

# Faculty of Engineering & Technology

Study and Evaluation Scheme

Of

Bachelor of Technology

B.Tech. (I Year)

**Group-A**

(for ME, CE & CT)

(Applicable w.e.f Academic Session 2013-17 till revised)



## AKS UNIVERSITY, SATNA

Study and Evaluation Scheme

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**AKS University, Satna**  
Sherganj, Panna Road, Satna (MP) 485001

**Study & Evaluation Scheme**  
**of**  
**Bachelor of Technology (CE, ME & CT)**  
**SUMMARY**

<b>Programme :</b>	<b>B.Tech (I Year)</b>		
<b>Duration :</b>	Four year full time (Eight Semesters)		
<b>Medium :</b>	English		
<b>Minimum Required Attendance :</b>	75 %		
<b>Maximum Credits:</b>	54 (Only First Year)		
<b>Evaluation Assessment :</b>	<b>Internal</b>	<b>External</b>	<b>Total</b>
	50	100	150

**Internal Evaluation (Theory/ Practical Papers)**

	<b>Sessional-I</b>	<b>Sessional-II</b>	<b>Continuous Assessment &amp; attendance</b>
	10	10	10+20= 30
<b>Duration of Examination :</b>	<b>External</b>	<b>Internal</b>	
	3 hrs.	2 hrs	

To qualify the course a student is required to secure a minimum of 36% marks in aggregate including the semester end examination, internal assessment evaluation (Both theory & Practical Papers)

A candidate who secures less than 36% or Grade 'D' of marks in a Subject/Paper(s) shall be deemed to have failed in that Subject/Paper(s). In case a student has secured less than 36% or Grade 'R' in Subject/Paper(s), he/she shall be deemed to re-appear (ATKT Examination) in Subject/Paper(s) to achieve the required percentage (Min. 36%) or grade (Min. D) in the Subject/Paper(s).

***Question Paper Structure***

- 1. The question paper shall consist of 26 questions in three Sections. Out of which Section-A shall be of Objective type 10 questions and will be compulsory. (weightage 2 marks each).*
- 2. Section-B shall contain 10 Short answer type questions and students shall have to answer any eight (weightage 5marks each).*
- 3. Out of the remaining six question s are long answer type questions, student shall be required to attempt any four questions. The weightage of Questions shall be 10 marks each.*

**AKS University, Satna ( M.P.)**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**B.Tech. & B.Tech+M.Tech (Integrated)**  
**Group-A**  
**(For Mechanical, Civil & Cement Tech)**  
**SEMESTER- I**

<b>Sr. No.</b>	<b>Sub. Code</b>	<b>SUBJECT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
1.	11MS101	ENGINEERING MATHEMATICS-I	3	2	-	4
2.	11CH102	ENGINEERING CHEMISTRY	3	1	-	4
3.	11ME103	BASIC MECHANICAL ENGINEERING	3	1	-	4
4.	11CE104	BASIC CIVIL & ENGG. MECHANICS	3	1	-	4
5.	11ME105	ENGINEERING DRAWING	2	-	-	2
6.	11EV106	ECOLOGY & ENVIRONMENTAL STUDIES	3	-	-	3
7.	11SD107	SSD-FUNCTIONAL ENGLISH-I	3	-	-	3
8.	11CH151	ENGINEERING CHEMISTRY-LAB	-	-	2	1
9.	11CE152	BASIC CIVIL & ENGG. MECHANICS - LAB	-	-	2	1
10.	11ME153	BASIC MECHANICAL ENGINEERING - LAB	-	-	2	1
11.	11ME154	ENGINEERING DRAWING- LAB	-	-	2	1
<b>Total</b>			<b>20</b>	<b>5</b>	<b>8</b>	<b>28</b>

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**SEMESTER- II**

<b>Sr. No.</b>	<b>Sub. Code</b>	<b>SUBJECT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
12.	11MS201	ENGINEERING. MATHEMATICS-II	3	1	-	4
13.	11PH208	ENGINEERING. PHYSICS	3	1	-	4
14.	11EE209	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	3	1	-	4
15.	11CA210	FUNDAMENTAL OF COMPUTER & PROGRAMMING	3	1	-	4
16.	11SS211-H/I	SPIRITUAL STUDIES- HINDUISM/ ISLAM	3	-	-	3
17.	11SD207	SSD-Functional English-II	3	-	-	3
18.	11PH251	ENGINEERING. PHYSICS LAB	-	-	2	1
19.	11EE252	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING - LAB	-	-	2	1
9.	11CA253	FUNDAMENTAL OF COMPUTER & PROGRAMMING -LAB	-	-	2	1
10	11ME254	WORKSHOP PRACTICE LAB	-	-	2	1
Total			18	4	8	26

**B.TECH  
SEMESTER-I  
ENGINEERING MATHEMATICS-I**

**UNIT-1 Differential Calculus**

Successive differentiation: Differentiation of  $n^{\text{th}}$  derivative of standard functions. Leibnitz theorem (without proof). Maclaurin's series and Taylor's series for one variable function. Partial differentiation, Homogeneous function, Euler's theorem, Application of partial differentiation in approximation and errors. Jacobians : Definition, Formulae {transformation from Cartesian to polar, spherical and cylindrical}. Maxima and minima of function of one and two variables. Radius of curvature, circle of curvature, centre of curvature, Involutives and Evolutes.

**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, Cayley-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, Application of double integral and triple integral to find the area and volume, Change of variables, Curve tracing. Lagrange's mean value theorem, Cauchy's mean value theorem.

**UNIT- 4 Vector Calculus**

Scalar and vector : Definition and terminology, dot and cross products, Vector and scalar point functions, Gradient of scalar function, Divergence of a vector point function, Curl of a vector point function and their physical interpretations, 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) and their applications.

**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, , General solution of ODE of first order and higher degree : Solvable for  $p$ ,  $x$  and  $y$ . Solution of Linear differential equations of  $n^{\text{th}}$  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  
SEMESTER-I  
Engineering Chemistry**

**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 environmeand 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<sup>2</sup>, sp<sup>3</sup>d, sp<sup>3</sup>d<sup>2</sup> and sp<sup>3</sup>d<sup>3</sup>). VSEPER theory, MOT and Molecular energy level diagram for, N<sub>2</sub>, O<sub>2</sub> and F<sub>2</sub> 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 hardning of cement.

Lubricnats:- 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 permulit 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  
S.S. Kumar  
O.P.Viramani, A.K.Narula

Polymer Science  
Applied Chemistry  
Appl. Che. (Theory Practice)

Tata McGraw Hill  
Tata McGrawHill2<sup>nd</sup>Edition2009  
NEWAGE Publication

**B.Tech.**  
**Semester-I**  
**BASIC MECHANICAL ENGG**

**UNIT- 1: Materials**

Classification of engineering material, composition of cast iron and carbon steels on iron-carbon diagram and their mechanical properties; Alloy steel and their applications; stress-strain diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials.

**UNIT-2: Measurement**

Temperature, pressure, velocity, flow, strain, force and torque measurement, concept of measurement error & uncertainty analysis, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set; introduction to lath, drilling, milling and shaping machines.

**UNIT-3: Fluids**

Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Bernoulli's equation for incompressible fluids, viscous and turbulent flow, working principle of fluid coupling, pumps, compressors, turbines, positive displacement machines and pneumatic machines. Hydraulic power & pumped storage plants for peak load management as compared to base load plants.

**UNIT-4: Thermodynamics**

First and second law of thermodynamics; steam properties, steam processes at constant pressure, volume, enthalpy & entropy, classification and working of boilers, efficiency & performance analysis, natural and induced draught, calculation of chimney height. Refrigeration, vapor absorption & compression cycles, coefficient of performance (COP), refrigerant properties & eco friendly refrigerants.

**UNIT-5: Reciprocating Machines**

Steam engines, hypothetical and actual indicator diagram; Carnot cycle and ideal efficiency; Otto and diesel cycles; working of two stroke & four stroke petrol & diesel IC engines

**Reference Books:-**

1. Narula; Material Science; TMH
2. Agrawal B & CM; Basic Mechanical Engg. Wiley India
3. Nag PK, Tripathi et al; Basic Mechanical Engg; TMH
4. Rajput; Basic Mechanical Engg;
5. Sawhney GS; Fundamentals of Mechanical Engg; PHI
6. Nakra and Chaudhary; Instrumentation & measurement; TMH
7. Nag PK; Engineering Thermodynamics; TMH

***List of Suggestive core Experiments***

1. Tensile testing of standard mild steel specimen.
2. Experiments on Bernoulli's theorem.
3. Flow measurements by ventury and orifice meters.
4. Linear and angular measurement using, Vernier; micrometer, slip gauge, dial gauge and sine-bar.
5. Study of different types of boilers and mountings.
6. Experiment on mini-boiler (50 Kg/Hour)
7. To find COP of a refrigeration unit.
8. Study of different IC engines & measurement of B.H.P. using rope/belt dynamometer.
9. Analysis of exhaust gases on petrol, diesel & biodiesel engines.

**B.Tech.  
Semester-I**

**BASIC CIVIL ENGG. & ENGG. MECHANICS**

**Unit I**

**Building Materials & Construction**

Stones, bricks, cement, lime, timber-types, properties, test & uses, laboratory tests concrete and mortar Materials: Workability, Strength properties of Concrete, Nominal proportion of Concrete preparation of concrete, compaction, curing.

Elements of Building Construction, Foundations conventional spread footings, RCC footings, brick masonry walls, plastering and pointing, floors, roofs, Doors, windows, lintels, staircases – types and their suitability

**Unit – II Surveying & Positioning:**

Introduction to surveying Instruments – levels, theodolites, plane tables and related devices. Electronic surveying instruments etc. Measurement of distances – conventional and EDM methods, measurement of directions by different methods, measurement of elevations by different methods. Reciprocal leveling.

**Unit –III Mapping & Sensing:**

Mapping details and contouring, Profile Cross sectioning and measurement of areas, volumes, application of measurements in quantity computations, Survey stations, Introduction of remote sensing and its applications.

**Engineering Mechanics**

**Unit - IV**

Forces and Equilibrium: Graphical and Analytical Treatment of Concurrent and nonconcurrent Coplanar forces, free Diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: Analysis of plane Trusses: Method of joints, Method of Sections. Frictional force in equilibrium problems

**Unit – V**

Centre of Gravity and moment of Inertia: Centroid and Centre of Gravity, Moment Inertia of Area and Mass, Radius of Gyration, Introduction to product of Inertia and Principle Axes. Support Reactions, Shear force and bending moment Diagram for Cantilever & simply supported beam with concentrated, distributed load and Couple.

**Reference Books:**

1. S. Ramamurtam & R.Narayanan; Basic Civil Engineering, Dhanpat Rai Pub.
2. Prasad I.B., Applied Mechanics, Khanna Publication.
3. Punmia, B.C., Surveying, Standard book depot.
4. Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI
5. S.P, Timoshenko, Mechanics of structure, East West press Pvt.Ltd.
6. Surveying by Duggal – Tata McGraw Hill New Delhi.
7. Building Construction by S.C. Rangwala- Charotar publications House, Anand.
8. Building Construction by Grucharan Singh- Standard Book House, New Delhi
9. Global Positioning System Principles and application- Gopi, TMH
10. R.C. Hibbler – Engineering Mechanics: Statics & Dynamics.
11. A. Boresi & Schmidt- Engineering Mechines- statics dynamics, Thomson' Books
12. R.K. Rajput, Engineering Mechanics S.Chand & Co.

**B.Tech.**  
**Semester-I**  
**Ecology & Environmental Studies**

**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  
Paryavaran Addhyan/Shiksha by: Dr Mahendra Kumar Tiwari University Publication Delhi  
A Text Book Of Environmental Science: P.C. Joshi & Namita Joshi, APH Publication Delhi  
Concept of Ecology: E.P.Odum  
A text book of Environmental science: SC Santra, Kalyani Publication  
Ecology and Environment: PD Saharma, Rastogi publication Meerut UP  
Introduction to Environmental Science by Y. Anjaneyulu BS Publication Hyderabad

**B.TECH  
SEMESTER-I  
ENGINEERING DRAWING & GRAPHICS**

**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. Jeyopooovan 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

## SSD - FUNCTIONAL ENGLISH-1

### 1<sup>st</sup> Semester

B.Tech (Engg.)/B.Tech (Ag.)/B.Tech (BT)/B.Sc.(Hons) Ag./B.Sc (BT)/B.Pharm/BBA/B.Com/B.com(Hons)/BCA(Hons)/Diploma (Engg.)

**INTRODUCTION:** Grammar is vital for the efficient use of language in academic as well as social environment. You already know that our speech is made up of sentences. A sentence is the basic unit of the written and spoken language. In this unit we will learn about various structural and functional parts of the sentence, their types ,subtypes and their usage.

#### Objectives:

- To enable the students to use verbs in appropriate contexts.
- To improve students' command of spoken English by practicing the functional language needed in different situations
- To familiarize the students with the concept of Functional English as a multi-focal discipline.
- To enable the students to use English correctly and confidently

#### UNIT-1

- a. Articles: Definite, Indefinite and Zero, Noun: numbers (singular and plural) and Personal Pronouns
- b. Introduction to verb :Ordinary and Auxiliary verbs, Regular and Irregular verbs
- c. **The Present Tense:** Present Continuous, Simple Present (Form and Use)

#### UNIT-2

**The Past and Perfect Tenses:** Simple Past, The Past Continuous, The Present Perfect, The Present Perfect Continuous, The Past Perfect and The Past Perfect Continuous. ( Form and Use)

#### UNIT-3

**The Future Tense:** Future Simple, The future Continuous ( Form and Use ),Causative Verbs,The Sequence of Tenses.

#### UNIT-4

Introduction to Modal Auxiliaries ( Form and Use )  
May and can for Permission and Possibility.  
Could for permission in the Past  
May ,Might for Possibility.  
Can and be able for Ability.  
Ought, Should, Must, have to,had to, Need for Obligation.

#### UNIT-5

The Conditional Sentences, The Passive Voice; Active Tenses and their Passive Equivalents including Modals, Use of Passive Structure.

**NOTE: Coverage of 1220 Regular (600) and Irregular Verbs (620) with their meaning and uses.**

**( Teachers are required to Introduce 25 verbs from the given verb list in every lecture)**

**B.Tech.**  
**Semester-II**  
**ENGINEERING MATHEMATICS-II**

**UNIT- 1 FOURIER SERIES AND FOURIER TRANSFORMATION**

Periodic functions, Trigonometric series, Fourier series of period  $2\pi$ , 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. Definition and Properties of Fourier transformation, Fourier sine transformation, and Fourier cosine transformation, convolution theorem, Z-transformation.

**UNIT- 2 LAPLACE TRANSFORMATIONS**

Laplace transform, Existence theorem (statement only), Laplace transform of elementary function, First and Second Shifting theorem, Change of scale property, Division property, Multiplication property, Integral property, Laplace transform of Derivatives of  $F(t)$ . Evaluation of improper integrals using Laplace transform, Laplace transform of Unit step (Heaviside) functions and Impulse (Dirac delta) functions, 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, Principle 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 and networks.

**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 and Non- Homogeneous Partial Differential Equations of  $n$ th order with constant coefficients,

Application of PDE: One dimensional Heat Equation, One dimensional wave equation, Solution of Laplace's equation in two dimension and problems.

**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. Solution of Bessel's differential equation and Legendre's differential equation by series solution method.

**Text Books :**

5. D.C. Agrawal, Engineering Mathematics-II, Sai prakasan.
6. H.K. Das, Basic Engineering Mathematics-II, S.Chand & company Ltd.
7. D. K. Jain., Engineering Mathematics-II
8. 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.

## B.Tech.

### Semester-II ENGINEERING PHYSICS

**Objective-** Engineering physics includes the study of a large number of diverse topics all related to things that go on in the world around us. It aims to give an understanding of this world both by observation and prediction of the way in which objects will behave. Concrete uses of physical principles and analysis in various fields of engineering and technology are given prominence in the course content.

#### 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 methods, 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.

**fiber 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 its classification, intrinsic & extrinsic semiconductor, Zener diode, tunnel diode, P-N junction and its applications, Hall effect.

**Superconductivity :-** Introduction, types of superconductor, Meissner effect, Type-I and Type-II Superconductors, properties of superconductors, and its applications.

#### Unit-5 Nano 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 composite.

#### 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  
SEMESTER-II  
BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

**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.
9. Transister Application as Amplifier & Switch.

**B.TECH  
SEMESTER-I  
Fundamentals of Computers & Programming**

**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.**  
**Semester-I**  
**WORKSHOP PRACTICE**

**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 planing 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 Practises -, Vol. I & II.
- 5 Jain. R.K. Production Technology -

# SSD- CSEP(COMMUNICATION SKILLS ENHANCEMENT PROGRAM)

## FUNCTIONAL ENGLISH-II

### 2<sup>nd</sup> Semester

B.Tech (Engg.)/B.Tech (Ag.)/B.Tech (BT)/B.Sc.(Hons) Ag./B.Sc (BT)/B.Pharm/BBA/B.Com/B.com(Hons)/BCA(Hons)/Diploma (Engg.)

#### Unit-1

Subject verb Agreement, Adjectives and Comparison of Adjectives, Determiners

#### Unit-2

Introduction to Prepositions ( Use and omission), Preposition of travel and movement, Preposition of Date and Time, Relations expressed by Preposition, Words followed by preposition, Finite and Non Finite Clauses& Uses of Let.

#### Unit-3

Conjunction: Co-ordinating and Subordinating, Sentences :Simple, Compound and Complex

#### Unit-4

Statement : Direct & Indirect, Phrasal Verb, Antonyms, Synonyms, Letter Writing: Formal (Parts& Layout)

#### Unit-5

**Communication:** Definition & Meaning of Communication, Importance & Process, Types: Verbal & Non-Verbal, Barriers, and how to overcome these barriers.

#### Reference:

Thomson, A.J and A.V. Martinet. *A Practical English Grammar*. Oxford University Press: New York.

Wren and Martin. *High School English Grammar and Composition*. S.Chand & Company Pvt. Ltd. : New Delhi

Greenbaum, Sidney. *Oxford English Grammar*. Oxford University Press: New York.

Rudzka-Ostyn, Brygida. (2003) *Word Power: Phrasal Verbs and Compounds*. Mouton de Gruyter, Berlin: New York

Chambers Dictionary of Antonyms & Synonyms

Hudson, Richard. *English Grammar*. Routledge: New York.

Rodrigues, M.V. *Effective Business Communication*. Concept Publishing Company: New Delhi.

Raman, Meenakshi & Sangeeta Sharma. *Communication Skills*. Oxford University Press

**SPIRITUAL STUDIES (HINDUISM)**  
**SRIMADBHAGWADGITA**  
**Compulsory for All Programme/ Courses**  
**श्रीमद्भगवद्गीता**

**UNIT-I**

**अध्याय—एक**

अर्जुन की मोहग्रस्तता,

**अध्याय—दो**

अर्जुन का नैराश्य, शरीर और आत्मा का विश्लेषण, कर्तव्यपालन, निष्काम कर्मयोग, स्थितप्रज्ञ एवं तापत्रय

**अध्याय—तीन**

कर्मयोग, षट्ठिकार

**UNIT-II**

**अध्याय—चार**

गीता का इतिहास, भगवान के प्राकट्य का कारण एवं उनकी सर्वज्ञता

**अध्याय—पांच**

ईश्वरभावनाभावित कर्म

**अध्याय—छः**

ध्यान योग या सांख्य योग, सिद्धि या समाधियोग

**अध्याय—सात**

परा और अपरा शक्ति, पुण्यात्मा मनुष्य के लक्षण

**UNIT-III**

**अध्याय—आठ**

ब्रह्मा, आत्मा, अधिभूत, अधिदैव, अधियक्ष, मुक्तिलाभ की विधि

**अध्याय—नौ**

परमगुहाज्ञान

**अध्याय—दस**

श्रीभगवान का ऐश्वर्य

**UNIT-IV**

**अध्याय—ग्यारह**

श्रीभगवान का विराटस्वरूप

### **अध्याय—बारह**

भक्तियोग का वर्णन, अव्यक्त की उपासना में क्लेश, शुद्ध भक्त के लक्षण

### **अध्याय—तेरह**

क्षेत्र, क्षेत्रज्ञ एवं कर्मक्षेत्र की परिभाषा, ज्ञान, ज्ञेय, प्रकृति एवं परमात्मा, चेतना

### **अध्याय—चौदह**

त्रिगुण स्वरूप

### **अध्याय—पंद्रह**

परम पुरुष का स्वरूप, जीव का स्वरूप

## **UNIT-V**

### **अध्याय—सोलह**

दैवीय स्वभाव, आसुरी स्वभाव

### **अध्याय—सत्रह**

श्रद्धा के तीन प्रकार, भोजन के प्रकार, यज्ञ के प्रकार, तप के प्रकार, दान के प्रकार, ऊँ कार का प्रतिपादन, सत्, असत् का प्रतिपादन

### **अध्याय—अठारह**

सन्यास एवं त्याग में अंतर, त्याग के प्रकार, कर्म के कारण, कर्म के प्रेरक तत्व, कर्म के प्रकार, कर्ता के प्रकार, चार वर्णों के स्वाभाविक गुण, प्रभु के प्रति समर्पण भाव

## **Recommended books**

### **संदर्भ ग्रंथ सूची**

1. श्रीमद्भगवद्गीता—गीताप्रेस, गोरखपुर।
2. श्रीमद्भगवद्गीता—मधुसूदनसरस्वती, चौखम्भा संस्कृत संस्थान, वाराणसी, 1994।
3. श्रीमद्भगवद्गीता—एस.राधाकृष्णन् कृत व्याख्या का हिन्दी अनुवाद, राजपाल एण्ड सन्स, दिल्ली, 1969।
4. श्रीमद्भगवद्गीता—श्रीमद् भक्तिवेदांत स्वामी प्रभुपाद, भक्तिदांत बुक ट्रस्ट, मुंबई, 1996।
5. Srimadbhagawadgita-English commentary by Jaydayal Goyandaka, Gita Press, Gorakhpur, 1997.

**SULLABUS**  
**SPIRITUAL STUDIES (ISLAM)**  
**Compulsory for All Programme/ Courses**

**UNIT-I**

**इस्लाम धर्म:-** 6वीं शताब्दी में अरब की (राजनैतिक, धार्मिक, सामाजिक, आर्थिक परिस्थितियां व कबीलाई व्यवस्था)

मोहम्मद साहब का जीवन परिचय, संघर्ष व शिक्षाएं, इस्लाम का प्रारम्भ, इस्लाम क्या है और क्या सिखाता है, ईमान-ईमाने मोजम्मल, ईमाने मोफस्सल।

**UNIT-II**

**इस्लाम धर्म की आधारभूत बातें:-**

तोहीद, कल्मा-कल्मा-ऐ-शहादत, कल्मा-ऐ-तैय्यबा, नमाज, रोजा, जकात और, हज का विस्तारपूर्वक अध्ययन

**UNIT-III**

**खोदा-तआला की किताबें (आसमानी किताबें):-**

“वही” की परिभाषा, तौरत, जुबूर, इंजील का परिचय, पवित्र कुरान का संकलन, पवित्र कुरान का महत्व, कुरान की मुख्य आयतें, पवित्र कुरान और हाफिजा

**UNIT-IV**

**पवित्र हदीसों और सुन्नतें:-**

हदीस और सुन्नत क्या है, हदीस और सुन्नत का महत्व, कुछ प्रमुख सुन्नतें और हदीसों का अध्ययन, सोकर उठने की सुन्नतें, लेबास की सुन्नतें, बीमारी और अयादत की सुन्नतें, सफर की सुन्नतें

**UNIT-V**

**इस्लाम धर्म की अन्य प्रमुख बातें:-**

मलाऐका या फरिशते (देवदूत), खुदा के रसूल, खुदा के पैगम्बर, नबी और रसूल में अन्तर, कयामत, सहाबा, खलीफा, मोजिजा और करामात, एबादत, गुनाह (कुफ्र और शिर्फ), माता-पिता, रिश्तेदार व पड़ोसी के अधिकार, इस्लाम में औरत के अधिकार, इस्लाम में सब्र और शुक्र, इस्लाम में समानता और भाईचारा

**ADDITIONAL KNOWLEDGE:-**

IN THE LIGHT OF ‘QURAN’ AND ‘HADEES’, TEN POINTS WILL BE DELIVERED TO THE STUDENTS DAILY, IN A SECULAR COUNTRY THE STUDENTS SHOULD KNOW THE PHILOSOPHY OF OTHER RELIGION ALSO SUCH AS “JAINISM”, “BUDHISM” AND “SANATAN DHARMA”.