Syllabus of Physics I & II

DEPARTMENT OF PHYSICS

V.B.S. Purvanchal University, Jaunpur (U.P.)
Department of Physics
Faculty of Engineering &Technology

Syllabus (2019-20)
PHYSICS-I

Module – 1: Relativistic Mechanics
Frame of reference, Inertial & non-inertial frames, Galilean transformations, Michelson-Morley experiment, Postulates of special theory of relativity, Lorentz transformations, Length contraction, Time dilation, Velocity addition theorem, Variation of mass with velocity, Einstein's mass energy relation, Relativistic relation between energy and momentum, Massless particle.

Module- 2: Wave Optics
Coherent sources, Interference in uniform and wedge-shaped thin films, Necessity of extended sources, Newton's Rings and its applications. Fraunhoffer diffraction at single slit and at double slit, absent spectra, Diffraction grating, Spectra with grating, Dispersive power, resolving power of grating, Rayleigh's criterion of resolution, Resolving power of grating.

Module- 3: Polarization and Laser
Polarization- Phenomena of double refraction, Nicol prism, Production and analysis of plane, circularly and elliptically polarized light, Fresnel's theory of optical activity, Polarimeters.
Laser: Absorption of radiation, Spontaneous and stimulated emission of radiation, Einstein's coefficients, Population inversion, various levels of Laser, Ruby Laser, He-Ne Laser, Laser applications.

Module- 4: Fiber Optics & Holography
Fibre Optics: Introduction to fiber optics, Acceptance angle, Numerical aperture, Normalized frequency, Classification of fibre, Propagation mechanism and communication in optical fibre, Attenuation and Dispersion in optical fibers.
Holography: Basic Principle of Holography, Construction and reconstruction of Image on hologram and applications of holography.

Reference Books:
1- Concept of Modern Physics - Arthur Beiser (Tata Mc-Graw Hill)
2- Introduction to Special theory of Relativity - Robert Resnick Wiley
3- Optics - Ajoy Ghatak (TMH), Brijlal & Subramanian (S. Chand)
4- Optical Fibre & Laser - Anuradha De. (New Age)
5- Fundamental of Physics - Resnick, Halliday & Walker (Wiely)
6- Principles of Physics - R.A. Serway& J.W. Jewett (Thomson Asia Pvt. Ltd.)

Course Outcomes:
1. To develop the understanding of Special theory of relativity.
2. To understand the physical optics and basic principle and application of Laser.
3. To understand the basic principle and application of fibre optics and holography.

V.B.S. Purvanchal University, Jaunpur (U.P.)
<u>Department of Physics</u>
Faculty of Engineering &Technology
<u>Syllabus (2019-20)</u>
PHYSICS-II

Module -1: Quantum Mechanics
Black body radiation, Stefan's law, Wien's law, Rayleigh-Jeans law and Planck's law, Wave particle duality, De Broglie concept of Matter waves, Phase and Group velocities, Davisson-Germer experiment, Heisenberg uncertainty principle and its applications, Wave function and its significance, Schrodinger wave equation, and its application-particle in one-dimensional box. Diffraction of X-rays by crystal planes, Bragg's spectrometer, Compton's effect.

Module- 2: Electromagnetic Field Theory
Continuity equation for current density, Displacement current, modifying equation for the curl of magnetic field to satisfy continuity equation, Maxwell's equations in vacuum and in non-conducting medium, Energy in an electromagnetic field, Poynting vector and Poynting theorem, Plane electromagnetic waves in vacuum and their transverse nature. Relation between electric and magnetic fields of an electromagnetic wave, Energy and momentum carried by electromagnetic waves, Resultant pressure, Skin depth.

Module- 3: Dielectric and Magnetic Properties of Materials
Dielectric constant and Polarization of dielectric materials, Types of Polarization (Polarizability), Equation of internal fields in liquid and solid (One- Dimensional), Claussius-Mussoti- Equation, Ferro and Piezo electricity (Qualitative), Frequency dependence of dielectric constant, Dielectric Losses, Important applications of dielectric material, Langevin's theory for dia and paramagnetic material, Phenomena of hysteresis and its applications.

Ultrasonics: Generation, detection and application of ultrasonic

Module- 4: Superconductivity and Nanomaterials
Superconductivity Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect), Type I and Type II superconductors, Temperature dependence of critical field, BCS theory (Qualitative), High temperature superconductors. Characteristics of superconductors in superconducting state, Applications of Super-conductors.

Introduction to Nanomaterials- Basic principle of nanoscience and technology, creation and use of buckyballs, structure, properties and uses of Carbon nanotubes, Applications of nanotechnology.

Reference Books:

1- Concept of Modern Physics -   Aurthur Beiser (Tata Mc-Graw Hill)
2- Solid State Physics -   C. Kittel 7thEdition (Wiley Eastern)
3- Solid State Physics   -   S.O.Pillai 5thEdition (New Age International)
4- Nanotechnology   -   Richard Booker and Earl Boysen(Wiley Publishing)

Course Outcomes:
1. To solve the classical and wave mechanics problems.
2. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory.
3. To aware of dielectrics, magnetic properties of materials and ultrasonic waves.
4. To understand the basics of superconductivity and nanotechnology

Syllabus of Chemistry I & II

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Environmental Science

KAE-104/204

For B.Tech. First Year Students

DEPARTMENT OF CHEMISTRY

V.B.S. Purvanchal University, Jaunpur (U.P.)

Department of Chemistry

Faculty of Engineering &Technology

Syllabus (2019-20)

CHEMISTRY-I

Module 1:   Atomic & Molecular Structure

Molecular Orbital Theory (MOT)- Important Features, LCAO methods, Type and formation of Molecular Orbitals (bonding & anti bonding), Sigma & Pi bonds, Molecular energy level diagram of Homo nuclear Diatomic Molecules (i.e. H_2, He_2, Be_2, B_2, C_2, N_2, O_2, F_2 and Ne_2), Magnetic properties', Bond order, Bond Energy & Bond length, Concept of Hydrogen Bonding in Biological System.

Module 2:   Chemical Kinetics

Introduction to the Chemical Kinetics, Rate of Chemical reaction, Factor affecting the rate of reaction (Concentration, Temperature, Pressure and Catalyst), Order and Molecularity of reaction, rate law, rate constant and its Unit, Differential and Integral rate constant for ZERO and First Order reaction, Half-life.

Module 3:   Phase Rule

Define the term Phase, Component, Degree of Freedom, Gibbs Phase rule (thermodynamic derivation), Phase Equilibrium & Phase diagram of one component system.

Module 4:   Mechanistic concept of Organic reaction

Bond Fission, Attacking reagent, Reaction intermediates (i.e. Carbocation, Carbon anion and Free radicles), Stability, Electronic effects (Inductive effect, Mesomeric Effects, Electrometric effects and Hyper conjugative effects) Type of Nucleophilic Substitution Reaction, Mechanism of Nucleophilic substitution reaction (i.e. SN^1 & SN^2).

Module 5:   Water Analysis

Hard & Soft Water (Temporary & Permanent Hardness) Quality aspect of water, Technique for water softening (i.e. Lime soda, Zeolite and Ion Exchange Resin Methods).

Reference Book:	
1. University Chemistry by B.H. Mahan	4. Physical chemistry by S. Glasstone
2. University Chemistry by C.N. R. Rao	5. Engineering Chemistry by S.S Dara
3. Organic Chemistry by I.L Finar	6. Polymer Chemistry by W.Billmeyer

V.B.S. Purvanchal University, Jaunpur (U.P.)

Department of Chemistry

Faculty of Engineering &Technology

Syllabus (2019-20)

CHEMISTRY-II

Module 1:   **State of Matter**

Elementary ideas of solid stats, Band theory of solid, Unit cell (Cubic system) point defects in solid, Techniques for structure determination of solid material (i.e. Braggs Equation), Structure and application of Graphite & Fullerenes, Nanomaterial's and application in drug delivery.

Module 2:   **Electrochemistry and Corrosion**

Nernst Equation and application, Relation of EMF with thermodynamic function (ΔH, ΔF and ΔS), Lead Storage Battery.
Corrosion, cause, effect and prevention.

Module 3:   **Spectroscopic Techniques**

Elementary ideas of Lambert & Beer Laws, Principle and application of UV, IR and Visible Spectroscopy.

Module 4:   **Polymers & Organometallics**

Polymer; Basic concepts & Classification of polymer, and biodegradable polymers. Preparation and application of some industrially important polymers (Buna S, Buna-N, Neoprene, Nylon-6, Nylon-6,6 and Terylene). General methods of synthesis of Organometallic compounds (Grignard reagent) and their applications.

Module 5:   **Fuels**

Classification of Fuels, Analysis of Coals, Calorific value of Fuels, Net calorific value, Gross Calorific Value and Determination of Calorific Value (i.e. Bomb Calorimeter).

Reference Book:

1. University Chemistry by B.H. Mahan
2. University Chemistry by C.N. R. Rao
3. Organic Chemistry by I.L Finar
4. Physical chemistry by S. Glasstone
5. Engineering Chemistry by S.S Dara
6. Polymer Chemistry by W.Billmeyer

V.B.S. Purvanchal University, Jaunpur (U.P.)

Department of Chemistry

Faculty of Engineering &Technology

Syllabus (2019-20)

Environmental Science
(KAE 104/204)

Module 1:	Definition, Scope & Importance, Need for Public Awareness-Environment definition, Ecosystem. Balanced Ecosystem, Human Activities- Food Shelter, Economic and Social Security. Effect of Human activities on Environment-Agriculture, Housing, Industry, Mininig and Transportation activities, Basics of Environmental Impact Assessment. Sustainable Development.
Module 2:	**Natural Resources**- Water Resources- Availability and Quality aspects. Water borne diseases; Water induced diseases. Fluride problem in drinking water. Minerals Resources, Forest Wealth, Materials Cycle-Carbon, Nitrogen and Sulphur Cycles.

Energy- Different type of Energy, Electro-magnetic radiation. Conventional and Non- Conventional sources. Hydroelectric, Fossil Fuel Based, Nuclear Solar, Biomass, and Biogas. Hydrogen as an alternative future source of energy. |
| **Module 3:** | Environmental Pollution and their effects. Water Pollution, Land Pollution, Noise Pollution, Public Health aspects. Air Pollution, Solid Waste management.

Current Environmental issue of importance: Population Growth, Climate Change and Global Warming-Effects, Urbanization, Automobile Pollution. ACID RAIN, OZONE layer depletion, Animal Husbandry |
| **Module 4:** | Environmental Protection Law, Role of Government, Legal aspects, initiatives by Non-Governmental Organization (NGO). Environmental Education, Women Education. |

Text Book/Reference Book:

1. Environmental Studies – Benny Joseph – Tata McGraw Hill 2005
2. Environmental Studies- Dr. D.L Manjunath, Pearson Education 2006
3. Environmental Studies- R. Rajagopalan – Oxford Publication 2005
4. Environmental Studies- R. Rajagopalan – Oxford Publication 2005
5. Principle of Environmental Science and Engineering – P. Venugopalan Rao, Prentice Hall, India
6. Environmental Science & Engineering – Meenakshi, Prentice Hall, India

Syllabus of Mathematics I,II,III

For B.Tech. Ist Year Students

DEPARTMENT OF MATHEMATICS

V.B.S. Purvanchal University, Jaunpur (U.P.)

Department of Mathematics

Faculty of Engineering &Technology

Syllabus (2019-20)

Mathematics-I

L 3 T 1   **MAX. MARKS 100**

Module 1:   Matrices   **[08]**

Types of Matrices: Symmetric, Skew-symmetric and Orthogonal Matrices; Hermitian and Skew Hermitian Matrices, Inverse and Rank of matrix using elementary transformations, Rank-Nullity theorem; System of linear equations, Characteristic equation, Cayley-Hamilton Theorem and its applications, Eigen values and Eigenvectors; Diagonalisation of a Matrix.

Module 2:   Differential Calculus- I   **[08]**

Introduction to limits, continuity and differentiability, Rolle's Theorem, Lagrange's Mean value theorem and Cauchy Mean value theorem, Successive Differentiation (nth order derivatives), Leibnitz theorem and its applications, Envelope, Involutes and Evolutes, Curve tracing: Cartesian and Polar co-ordinates.

Module 3:   Differential Calculus-II   **[08]**

Partial derivatives, Total derivative, Euler's Theorem for homogeneous functions, Taylor and Maclaurin's theorems for a function of one and two variables, Maxima and Minima of functions of several variables, Lagrange Method of Multipliers, Jacobians, Approximation of errors.

Module 4:   Multivariable Calculus-I   **[08]**

Multiple integration: Double integral, Triple integral, change of order of integration, Change of variables, Applications: Areas and volumes, Centre of mass and Centre of gravity (Constant and variable densities).

Module 5:   Vector Calculus   **[08]**

Vector differentiation: Gradient, Curl, Divergence and their Physical interpretations, Directional derivatives, Tangent and Normal planes. Vector Integration: Line integral, Surface integral, Volume integral, Gauss's Divergence theorem, Green's theorem, Stoke's theorem (without proof) and their applications.

COURSE OUTCOMES

1. Solving linear simultaneous equations.
2. Understanding the concept of limit, continuity and differentiability and apply in the study of Rolle's, Lagrange and Cauchy mean value theorem and Leibnitz theorems.
3. Applications of partial derivatives in maxima, minima, series expansions of functions and Jacobians.
4. Evaluation of multiple integrals and their applications for finding area, volume, centre of mass and centre of gravity.
5. Familiarity with concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals.

Text Books:

1. **B. V. Ramana**, Higher Engineering Mathematics, Tata Mc Graw-Hill Publishing Company Ltd., 2008.
2. **B. S. Grewal**, Higher Engineering Mathematics, Khanna Publisher, 2005.
3. **R K. Jain & S R K. Iyenger**, Advance Engineering Mathematics, Narosa Publishing House 2002.

Reference Books

1. **E. Kreyszig,** Advance Engineering Mathematics, John Wiley & Sons, 2005.
2. **Peter V. O'Neil**, Advance Engineering Mathematics, Thomson (Cengage) Learning, 2007.
3. **Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas**, Calculus, Eleventh Edition, Pearson.
4. **D. Poole, Linear Algebra** : A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
5. **Ray Wylie C and Louis C Barret,** Advanced Engineering Mathematics, Tata Mc-Graw-Hill; Sixth Edition.
6. **Chandrika Prasad**.Advanced Engineering Mathematics,
7. **Murray Spiegel**, Schaum's Outline of Advanced Mathematics for Engineers and Scientists

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V.B.S. Purvanchal University, Jaunpur (U.P.)
Department of Mathematics
Faculty of Engineering &Technology

Syllabus (2019-20)
Mathematics-II

L 3 T 1	MAX MARKS 100

Module 1:   Ordinary Differential Equation of Higher Order   [10]
Linear differential equation of nth order with constant coefficients, Simultaneous linear differential equations, second order linear differential equations with variable coefficients, Solution by changing independent variable, Reduction of order, Normal form, Method of variation of parameters, Cauchy-Euler equation, Series solutions (Frobenius Method).

Module 2:   Multivariable Calculus-II   [08]
Improper integrals, Beta & Gama function and their properties, Dirichlet's integral and its applications, Application of definite integrals to evaluate surface areas and volume of revolutions.

Module 3:   Sequences and Series   [08]
Definition of Sequence and series with examples, Convergence of sequence and series, Tests for convergence of series, Fourier series, Half range Fourier sine and cosine series.

Module 4:   Complex Variables – Differentiation   [08]
Limit, Continuity and differentiability, Functions of complex variables, Analytic functions, Cauchy-Riemann equations (Cartesian and Polar form), Harmonic function, Analytic functions, Conformal mapping, Mobius transformation and their properties

Module 5:   Complex Variables –Integration   [08]
Complex integrals, Contour integrals, Cauchy- Goursat theorem, Cauchy integral formula, Taylor's series, Laurent's series, Liouvilles's theorem, Singularities, Classification of Singularities, zeros of analytic functions, Residues, Cauchy Residue theorem, Evaluation of real integrals of the type $\int_{-\infty}^{\infty} f(x)\, dx$ and $\int_{0}^{\pi} f(cos\theta, sin\theta)\, d\theta$.

COURSE OUTCOMES

1. Understand the concept of differentiation and apply for solving differential equations.
2. Remember the concept of definite integral and apply for evaluating surface areas and volumes.
3. Understand the concept of convergence of sequence and series. Also evaluate Fourier series
4. Illustrate the working methods of complex functions and apply for finding analytic functions.

5. Apply the complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals.

Text Books:

1. **B. V. Ramana**, Higher Engineering Mathematics, Tata McGraw-Hill Publishing Company Ltd., 2008.
2. **B. S. Grewal,** Higher Engineering Mathematics, Khanna Publisher, 2005.
3. **R. K. Jain & S. R. K. Iyenger**, Advance Engineering Mathematics , Narosa Publishing -House, 2002.

Reference Books

1. **E. Kreyszig**, Advance Engineering Mathematics, John Wiley & Sons, 2005.
2. **Peter V. O'Neil**, Advance Engineering Mathematics, Thomson (Cengage) Learning, 2007.
3. **Maurice D. Weir, Joel Hass, Frank R.Giordano, Thomas,** Calculus, Eleventh Edition, Pearson.
4. **G.B Thomas, R L Finney**, Calculus and Analytical Geometry, Ninth Edition Pearson, 2002.
5. **James Ward Brown and Ruel V Churchill,** Fourier Series and Boundary Value Problems, 8th Edition-Tata McGraw-Hill
6. **D. Poole** , Linear Algebra : A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
7. **Veerarajan T**., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
8. **Charles E Roberts Jr**, Ordinary Diffrential Equations, Application, Model and Computing, CRC Press T&F Group.
9. **James Ward Brown and Ruel V Churchill**, Complex Variables and Applications, 8th Edition, Tata McGraw-Hill.

V.B.S. Purvanchal University, Jaunpur (U.P.)

Department of Mathematics

Faculty of Engineering &Technology

Syllabus (2019-20)

Mathematics-III/IV(KAS301/401)

L 3 T 1   **MAX MARKS 100**

Partial Differential Equations, Probability and Statistics

Module I: **Partial Differential Equations**

Origin of Partial Differential Equations, Linear and Nonlinear Partial Differential Equations of first order, Lagrange's Equations, Charpit's method, Cauchy's method of Characteristics, Solution of Linear Partial Differential Equation of Higher order with constant coefficients, Equations reducible to linear partial differential equations with constant coefficients.

Module II: **Applications of Partial Differential Equations**:

Classification of linear partial differential equation of second order, Method of separation of variables, Solution of wave and heat conduction equation up to two dimension, Laplace equation in two dimensions, Equations of Transmission lines.

Module III: **Statistical Techniques I**:

Introduction: Measures of central tendency, Moments, Moment generating function (MGF), Skewness, Kurtosis, Curve Fitting, Method of least squares, fitting of straight lines, Fitting of second degree parabola, Exponential curves, Correlation and Rank correlation, Regression Analysis: Regression lines of y on x and x on y, regression coefficients, properties of regressions coefficients.

Module IV: **Statistical Techniques II:**

Probability and Distributions: Introduction, Addition and multiplication law of probability, Conditional probability, Baye's theorem, Random variables (Discrete and Continuous Random variables), Probability mass function and Probability density function, Expectation and variance, Discrete and Continuous Probability distribution: Binomial, Poisson and Normal distributions.

Module V: Statistical Techniques III:

Sampling and Testing of Hypothesis: Introduction, Sampling Theory (Small and Large) , Hypothesis, Null hypothesis, Alternative hypothesis, Testing a Hypothesis, Level of significance, Confidence limits, Test of significance of difference of means, Z-test, t-test and Chi-square test.

COURSE OUTCOMES

	Course Outcome (CO)	Bloom's Knowledge Level (KL)
	At the end of this course, the students will be able to:	
CO 1	Remember the concept of partial differential equation and to solve partial differential equations	K_1 & K_3
CO 2	Analyze the concept of partial differential equations to evaluate the problems concerned with partial differential equations	K_4 & K_5
CO 3	Understand the concept of correlation, moments, skewness and kurtosis and curve fitting	K_2
CO 4	Remember the concept of probability to evaluate probability distributions	K_1 & K_5
CO 5	Apply the concept of hypothesis testing and statistical quality control to create control charts	K_3 & K_6

K_1 –Remember, K_2 – Understand, K_3 – Apply, K_4 – Analyze, K_5 – Evaluate, K_6 – Create

Evaluation methodology to be followed:

The evaluation and assessment plan consists of the following components:

   a. Class attendance and participation in class discussions etc.
   b. Quiz.
   c. Tutorials and assignments.
   d. Sessional examination.
   e. Final examination.

Award of Internal/External Marks:

Assessment procedure will be as follows:
1. These will be comprehensive examinations held on-campus (Sessionals).
2. Quiz.
   a. Quiz will be of type multiple choice, fill-in-the-blanks or match the columns.
   b. Quiz will be held periodically.
3. Tutorials and assignments
   a. The assignments/home-work may be of multiple choice type or comprehensive type at least one assignment from each Module/Unit.

b. The grades and detailed solutions of assignments (of both types) will be accessible online after the submission deadline.
4. Final examinations.

Text Books

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003
3. S. Ross: A First Course in Probability, 6th Ed., Pearson Education India, 2002.
4. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
5. SC Gupta and VK Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, Delhi

Reference Books

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
2. R.K. Jain and S.R.K. Iyenger: Advance Engineering Mathematics; Narosa Publishing House, New Delhi.
3. J.N. Kapur: Mathematical Statistics; S. Chand & Sons Company Limited, New Delhi.

DEPARTMENT OF ELECTRICAL ENGINEERING

Syllabus of B.Tech. First Year Students

BASIC ELECTRICAL ENGINEERING

BASIC ELECTRICAL ENGINEERING

Module - 1: DC Circuits [08]

Electrical circuit elements (R, L and C), Concept of active and passive elements, voltage and current sources, concept of linearity and linear network, unilateral and bilateral elements, Kirchhoff's laws, Loop and nodal methods of analysis, Star-delta transformation, Superposition theorem, Thevenin theorem, Norton theorem, Maximum Power Transfer Theorem.

Module - 2: Steady- State Analysis of Single Phase AC Circuits [10]

Representation of Sinusoidal waveforms – Average and effective values, Form and peak factors, Concept of phasors, phasor representation of sinusoidally varying voltage and current.

Analysis of single phase AC Circuits consisting of R, L, C, RL, RC, RLC combinations (Series and Parallel), Apparent, active & reactive power, Power factor, power factor improvement. Concept of Resonance in series & parallel circuits, bandwidth and quality factor.

Three phase balanced circuits, voltage and current relations in star and delta connections.

Module - 3 : Transformers [08]

Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

Module –4 : Electrical machines [08]

DC machines: Principle & Construction, Types, EMF equation of generator and torque equation of motor, applications of DC motors (simple numerical problems)

Three Phase Induction Motor: Principle & Construction, Types, Slip-torque characteristics, Applications (Numerical problems related to slip only)

Single Phase Induction motor: Principle of operation and introduction to methods of starting, applications.

Three Phase Synchronous Machines: Principle of operation of alternator and synchronous motor and their applications.

Module –5 : Electrical Installations [06]

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Importance of earthing. Types of Batteries, Important characteristics for Batteries. Elementary calculations for energy consumption and savings, battery backup.

COURSE OUTCOMES

1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits.
2. Analyze the steady state behavior of single phase and three phase AC electrical circuits.
3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.
4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.
5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.

Text Books:

1. Ritu Sahdev, "Basic Electrical Engineering", Khanna Publishing House.

2. S. Singh, P.V. Prasad, "Electrical Engineering: Concepts and Applications" Cengage.

3. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill.

4. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill.

Reference Books:

1. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.

2. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press.

3. V. D. Toro, "Electrical Engineering Fundamentals", Pearson India.

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DEPARTMENT OF MECHANICAL ENGINEERING

Engineering Graphics and Design

Syllabus of B.Tech. First Year

Engineering Graphics and Design

Module 1: Introduction to Engineering Drawing, Orthographic Projections [08]

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Scales –Principles of Orthographic Projections – Conventions – Projections of Points and Lines inclined to both planes; Projections of planes inclined Planes – Auxiliary Planes.

Module 2: Projections and Sections of Regular Solids [08]

Sections in lined to both the Planes – Auxiliary Views; Simple annotation, dimensioning and scale. Floor plans the include: windows, doors and fixtures such as WC, Both, sink, shower, etc. Prism, Cylinder, Pyramid, Cone – Auxiliary Vies: Development of surfaces of Right Regular Solids – Prism, Pyramid, Cylinder and Cone.

Module 3: Isometric Projections [08]

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Viceversa, Conversions.

Module 4: Computer Graphics [08]

Listing the computer technologies the impact on graphical communication, Demonstration knowledge of the theory of CAD software [such as: The Menu System, Tollbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects: Isometric Views of lines, Planes, Simple and compound Solids]; Set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles: Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to pater using the print command: orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modelling of parts and assemblies. Parametric and non-parametric solid, surface, and wireframe models. Part editing and twodimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, Multiview, auxiliary, and section views. Spatial visualization exercises Dimensioning guidelines, tolerancing techniques; dimensioning and scale multi views of dwelling

Module 5: Demonstration of a simple team design project [08]

Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids; meshed topologies for engineering analysis and tool-path generation for component manufacture;

geometric dimensioning and tolerancing; Use of solid-modelling software for creating associative models at the component and assembly levels; floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Applying colour coding according to building drawing practice; Drawing sectional elevation showing foundation to ceiling; Introduction to Building Information Modelling (BIM).

Suggested Text/ Reference Books:

1. Bhatt N.D., Panchal V.M. & Ingle P.R. (2014), Engineering Drawing, Charotar Publishing House.
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C.M. (2012), Engineering Graphics, TMH Publication Engineering Graphics & Design, A.P. Gautam & Pradeep Jain, Khanna Publishing House Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers.
4. (Corresponding set of) CAD Software Theory and User Manuals.

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Syllabus of B.Tech. First Year

[**Semester I & II**]

Department of Humanities &Social Sciences

Department of Humanities & Social Sciences

Professional English

Module 1- Basics of Technical English   [08]

Technical English: Definition; Extent& Coverage; Dimensions; Reading; Skimming; Scanning; Churning & Assimilation; Writing: Methods: Inductive; Deductive; Exposition; Linear; Interrupted; Spatial & Chronological etc; Technical Communication; Approaches: Brevity; Objectivity; Simplicity; Utility & Clarity. **Listening**: Active; Passive; Thinking strategies: Positive & Logical thinking; Speaking: Essentials Nuances & Modes of Speech Delivery.

Module 2- Components of Technical Writing   [08]

Vocabulary Building: Select words; Concept of word formation; Word formation; Root words from foreign languages & their use in English; Prefixes & Suffixes: Derivatives; Synonyms; Antonyms; Abbreviations. Homophones. One word substitutes; Requisites of Sentences.

Module 3- Basic Technical Writing Skills   [08]

Forms: Business writing: Principle; Purchase & Sales Letters; Drafts; Official Writing: Official Letter; D.O. Letter; Notices; Agenda; Minutes of Meeting; Sentence Structure; Phrases & Clauses in sentences; Coherence; Unity; Emphasis in Writing; Devices; Use of Writing methods in Documents; Techniques of writing.

Module 4- Common Grammatical Errors & Technical Style   [08]

Subject-verb agreement; Correct usage: Noun; Pronoun; Agreement; Modifiers; Articles; Prepositions; Cliches; Redundancies; Technical Style: Features; Choice of words; Sentences: Descriptive; Narrative; Expository; Defining & Classifying; Length of paragraph; Writing of Introduction & Conclusion.

Module 5- Presentation Strategies & Oral Communications   [08]

Analysis of locale; Audience; Modulating Style & Content; Speaking with confidence; Kinesics; Paralinguistic features of Voice-Dynamics: Pitch; Intonation; Stress & Rhythm; Conversation & dialogues; Communication at work-place; etc.

COURSE OUTCOMES

1. Students will be enabled to **understand** the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.
2. Students would be able to **create** substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.
3. Students will **apply** it at their work place for writing purposes such as Presentation/official drafting/administrative communication and use it for document/project/report/research paper writing.

4. Students will be made to **evaluate** the correct & error-free writing by being wellversed in rules of English grammar & cultivate relevant technical style of communication & presentation at their work place & also for academic uses.

5. Students will **apply** it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing interpersonal communication skills and positive attitude leading to their professional competence.

Text Books

1. Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.
2. Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, NewDelhi.

Reference Books

1. Word Power Made Easy by Norman Lewis, W.R.Goyal Pub. & Distributors, 2009, Delhi.
2. Manual of Practical Communication by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2013, Delhi.
3. English Grammar and Usage by R.P.Sinha, Oxford University Press, 2005, New Delhi.
4. English Grammar, Composition and Usage by N.K.Agrawal&F.T.Wood, Macmillan India Ltd., New Delhi.
5. Effective Communication Skill, Kulbhusan Kumar, RS Salaria, Khanna Publishing House
6. English Grammar & Composition by Wren & Martin, S.Chand& Co. Ltd., New Delhi.
7. Communication Skills for Engineers and Scientists, Sangeeta Sharma et.al. PHI Learning Pvt. Ltd, 2011, New Delhi.
8. Personality Development, Harold R. Wallace &L.Ann Masters, Cengage Learning, New Delhi 9. Personality Development & Soft Skills, BarunK.Mitra, Oxford University Press, 2012 New Delhi.
9. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.
10. Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd. 1990, Delhi. 12. Spoken English- A manual of Speech and Phonetics by R.K.Bansal&J.B.Harrison, Orient Blackswan, 2013, New Delhi.
11. Business English by Ken Taylor, Orient Blackswan, 2011, New Delhi.

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