Composition of Green , Dry and Loam sand. Methods used to prepare simple green and bench and pit mould dry sand bench mould using single piece and split patterns.

Unit V

Welding: Study and use of tools used for Brazing, Soldering, Gas & Arc welding. Preparing Lap & Butt joints using gas and arc welding methods, Study of TIG & MIG welding processes . Safety precautions.

Reference Books:

1. Bawa HS; Workshop Practice, TMH
2. Rao PN; Manufacturing Technology- Vol.1 & 2, TMH
3. John KC; Mechanical workshop practice; PHI
4. Hazara Choudhary; Workshop Practices -, Vol. I & II.
- 5 Jain. R.K. Production Technology -

B.TECH.	ECOLOGY & ENVIRONMENTAL STUDIES	SEMESTER-I or II	3+0+0
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Unit 1 :

Definition, scope and importance, need for public awareness. Natural resources and associated problems. Forest resources: Use and over-exploitation, deforestation, mining, dams and their effects on forest. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Land resources : Land as a resource, land degradation, soil erosion and desertification.

Unit 2 :

Food resources : World food problems, effects of modern agriculture, fertilizer-pesticide problems, Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

Unit 3 :

Concept of an ecosystem, Structure and function of an ecosystem. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. introduction, types, characteristic features, structure and function of the terrestrial ecosystem and Aquatic ecosystems. Diversity, Definition & types, Biogeographical classification of India, Value of biodiversity, Biodiversity at global, National and local levels. India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity, Endangered and endemic species of India, Conservation of biodiversity.

Unit 4 :

Definition: Cause, effects and control measures of :- Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste Management : Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies, Disaster management: floods, earthquake, cyclone and landslides.

Unit 5 :

Sustainable development, urban problems related to energy Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns, Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Environmental legislation, Public awareness. Population growth, Population explosion - Family Welfare Programme. Environment and human health. HIV/AIDS.. Role of Information Technology in Environment and human health.

Field work

- Visit to a local area to document environmental assets, river/ forest/grassland/hill/mountain
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc

Suggested Books:

A text book of Environmental Studies, Erach Bharucha, UGC Publication Delhi
A text book of Environmental science: Purohit Shami & Agrawal, Agrobios Student edition Jaipur
A text book of Environmental Studies: Kaushi & Kaushik New age
International Publication Paryavaran Addhyan : MP Hindi Granth Academy
Paryavaran Addhyan : KL Tiwari and Jadhav Publication

B.TECH.	BASIC MECHANICAL ENGINEERING	SEMESTER-I or II	3+1+0
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Unit-I

MANUFACTURING PROCESSES: Sheet Metal Work processes (applications, advantages/disadvantages). Welding: Types – Equipments – Tools and accessories – Techniques employed - applications, advantages / disadvantages – Gas cutting – Brazing and soldering Lathe Practice: Types - Description of main components – Cutting tools – Work holding devices – Basic operations. Simple Problems. Drilling Practice: Introduction – Types – Description – Tools. Simple Problems.

Unit-II

POWER GENERATION: External and internal combustion engines Auto diesel & dualcycles, comparative study – Hydro, thermal and nuclear power plants (layouts, element/component description, advantages, disadvantages, applications). Simple Problems. Introduction to Steam water and gas turbines, basics of Rankine & Joule cycle, centrifugal pumps.

Unit-III

MACHINE ELEMENTS: Springs: Helical and leaf springs – Springs in series and parallel. Cams: Types of cams and followers – Cam profile Power Transmission: Gears (terminology, spur, helical and bevel gears, gear trains). Belt drives (types). Chain drives. Simple problems. Introduction to mechanisms, four bar chain, inversions.

Unit-IV

THERMAL ENGINEERING: Basic concepts of thermodynamics, Concept of system, Introduction to Zeroth, first & second law of thermodynamics, salient features of steamboilers, accessories & mountings, High pressure boilers Basic modes of heat transfer Fourier's law, Stefan Boltzmann's law, Newton's law. Concept of refrigeration & air conditioning, ton of refrigeration, COP. working of domestic refrigerator & air conditioner

Unit-V

MECHANICAL PROPERTIES AND DEFORMATION MECHANISMS:

Mechanisms of plastic deformation, slip and twinning – Types of fracture – mechanical Properties of materials, Testing of materials under tension, compression and shear loads – Hardness tests (Brinell, Vickers and Rockwell), hardness tests, Impact test Izod and Charpy, fatigue and creep failure mechanisms. Ferrous & non ferrous materials, non metallic materials, Alloys & phase diagram.

REFERENCES

Jonathan Wickert, Kemper Lewis, An Introduction to Mechanical Engineering, CENGAGE Learning.

Michael Clifford, Kathy Simmons, Philip Shipway, An Introduction to Mechanical Engineering: Part 1 and Part 2, Taylor and Francis

B.TECH.	ENGINEERING PHYSICS	SEMESTER-I OR II	4+0+2
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Unit-1 Wave Mechanics

Interference:- coherent sources, principle of superposition, definition and types of interference, Interference from parallel thin films, wedge shaped films, Newton's rings, Michelson's Interferometer, experiments and their applications.

Diffraction:- Fresnel diffraction , diffraction at a straight edge, single slit , double slit and n-Slit Diffraction grating, dispersive power of grating , resolving power of prism and grating. **Polarization:-** Introduction , production of plane polarized light by different method, Brewster's law and Malu's law , double refraction, Nicol prism, Quarter and half wave plate, polarimeter.

Unit-2 Laser & Fiber Optics

LASER:- Absorption , Stimulated and Spontaneous emission, coherence, pumping, population Inversion, Principle of laser beam , Einstein's coefficients , principle and working of He-Ne laser & Ruby Laser with energy level diagram, applications and uses of laser.

fibre optics:- fundamental idea about optical fibre, types of optical fibre, mechanism of optical fibre (qualitative only), optical communication, applications and uses of optical fibre.

Unit-3 Quantum Mechanics

Phase & Group velocities and their relationship, Uncertainty principle with elementary proof and applications, Debroglie's concept of matter waves, Schrodinger's wave equation, (Time dependent and time independent), interpretation of wave function, eigen values and eigen functions , Compton's effect.

Unit-4 Solid State Physics & Superconductivity

Solid State Physics:- Formation of energy bands in solids, classification of conductors, semiconductors and insulators on the basis of energy band theory, semiconductors and it's classification, intrinsic & extrinsic semiconductor, Zener diode, tunnel diode, P-N junction and it's applications , Hall effect .

Superconductivity :- Introduction, types of superconductor, Meissner effect , Type-I and Type-II Superconductors, properties of superconductors, and it's applications.

Unit-5 Neno Technology

Introduction, nanoscale, quantum dot, quantum wire and quantum well , concept of nano materials, Nano particles, carbon nano tubes, nano clays, nano mud , nano fibres and their properties, preparation technique of nano materials and nano fibres, characterisations of nano materials by using X-ray diffraction and scanning electron microscopy measurements, applications and future of nano technology in the field of electronics, nanorobots, quantum computing, space energy, DNA, Biomedical, Polymers, Textiles and nano co

TEXT BOOKS

1. "ENGINEERING PHYSICS" BY – Navneet Gupta , Dhanpat Rai Publications.
2. "ENGINEERING PHYSICS" BY – Kshir Sagar

REFERENCE BOOKS

1. Verma H.C. "CONCEPT IN PHYSICS" , Bharti Bhawan Ltd. ,New Delhi
2. Optics by- Ghatak
3. "A text book of nano science" S.K. Kataria and Sons, New Delhi
4. Solid state physics By- Kittel

List of Experiments (Any-10)

1. To determine the refractive index of prism by Spectrometer.
2. To find wave length of diffraction grating with the help of mercury lamp.
3. To find wave length of sodium light with the help of Newton's ring.
4. To study diffraction of light with the help of single slit experiment by using laser beam.
5. To find the specific rotation of angle of a sugarcane solution by using polarimeter.
6. To find the value of Plank's constant.
7. To study the characteristics curve of P-N junction diode & Zener diode.
8. To study the characteristics curve of P-N-P transistor.
9. To study the characteristics curve of N-P-N transistor.
10. Calibration of ameter with the help of a potentiometer.
11. Determination of value of unknown resistance by using wheatstone bridge.
12. Calibration of a Volt meter with the help of a potentiometer.
13. To determine the energy band gap in a semiconductor using a P-N Junction diode.

B.TECH.	FUNDAMENTALS OF COMPUTERS & PROGRAMMING	SEMESTER-I OR II	3+1+0
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Unit 1

Introduction to Computers, Characteristics of Computers, Memory. Types of Programming Languages: Machine Languages, Assembly Languages, High Level Languages; Basic DOS commands.

UNIT 2

What is C: Historical development of C, where C stands, Getting Started with C: The C Character set, Types of C Constants, Types of C Variables, C keywords, identifiers, and literals.

Basic input & output function – printf and scanf.

Operator: arithmetic operators, relational operators, assignment operators, logical operators, increment and decrement operators, conditional operator.

UNIT 3

Decision control structure: control instructions in C, if, if-else, if-else if, nested if. Loops control structure: while loop, for loop, do – while loop, odd loop, nested loop, Break, continue, case control structure, go to, and exit statement

UNIT 4

Array what are arrays, array initialization, 2D array ,initialization of 1D and 2D array.

Function: Need of function, declaring function, defining, calling function, types of function, passing parameter in function.

UNIT 5

MS-Office: Introduction and Features. MS Word: Introduction, Features and Applications, working with MS Word: Menus & Commands, Toolbars & Buttons,, Creating a New Document, word in table, Arithmetic operation with Excel Sheet. Creating a Power Point Presentation.

Networking-Definition, types of Network, protocol, E-mail, creating an email account, Cyber law and Security, hacking and Cracking Overview.

Text Book

1. Pradeep K. Sinha and Priti Sinha, “Computer Fundamentals: Fourth Edition”, BPB Publications,

Reference Books

1. E. Balagurusamy, “Programming in ANSIC C”, Tata McGraw Hill, 2002
2. Yashavant Kanetkar, “Let Us C” – Seventh Edition, BPB Publications, 2007

B.TECH.	BASIC ELECTRICAL & ELECTRONICS	SEMESTER-I OR II	4+0+2
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Unit 1 : INTRODUCTION TO ELECTRICAL ENGINEERING-

Importance of electrical engineering in day to day life electrical elements and their classification
Electrical circuit analysis- concept of networks, active & passive elements, Voltage and current sources, dependent and independent sources, source conversion, DC circuits analysis using mesh & nodal method, Thevenin's & superposition theorem, star-delta transformation.

UNIT 2 : AC circuits

1-phase AC circuits under sinusoidal steady state, active, reactive and apparent power, physical meaning of reactive power, power factor, 3-phase balanced and unbalanced supply, star and delta connections.

Unit 3 : Transformers

Review of laws of electromagnetism, mmf, flux, and their relation, analysis of magnetic circuits. Single-phase transformer, basic concepts and construction features, voltage, current and impedance transformation, equivalent circuits, phasor diagram, voltage regulation, losses and efficiency, OC and SC test.

Unit 4 : Digital Electronics

Number systems used in digital electronics, decimal, binary, octal, hexadecimal, their complements, operation and conversion, floating point and signed numbers, Demorgan's theorem, AND, OR, NOT, NOR, NAND, EX-NOR, EX-OR gates and their representation, truth table, half and full adder circuits, R-S flip flop, J-K flip flop.

Unit 5 : ELECTRONIC COMPONENTS AND CIRCUITS

Passive components-resistors, inductors and capacitors and their types. Introduction to Semiconductors, Diodes, V-I characteristics, Bipolar junction transistors (BJT) and their working, introduction to CC, CB & CE transistor configurations, different configurations and modes of operation of BJT, DC biasing of BJT.

TEXT BOOKS-

1. Basic electrical & electronics engg. J.B GUPTA
2. Basic electrical & electronics engg. R.K RAJPUT
3. Electrical technology Volume-I B.L THAREJA

References:

1. Vincent Del Toro, Electrical Engineering Fundamentals, PHI Learning, II Edition
2. S.Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI, II Edition.
3. Millman, Halkias & Parikh, Integrated Electronics, Mc Graw Hill, II Edition
4. Nagrath & Kothari, Basic Electrical Engineering, III Edition TMH.
5. J.S. Katre, Basic Electronics Engg, Max Pub. Pune.
6. Hughes, Electrical and Electronic Technology, Pearson Education IX Edition

List of Experiments

1. Verification of Truth Table for Various Gates.
 2. Verification of Superposition Theorems.
 3. Verification Thevenin Theorems.
 4. Identification of Different electronics components.
 5. Study of Transformer Nameplate Rating, Determination of Ratio Polarity.
 6. Study of Input & output characteristics of common emitter, common base Amplifier.
 7. Measurement of Power in 1-phase circuit using ammeter, volt meter & wattmeter.
 8. Observing input & output Waveform of rectifiers.
- Transister Application as Amplifier & Switch.

B.TECH.	BASIC CIVIL ENGINEERING	SEMESTER-I OR II	3+0+0
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Unit -1

Overview of Civil Engineering , types of infrastructures, Effect of infrastructure facilities on economy and environment, Role of Civil Engineers in the infrastructural Development Introduction to sub domains of Civil Engineering Size of Infrastructure Industry emerging trends in infra spending through public and public-private partnership (PPP) , talent shortage and global trends in workshop mobility and skill demands

Unit -2

Stages in the life of construction- Design , construction , Maintance , Repair , Demolition / Recycling; an overview of Indian standards, unit and conversion factors for lengths, areas, volumes and weights; Opportunities and challenge of India's Infrastructure , Interdisciplinary nature of civil engineering projects.

Unit – 3

Roads: Types of Roads, road plan , components of road and their function; Bridges: important parts of bridges, classification of bridges: types of dams

Unit – 4

Properties and classification of common building materials- Stones, Bricks, Sand , Limes, Cement, Mortar , Concrete, and Steel

Unit – 5

Overview of Indian Road Congress , National Highway Authority of India (NHAI) and Society of Civil Engineers (ASCE), Emerging areas and new technologies in the field of civil engineering

References:

1. Elements of civil engineering by MD Saika, B. Mohan Das , MM Das , PHI Learning Private Limited
2. 2. Prakash M.N. Mehata , Ganesh b., A textbook on elements of civil engineering , PHI Learning Private Limited

B.TECH.	ENGINEERING DRAWING & GRAPHICS	SEMESTER-I OR II	2+0+4
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Unit -1

Scales: Representative factor, plain scales, diagonal scales, scale of chords.

Conic sections: Construction of ellipse, parabola, hyperbola by different methods; Normal and Tangent.

Special Curves: Cycloid, Epi-cycloid, Hypo-cycloid, Involutives, Archimedean Spiral

Unit -2

Projection: Types of projection, orthographic projection, first and third angle projection,

Projection of points and lines, Line inclined to one plane, inclined with both the plane, True Length and True Inclination, Traces of straight lines.

Unit - 3

Projection of planes and solids: Projection of Planes like circle and polygons in different positions; Projection of polyhedrons like prisms, pyramids and solids of revolutions like cylinder, cones in different positions.

Unit - 4

Section of Solids: Section of right solids by normal and inclined planes; Intersection of cylinders.

Development of Surfaces: Parallel line and radial - line method for right solids.

Unit - 5

Isometric Projections: Isometric scale, Isometric axes, Isometric Projection from orthographic drawing.

Computer Aided Drafting (CAD): Introduction, benefit, software's basic commands of drafting entities like line, circle, polygon, polyhedron, cylinders; transformations and editing commands like move, rotate, mirror, array; solution of projection problems on CAD.

References:

1. Visvesvaraya Tech. University; A Premier on Computer Aided Engg drawing; VTU Belgaum
2. Venugopal K.; Engineering Graphics; New Age
3. John KC; Engg. Graphics for Degree; PHI.
4. Gill P.S.; Engineering Drawing; kataria
5. Jeyopooan T.; Engineering drawing & Graphics Using AutoCAD; Vikas
6. Agrawal and Agrawal; Engineering Drawing; TMH

TEXT BOOKS

1. Bhatt N.D.; Engineering Drawing, Charotar
2. Engineering Drawing R. K. Dhawan

B.TECH.	BASIC MINING ENGINEERING	SEMESTER-I	3+0+0
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Unit I : Earth-Geology-Branches of Geology-origin, internal structural of earth, plate tectonics. Definitions of Geology-Definition of mineral and Rocks-Classification-Igneous-Sedimentary & Metamorphic- Examples of each Rock Type, Minerals and Ore classification of metallic and non metallic minerals. – Energy Minerals (Coal, Lignite, Petroleum Crude, Coal Bed Methane) – Ferrous Minerals(Iron, Manganese, Chromium etc), Atomic Minerals(Uranium, Illiminite, Beach Sand etc)–Non-Ferrous Minerals(Limestone, Dolomite, Bauxite, etc) – Metals & Non Metals - Classification of Coal (Peat-Lignite-Bituminous & Anthracite) - Uses of Coal & Lignite – Some important Minerals – Copper, Lead & Zinc, Chromite, Iron Ore, Limestone, Bauxite, Dolomite, Diamond, Gold etc – Their occurrence in India-CG & MP, -Uses. Prospecting-Exploration-Drilling for exploration-Ore/Coal Reserve Terms & Terminology.

Unit II : Mining administration-Mines-Safety-DGMS (Role of DGMS)-IBM-CIMFR-Exploration agencies-Coal India and its subsidiary companies-Neyveli Lignite Corporation Ltd, NMDC Ltd-Acts and Rules related to Mining in India (Mines Act, CMR, MMR, MVTR, etc)-Mine Planning

Unit III : Mining Terms – Opencast (OC) terms – Under Ground (UG) Mining terms Opencast vs UG Mining, How to select UG & OC Mining. – UG Mining – entry (Shaft & Incline – Shaft fittings-Winders-Pit Top, Pit Bottom), Different types of UG Mining of Coal & Metal;

What do we see/observe in UG Mine Pit-Top – Haulage-or Winder-Ventilation Fan-Lamp Room-First Aid Room-Unloading & Loading of men & material (into Incline or Shaft system)-Man riding system(in some Inclines) – Entrance to walking way-Conveyor or Rope haulage system(in Inclines) – Road ways, Method of Work (Bord & Pillar-Longwall etc)-Face, Roof & Floor-Support system-Track & Tubs, Locomotives-Drilling & Blasting Face-Development & Depillaring face-Ventilation Duct-Ventilating Doors-Lighting system-Transformer room-Priming station-First Aid Room/chamber-Rope Haulage system –Sump etc.

Unit IV : Opencast Mining – Stripping ratio-Box cut-Dump for OB and Coal/Ore-Main haul road-Benches-Bench dimensions-Production Face-Drilling & Blasting-Loading-Dumper transport-Ramp-Sump etc. Quarry operations-Shovel/Excavator Mining system-Dragline system – Unit Operations (Drilling-Blasting-Loading & Hauling)-Lighting-OB removal-Dumping of OB – HEMM selection and where to adopt?

Unit V : Role of Mining in economic development of India-MMDR Act 2015-National Mineral Policy-Mineral/Coal statistics etc.- Environmental impact of Mining (Land-Water-Air) etc

References:

- 1) Elements of Mining Technology, (Vol. I) by D.J. Deshmukh
- 2) Introduction to Mining by G.K. Pradhan
- 3) Training Aid (Mining) Published by AKS University

References

1. Indian Bureau of Mines, Minerals Year Book & other publications
2. Dr C.M.Kole, Khuli Khan Ka Ayojan (Hindi), CMPDIL, Ranchi
3. Dr. Calvin Konya; “Rock Blasting and Overbreak Control” Precision Blasting Services, Montville, Ohio
4. C.P. Chugh, High Technology in Drilling and Exploration. Pub: Oxford & IBH Publishing Co. Pvt.Ltd. New Delhi.
5. C.P. Chugh, Diamond Drilling. Pub: Oxford & IBH Publisher. Howard, L.Hartman, Introductory Mining Engineering, Pub: John Willey & Sons
6. Web sites : mines.nic.in, GSI, CMPDI, Coal India, NMDC etc.

Reference Journals

1. Journal of Institution of Engineers(India)-Mining
2. Journal of Mines, Metals & Fuels, Kolkata
3. Indian Mining & Engineering Journal, Bhubaneswar
4. Journal of Mining Engineers, MEAI, Hyderabad
5. Minetech, CMPDIL(Quarterly)
6. CMTM(Coal Mining Technology) Journal, IIMC Publication, Ranchi
7. Minerals & Metals Review, Bombay

B.TECH.	ENGINEERING MATHEMATICS-II	SEMESTER-I	4+1+0
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UNIT- 1 FOURIER SERIES AND FOURIER TRANSFORMATION

Periodic functions, Trigonometric series, Fourier series of period 2π , Euler's formulae, Functions having arbitrary period, Change of interval, Parseval's identity for Fourier series, Fourier series for Even and odd functions, Half range sine series and Half range cosine series. Fourier transformation, Fourier sine transformation, Fourier cosine transformation (elementary).

UNIT- 2 LAPLACE TRANSFORMATIONS

Laplace transform, Existence theorem (statement only), Laplace transform of elementary function, First Shifting theorem, Change of scale property, Division property, Multiplication property, Integral property, Laplace transform of Derivatives of $F(t)$. Laplace transform of periodic functions, Application to solve simple linear and simultaneous differential equations. Inverse Laplace transformation and its properties, Convolution theorem.

UNIT-3 Algebra of Logic and Graph Theory

Algebra of Logic: Boolean Algebra, Principal of Duality, Basic Theorems, Boolean expressions and minimal Boolean function: CNF and DNF, Switching circuit Diagram.

Graph: Definition, Sub graph simple graph, Weight Graph, Connected and disconnected Graph, complete Graph, Regular Graph, Walks, Paths, Circuits, Euler's Graph, degree of vertices, Length of edges, Matrix representation of a Graph, Adjacency and incidence matrices of a Graph, Isomorphic and Homomorphism Graph, Tree: Definition, types of tree.

UNIT-4 LINEAR AND NON- LINEAR PARTIAL DIFFERENTIAL EQUATION

Formation of PDE, Solution of equation by direct integration, linear Partial Differential Equation of first order : Lagrange's linear equation, Non-linear Partial Differential Equation of first order : Charpit's method. Solution of Linear Homogeneous Partial Differential Equations of nth order with constant coefficients.

UNIT-5 SERIES SOLUTION OF ODE AND SPECIAL FUNCTION

Second order linear differential Equation with variable coefficients: Inspection method, Reduction method, Change of independent variable, variation of parameter. Power Series solution of ordinary linear differential equation of second order with variable coefficients.

Text Books:

1. D.C. Agrawal, Engineering Mathematics-II, Sai prakasan.
2. H.K.Das, Basic Engineering Mathematics-II, S.Chand & company Ltd.
3. D. K. Jain., Engineering Mathematics-II
4. Sonendra Gupta, Engineering Mathematics-II, Dhanpat Rai Publishing Company(P) Ltd.

Reference Books:-

1. B.S.Grewal, Engineering Mathematics, Khanna Publishers, 2004.
2. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, 2005.
3. B.V.Ramana, Higher Engineering mathematics, Tata Mcgraw-Hills Publishing Company Limited.
4. Chandrika Prasad, Advanced Mathematic for Engineers, Prasad Mudranalaya, 1996.