Bansilal Ramnath Agarwal Charitable Trust's
VISHWAKARMA INSTITUTE OF TECHNOLOGY – PUNE
(An autonomous Institute affiliated to Savitribai Phule Pune University)
666, Upper Indiranagar, Bibwewadi, Pune – 411 037.

Bansilal Ramnath Agarwal Charitable Trust's

Vishwakarma Institute of Technology

(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Structure & Syllabus of

Department of Engineering, Sciences & Humanities (DESH)

Pattern 'A-14'
F. Y. B. Tech. (Common)
Effective from Academic Year 2014-15

Prepared by: - Board of Studies in Engineering, Sciences & Humanities

Approved by: - Academic Board, Vishwakarma Institute of Technology, Pune

Signed by,

Chairman – BOS **Chairman – Academic Board**

Content

@ *Please Refer GP/OE/Language Course Booklet for Structure & Syllabi*

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Program Educational Objectives (PEO)

F.Y. B. Tech. (Common)

PEO No.	Description of the Objective
I	**Logical Development:** To develop logical approach and reasoning for understanding, analyzing and designing of engineering applications / to unfamiliar situations
II	**Thought Process:** To promote the process of problem solving abilities, experimental, observational, manipulative, decision making, imagination, visualization and investigatory skills in the learners,
III	**Core Competence:** To provide students with a solid foundation in mathematical, scientific and engineering fundamentals required to solve engineering problems and also to pursue higher studies.
IV	**Professionalism:** To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context.
V	**Learning Environment:** To provide student with an academic environment aware of excellence, leadership, written ethical codes and guidelines, and the life-long learning needed for a successful professional career.

Course Objectives: Course objectives are specified in the course syllabus

2. Program Outcomes

a. Learners will demonstrate basic knowledge in mathematics, science and engineering.
b. Learners will be familiar with different materials used engineering applications.
c. Learners will demonstrate an ability to design simple mechanical components.
d. Learners will have the confidence to apply engineering solutions in global and societal contexts.
e. Learners will demonstrate the ability to design and conduct experiments, interpret and analyze data, and report results.
f. Learners will demonstrate the ability of engineering drawing that meets desired specifications and requirements.
g. Learners will demonstrate skills to use modern engineering tools, software and equipment to analyze problems.
h. Learners will demonstrate an ability to visualize and work on laboratory and multi-disciplinary tasks.
i. Learners will be familiar with safety, product quality aspects and quality control.
j. Learners will be able to communicate effectively in both verbal and written forms.
k. Learners will be prepared to participate in competitive examinations like GATE, GRE.
l. Learners will be able to understand electrical circuits and its analysis.
m. Learners will be able to demonstrate psychomotor skills for effective use of engineering tools and equipment.
n. Learners will be able to demonstrate understanding of professional, ethical and social responsibilities,
o. Learners will be able to deliver oral presentations and can write well organized accurate reports,
p. Learners will be motivated to engage in to self-learning.

FF No. 653

Issue 4, Rev. 1 , Dt. 01/03/2014

F.Y. B. Tech. Structure with effect from Academic Year 2014-15

Module 1

Code	Subject	Type	Teaching Scheme			Assessment Scheme						Credits
			L	P	Tut.	ISA					ESA	
						Test 1	Test 2	HA	Tut.	CA	ESE	
HS10109	Linear Algebra and Random Variables	Theory - Core	3	-	1	10	20	5	5	-	60	4
HS10103	Modern Physics	Theory – Core	3	-	1	10	20	5	5	-	60	4
CH10101	Chemistry	Theory – Core	3	-	-	15	20	5	-	-	60	3
ME10101	Engineering Graphics	Theory – Core	3	-	-	15	20	5	-	-	60	3
HS16101 HS16103 HS16105 HS16107	Sociology Psychology Philosophy EVS	Theory – OE	2	-	-	15	20	5	-	-	60	2
HS10301	Engineering Graphics Lab	Lab – Core	-	2	-	-	-	-		70	30	1
CH10301	Science Lab	Lab – Core	-	2	-	-	-	-		70	30	1
HS17401	Mini Project	Project	-	4	-	-	-	-		70	30	2
		TOTAL	**14**	**08**	**2**							**20**

FF No. 653

Issue 4, Rev. 1 , Dt. 01/03/2014

F.Y. B. Tech. Structure with effect from Academic Year 2014-15

Module 2

Code	Subject	Type	Teaching Scheme			Assessment Scheme						Credits
			L	P	Tut.	ISA					ESA	
						Test 1	Test 2	HA	Tut.	CA	ESE	
HS10102	Differential Integral and Calculus	Theory - Core	3	-	1	10	20	5	5	-	60	4
HS10104	Engineering Mechanics	Theory – Core	3	-	1	10	20	5	5	-	60	4
HS10108	Electrical Engineering Fundamentals	Theory – Core	3	-	-	15	20	5	-	-	60	3
CS10102	Computer Programming	Theory – Core	3	-	-	15	20	5	-	-	60	3
HS16102 HS16104 HS16106 HS16108	Economics Management Technology Cost & Acc. Business Law	Theory – OE	2	-	-	15	20	5	-	-	60	2
CS10302	Computer Programming	Lab – Core	-	2	-	-	-	-		70	30	1
HS10306	Engineering Lab	Lab – Core	-	2	-	-	-	-		70	30	1
HS17402	Mini Project	Project	-	4	-	-	-	-		70	30	2
		TOTAL	**14**	**08**	**2**							**20**

F.Y. B. Tech. Structure with effect from Academic Year 2014-15

Semester I – Irrespective of Module

Code	Subject	Type	Teaching Scheme			Assessment Scheme						Credits
			L	P	Tut.	ISA					ESA	
						Test 1	Test 2	HA	Tut.	CA	ESE	
HS10107	Communication Skill	Comm. Skill	-	2	-	-	-	-		70	30	1
HS153xx	General Proficiency	GP	-	2	-	-	-	-		70	30	1
HS15301 HS15302 HS15303 HS15304 HS15305	English I French I German I Spanish I Japanese I	Language	-	2	-	-	-	-		70	30	1
HS14301	Engineering Workshop	Workshop	-	2	-	-	-	-		70	30	1
		TOTAL	-	8	-							4

FF No. 653

Issue 4, Rev. 1 , Dt. 01/03/2014

F.Y. B. Tech. Structure with effect from Academic Year 2014-15

Semester II – Irrespective of Module

Code	Subject	Type	Teaching Scheme			Assessment Scheme						Credits
			L	P	Tut.	ISA					ESA	
						Test 1	Test 2	HA	Tut.	CA	ESE	
HS17301	General seminar I	Comm. Skill	-	2	-	-	-	-		70	30	1
HS153xx	General Proficiency	GP	-	2	-	-	-	-		70	30	1
HS15306 HS15307 HS15308 HS15309 HS15310	French II German II Spanish II Japanese II English II	Language	-	2	-	-	-	-		70	30	1
HS14302	Trade Workshop	Workshop	-	2	-	-	-	-		70	30	1
		TOTAL	-	8	-							4

HS153xx : General Proficiency Courses as per following list

MODULE I

FF No. 653

Issue 4, Rev. 1 , Dt. 01/03/2014

F.Y. B. Tech. Structure with effect from Academic Year 2014-15

Module 1

Code	Subject	Type	Teaching Scheme			Assessment Scheme						Credits
			L	P	Tut.	ISA					ESA	
						Test 1	Test 2	HA	Tut.	CA	ESE	
HS10109	Linear Algebra and Random Variables	Theory - Core	3	-	1	10	20	5	5	-	60	4
HS10103	Modern Physics	Theory – Core	3	-	1	10	20	5	5	-	60	4
CH10101	Chemistry	Theory – Core	3	-	-	15	20	5	-	-	60	3
ME10101	Engineering Graphics	Theory – Core	3	-	-	15	20	5	-	-	60	3
HS16101 HS16103 HS16105 HS16107	Sociology Psychology Philosophy EVS	Theory – OE	2	-	-	15	20	5	-	-	60	2
HS10301	Engineering Graphics Lab	Lab – Core	-	2	-	-	-	-		70	30	1
CH10301	Science Lab	Lab – Core	-	2	-	-	-	-		70	30	1
HS17401	Mini Project	Project	-	4	-	-	-	-		70	30	2
		TOTAL	**14**	**08**	**2**							**20**

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FF No. : 654

HS10109 :: LINEAR ALGEBRA AND RANDOM VARIABLES

Credits: 03	**Teaching Scheme:** - Theory 3 Hrs/Week

Prerequisites: Nil

Objectives:

This course is about the understanding and application of fundamental techniques involved in the analysis of engineering systems. This aims to equip the students with mathematics needed to analyze and solve a range of engineering problems with focus on conceptual understanding.

- To make aware students about the importance and symbiosis between Mathematics and Engineering.
- Achieve a fluency with Mathematical tools which is an essential weapon in modern Graduate Engineer's Armory.
- Balance between the development of understanding and mastering of solution techniques with emphasis being on the development of student's ability to use Mathematics with understanding to solve Engineering problems by retaining the philosophy of **"learning by doing".**
- Mapping with PEOs: I, III V: (a, k, p)

Unit I

Vector spaces **(08 Hrs)**

A. Rank of a Matrix, Systems of linear equations, Vectors in n-dimension, Vector spaces and subspaces, Spanning sets and Linear independence, Basis and dimension, Column space, Null Space, Row space.

B. Applications of systems of linear equations: Electrical Network Analysis.

Unit II

Inner product spaces and Linear Transformations **(08 Hrs)**

A. Inner Product spaces, Euclidean spaces, Norms, Construction of Orthogonal sets, The Gram–Schmidt process. Linear Transformation, Orthogonal transformations and its (2-D and 3-D) geometrical interpretation,

B. Orthogonal Matrix

Unit III

Eigen values and Eigen vectors **(08 Hrs)**

A. Eigen values and Eigen vectors. Cayley-Hamilton theorem and its applications. Diagonalization, symmetric matrices and orthogonal diagonalization. Application of eigen values and eigen vectors to rotation of axes, Quadratic forms and reduction of quadratic forms to canonical form.

B. Inverse and power of matrix using modal matrix.

Unit IV
Complex Numbers **(08 Hrs)**

A. Revision on complex numbers up to Argand Diagram. Polar form of a complex number. De Moivre's theorem and roots of a complex number. Exponential functions of a complex variable. Circular functions of a complex variable. Hyperbolic and inverse hyperbolic functions. Separation of real and imaginary parts of functions of complex variables.
B. Logarithm of a complex number.

Unit V
Probability and Statistics **(08 Hrs)**

A Random variables, Probability distributions, Mathematical Expectation and variance. Binomial, Poisson, and Normal distributions. Joint distribution of discrete Random Variables.

B. measurement of central tendency and Correlation of statistical data.

Note: Five assignments on self study, comprising of one assignment from each unit.

Text Books

1. "Linear Algebra: An Introduction", Ron Larson and David C. Falvo, Brooke/Cole, a part of Cengage Learning (Indian Edition).
2. "Higher Engineering Mathematics", B.S. Grewal, Khanna Publishers.
3. "Introduction to Probability and statistics" Seymour Lipschutz, John Schiller, Schaum's Outline, Tata McGraw-Hill.

Reference Books

1. "Linear Algebra and its Applications", Gilbert Strang , Cengage Learning (Indian Edition),
2. "Linear Algebra and its Applications", David C. Lay, Pearson Education Inc.

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FF No. : 654

HS10103 :: MODERN PHYSICS

Credits: 03	**Teaching Scheme:** - Theory 3 Hrs/Week

Prerequisites: Nil

Objectives:

- To understand fundamental principles of modern physics specifically concern to optics and quantum physics and their engineering applications,
- To provide problem solving experience in optics and quantum physics, in both the classroom and the laboratory learning environment,
- To motivate the students through practical examples that demonstrates the role of physics in progress of engineering disciplines so as to inculcate the interdisciplinary academic environment.
- Mapping with PEOs: I, II, III, V : (a, e, h, o, p)

Unit I **(8 Hrs)**

[A]

Interference: Coherence, Thin film Interference, Fringe width, Colours in Thin Films (Oil Film, Peacock Feather), Newton's Rings, Michelson's Interferometer, Applications: Wavelength of Light, Resolution of Spectral Lines, Interference Applications: Optically Plane Surface, Antireflection Coatings.

Diffraction: Fresnel and Fraunhofer Diffraction, Fraunhofer Diffraction at Single Slit (Geometrical Method), Conditions for Maxima and Minima, Intensity Pattern, Plane Diffraction Grating (Qualitative Results Only), Dispersive Power of Grating, Resolving Power, Rayleigh's Criterion of Resolution, Resolving Power of Grating and Telescope, X - Ray Diffraction from Crystals, Braggs Law.

[B] Self Study

Applications of Newton's Rings for Determination of (i) Radius of Curvature of Plano Convex Lens (ii) Refractive Index of Liquid, Applications of Michelson's Interferometer for Determination of (i) Wavelength of a Monochromatic Source (ii) Refractive Index / Thickness of a Transparent Thin Film, Interference Filters.

Diffraction at Circular Aperture (Results Only), Applications: Resolving Power of Microscope, Wavelength Determination using Grating, Braggs X-ray Spectrometer.

Unit II **(7 Hrs)**

[A]

Polarization

Introduction, Malus Law, Double Refraction (Huygen's Theory), Huygen's Construction of Doubly Refracted Wave Fronts for Normal Incidence in Crystal cut with Optic Axis (i) Parallel to Surface, (ii) Inclined to Surface, Retardation Plates, Elliptically Polarized Light and its Production, Dichroism, Applications: LCD, Polaroids, Antennas.

Introduction to Special Theory of Relativity

Frames of References, Galilean Relativity, Michelson Morley Experiment (Results only), Physical Event, Lorentz Transformations of Space and Time, Einstein's Formulation of Special relativity, Length Contraction, Time Dilation.

[B] Self Study

Brewster's Law, Geometry of Calcite Crystal, Huygen's Construction of Doubly Refracted Wavefronts for Normal Incidence in Crystal cut with Optic Axis Perpendicular to Surface, Quarter Wave Plate (QWP), Half wave plate (HWP), Nicols Prism, Circularly Polarized Light, Detection of Light (PPL, CPL, EPL, Upl, Par PL).

Relative Velocity, Relativistic Mass and Momentum, Mass and Energy.

Unit III **(9 Hrs)**

[A]

Elementary Quantum Mechanics

Limitations of Classical Mechanics and Need of Quantum Mechanics, Wave Particle Duality, Quantum Particle, de-Broglie's Hypothesis, Phase Velocity and Group Velocity, Heisenberg's Uncertainty Principle, Electron Diffraction at Single Slit, Concept of Wave Function (ψ), Max Born's Interpretation of ψ, Physical Significance of ψ and ψ^2.

Quantum Mechanics

Schrödinger's Wave Equations, Applications of Schrodinger's Wave Equations to problems of (i) Particle in Rigid Box (1 D - Infinite Potential Well), Tunneling through a Potential Energy Barrier, Applications of Tunneling Effect, Tunnel Diode.

Nanoscience and Nanotechnology

Introduction, Nanoscience and Nanomaterials, Nanoparticles Properties (Quantum Size Effects: optical, electrical, magnetic, structural, mechanical), Zero, One, Two Dimensional nanostructures, Applications.

[B] Self Study

Rutherford's atomic model, Black body radiation, Photoelectric Effect, Bohr Atom model and its Limitations, Davisson and Germer's Experiment, γ – ray microscope.
Particle in a Non-rigid Box (Finite Potential Well), Qualitative (Results Only), Physical Interpretation of Quantum Numbers.

Techniques of nanomaterials synthesis (physical, chemical, biological, mechanical, vapour and hybrid methods), Applications of nanotechnology in textile, cosmetics, electronics, energy, automobiles, space, defence, medical, environmental.

Unit IV **(9 Hrs)**

[A]

Semiconductor Physics

Kronig-Penny Model (Qualitative), Band Theory of Solids, Energy Bands in C (Graphite, Diamond), Ohm's Law (Microscopic), Temperature Dependence of Conductivity, Hall Effect, Fermi Level, Fermi-Dirac Probability Distribution Function, Fermi Level in Intrinsic (derivation) and Extrinsic Semiconductors (Effect of Temperature and Doping Level on Fermi Energy), Working of PN Junction Diode from Energy Band Diagrams, Photovoltaic Effect, Solar Cell Working and Characteristics.

Superconductivity

Introduction, Properties of Superconductors (Zero Resistance, Meissner Effect, Critical Fields, Persistent Currents, Critical Current Density, London Penetration Depth, Isotope Effect), BCS Theory, Preparation of High Tc Superconductors, DC and AC Josephson Effect, Superconducting Quantum Interference Devices (SQUID), Applications.

[B] Self Study

Hybridization, Energy Bands in Li, Be, Na, Si, Valence Band, Conduction Band, Forbidden Gap, Classification of Solids into Conductors, Semiconductors and Insulators, Electrical Conductivity of Conductors and Semiconductors, PNP and NPN Transistors, Applications of Solar Cell.

Type I and II Superconductors, High Tc Superconductors, Applications: Transmission Lines, Superconducting Magnets, Maglev Trains, Magnetic Resonance Imaging (MRI Scanning), Superconductors in Computing.

Unit V **(7 Hrs)**

[A]

Lasers and Applications

Stimulated Absorption, Spontaneous and Stimulated Emission, Population Inversion, Basic Requirements for Lasing Action, Laser Properties, He-Ne Laser, Semiconductor Diode Laser, Carbon Dioxide Laser (Principle, Construction and Working).

Nuclear Physics

Binding Energy Curve, Nuclear Fission, Q - value of Nuclear Reaction, Nuclear Magnetic Resonance (NMR), Applications, Nuclear Fusion, Controlled Fusion, Ignition Temperature, Fusion Reactors, Confinement Schemes: Gravitational, Magnetic, Inertial, Laser Fusion Reactor.

[B] Self Study

Ruby Laser, Applications of Lasers (Industry : Drilling, Welding and Micromachining,

Medical: Laser Eye, Skin, Cosmetic Surgery, Communication: Fibre Optics, Military Applications: Laser range detection, Laser Guided Missiles)

Nuclear constituents, Atomic Mass Unit, Mass Defect and Packing Fraction, Binding Energy, Uranium Chain reaction, Distinction between Nuclear Fission and Fusion, Fusion: Future Source of Energy, Fusion reactions.

Note: Five assignments on self study, comprising of one assignment from each unit.

Text Books

1. "Engineering Physics", Hitendra K. Malik & A. K. Singh, Tata McGraw Hill, New Delhi, 2010,
2. "Physics for Scientists and Engineers with Modern Physics", Raymond J. Serway & John W. Jewett, Seventh Edition, Thomson / Cengage Learning, New Delhi, 2010,
3. "Concepts of Modern Physics", Beiser Arthur, (6th) New, Tata McGraw Hill Pub. Co, 2005.

Reference Books

1. "University Physics with Modern Physics", Young and Freedman – 12th Ed. (Pearson Education),
2. "Lectures on Physics", Volume 1, 2 and 3 by Richard P. Feynman, Narosa Publisers / Pearson Education.

Additional Readings

1. "Fundamentals of Optics", Jenkins & White, M Hill Book Co, 1983,
2. "Fundamentals of Physics", Resnick and Halliday, John Wiley and Sons.

FF No. : 654

CH10101 :: CHEMISTRY

Credits: 03 | **Teaching Scheme:** - Theory 3 Hrs/Week

Prerequisites: Nil.

Objectives:

- To develop analytical ability amongst students.
- To impart pure chemistry principles.
- To understand the chemistry behind development of fundamentals.
- Mapping with PEOs: II, III, V : (a, b, e, h, o, p)

Unit I **(9 Hrs)**

[A]

Chemical Bonding and Co-ordination Chemistry

Types of Bonds, Valance Bond Theory, Concept of Hybridization, Molecular Orbital Theory, MO Diagrams for Homogeneous and Heterogeneous molecules, Interpretation of Bond Order and Magnetic properties of molecules. Types of ligands, Nomenclature of Co-ordination complexes, Isomerism in Co-ordination complexes. Theories of Co-ordination compounds (VBT and CFT).

[B] Self Study: M.O. Diagram for N_2 and NO, Calculation of bond order and magnetism,

Unit II **(9 Hrs)**

[A]

Molecular Spectroscopy

Absorption Laws, Principle, Instrumentation and applications of UV-Visible, IR and NMR Spectroscopy, Woodward- Fieser Rule for calculating λ max. General idea of Mass spectroscopy, Numerical on all the three types of spectroscopy.

[B] Self Study: Additional numerical on UV-visible, IR and NMR spectroscopy.

Unit III **(8 Hrs)**

[A]

Thermodynamics

Basic terms in Thermodynamics, First law of thermodynamics, concept of enthalpy, Limitations, Second law of thermodynamics, Clausius and Kelvin statement, Concept of Entropy, Change in entropy for isothermal, reversible and irreversible process. Free energy, Physical significance and application of Gibbs-Helmholtz equation, Vant Hoff's Isotherm and Isochore. Numerical.

[B] Self Study: Numericals on first law of thermodynamics, entropy and enthalpy.

Unit IV **(7 Hrs)**

[A]

Chemical Kinetics

Rate of reaction, experimental determination, Rate law and rate constant, Order and molecularity of reaction, Integrated rate equation for first and second order kinetics, Half life for first and second order kinetics, Arrhenius equation, Numericals on activation energy, Half life, rate constant for first and second order kinetics.

[B] Self Study: Characteristics of rate constant, comparison between rate of reaction and rate constant, comparison between order and molecularity of reaction.

Unit V **(7 Hrs)**

[A]

Structure and Reactivity of Organic Molecules

Explanation and application of inductive, electromeric, mesomeric and hyperconjugative effect, Structure and stability of carbocation, carbanian, and free radical, Types of organic reactions (Substitution, Addition and Elimination), Optical isomerism, Geometrical isomerism, Conformational analysis of ethane.

[B] Self Study: Types of Bond cleavage, study of named reactions.

Note: Five assignments on self study, comprising of one assignment from each unit.

Text Books

1. "Engineering Chemistry", Dr. B. S. Chauhan, University Science Press, New Delhi, 3rd edition,
2. "Engineering Chemistry", Jain and Jain, Dhanpat Rai Publication.

Reference Books

1. "Principle of Physical Chemistry", B.R. Puri, L.R. Sharma, M.S. Pathania, S. Chand and Co. Ltd., New Delhi,
2. "Organic Chemistry- Vol 1", I L Finar, Pearson, 6th Edition,
3. "Selected Topics in Inorganic Chemistry" W. U. Malik, G. D. Tuli, R. D. Madan S. Chand and Co. Ltd., New Delhi.

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FF No. : 654

ME10101 :: ENGINEERING GRAPHICS

Credits: 03 **Teaching Scheme:** - Theory 3 Hrs/Week

Prerequisites: Nil

Objectives:

- To develop an imagination for 3D objects
- To study Engineering curves and their applications.
- To learn basic concepts of Projections of lines, planes and solids.
- To learn development of lateral surface of solids, interpenetration of solids and their engineering applications.
- To understand the basic principles of orthographic and isometric projections.
- Mapping with PEOs: I, II, III, V : (c, e, f, h, p)

Unit I: **(9 Hrs)**

A: Engineering Curves
Conic sections, Cycloid, Involutes, Archimedean spiral, Helix on cylinder and cone.
Orthographic Projections
Reference Planes, Types and Methods of projections with symbols, Projections of various objects, Full and half sectional views.

B: Epi-Cycloid, Hypo-Cycloid, Trochiods, offset section, revolved section, aligned section, removed section.

Unit II: **(9 Hrs)**

A: Projections of points, lines and planes
Projections of points in various quadrants, Projections of lines inclined to both reference planes (lines in first quadrant only), locating traces of lines. Projections of planes inclined to both reference planes, inclination of given plane with HP & VP, obtaining true shape, Distance of point from a given plane.

B: Distance between skew lines. Angle between two planes. Composite planes.

Unit III: **(8 Hrs)**

A: Projections of Solids and Sections of Solids
Classification of solids, Projections of solids such as Prism, Pyramids, Cylinder, Cone, Cube, tetrahedrons inclined to both reference planes. Types of section planes, Projections of above solids cut by various section planes, True shape of section.

B: Projections of Composite solids
Locating section planes for obtaining given sectional views and drawing sectional views i.e. Reverse sections.

Unit IV: **(8 Hrs)**

A: Development of Lateral Surfaces of Solids (DLS) and Inter-penetration of Solids
Development of Lateral Surface-concept, methods, applications. Inter-penetration of solids such as Prism-Prism, Prism-Pyramid, Cylinder-cylinder and Cylinder- cone;

B: Anti-development of lateral surfaces of cut solids. Interpenetration of prism cylinder.

Unit V: **(8 Hrs)**

A: Isometric Drawing
Isometric Projections and Isometric views, Construction of Isometric views from given orthographic views.

B: Isometric views of Sphere with other solids.

Note: Five assignments on self study, comprising of one assignment from each unit.

Text Books:

1. "Engineering Drawing", N. D. Bhatt, 50th edition, Charotar Publication.
2. "Engineering Drawing with an introduction to AUTOCAD" by Dhananjai A. Jolhe, 5th edition, Tata McGraw Hill education pvt.ltd., New Delhi.
3. "Engineering Graphics",by C. M. Agawal, Basant Agrawal, 2nd edition,Tata McGraw Hill education pvt.ltd., New Delhi.

Reference Books:

1. "Fundamental of Engineering Drawing", Warren J. Luzzader, Prentice Hall of India, New Delhi.
2. "Engineering Drawing and Graphics", by Venugopal K., New Age Internation Publishers.
3. "Text book of Engineering Drawing", K. L. Narayana & P. Kannaiah, Scitech Publications, Chennai.

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FF No. : 654

HS10209 :: LINEAR ALGEBRA AND RANDOM VARIABLES
(Tutorial)

Credits: 01	**Teaching Scheme:** Tutorial 1 Hr/Week

Prerequisites: Nil.

Objectives:
This course is a full one semester course taken by all junior freshmen engineering students. It starts with matrix, linear algebra, complex numbers, solid geometry and calculus of functions of one variable. This course emphasizes both theoretical foundations of linear algebra, complex number and their applications. It is intended to enable students to recognize mathematical structures in practical problems, to translate problems into mathematical language and to apply 'Linear Algebra and Random Variables' to solve them as well as real world problems.
Upon completion of this module students will be able to:

- Recognize mathematical structures in practical problems.
- Translate problems into mathematical language and analyze problems using methods from all the units.
- Mapping with PEOs: I, III, V : (a, k, p)

List of Contents

In module I students will work on problems to practice and apply methods introduced in the theory lectures. Discussions of problems in small groups is always encouraged and facilitated and students are asked to submit weekly home work assignments and provide them immediate feedback and support materials.

Tutorial No. 1:	Summary on rank of a matrix, solution of linear systems.
Tutorial No. 2:	vector spaces and subspaces,
Tutorial No. 3:	Linear dependence and independence. Basis and dimension.
Tutorial No. 4:	Inner product , Gram Schmidt Process, linear transformations, matrices for linear transformations
Tutorial No. 5	Summary on Eigen values and eigen vectors, Cayley-Hamilton theorem and its application.
Tutorial No. 6:	Diagonalization, symmetric matrices and orthogonal diagonalization and problems solving.

Tutorial No. 7:	Application of eigen values and eigen vectors to rotation of axis (quadratic forms and reduction of quadratic forms to canonical forms)
Tutorial No. 8:	Summary on complex numbers upto Argand diagram, polar form of a complex number, De Moivre's theorem roots of complex numbers and problems solving
Tutorial No. 9:	Summary on exponential and circular functions of complex variables, hyperbolic and inverse hyperbolic functions
Tutorial No. 10:	Separation of real and imaginary parts of functions of complex variables and problems solving.
Tutorial No. 11:	Random variables, Probability distribution, Joint probability distribution.
Tutorial No. 12:	Binomial, Poisson and Normal distribution.

Text Books

1. "Linear Algebra: An Introduction",Ron Larson and David C. Falvo, Brooke/Cole, a part of Cengage Learning (Indian Edition), First Indian reprint 2010.
2. "Introduction to Probability and statistics" Seymour Lipschutz, John Schiller, Schaum's Outline, Tata McGraw-Hill. "Higher Engineering Mathematics", B.S. Grewal, Khanna Publishers40th Edition 2007.
3. "Higher Engineering Mathematics", B.S. Grewal, Khanna Publishers,40th Edition 2007.

Reference Books

1."Linear Algebra and its Applications", Gilbert Strang, Cengage Learning (Indian Edition) 10th Indian reprint 2011.
2."Linear Algebra and its Applications", David C. Lay, Pearson Education Inc, 12th impression 2011

FF No. : 654

HS10203 :: MODERN PHYSICS (Tutorial)

Credits: 01	**Teaching Scheme: -** 1 Hr/Week

Prerequisites: : Nil

Objectives:

- To understand fundamental principles of modern physics specifically concern to optics and quantum physics and their engineering applications,
- To provide problem solving experience in optics and quantum physics, in both the classroom and the laboratory learning environment,
- To motivate the students through practical examples that demonstrates the role of physics in progress of engineering disciplines so as to inculcate the interdisciplinary academic environment.
- Mapping with PEOs: I, II, III, V : (a, e, h, o, p)

List of Contents

In this module students will work on problems to practice and apply methods introduced in the theory lectures. Discussions of problems in small groups is always encouraged and facilitated and students are asked to submit weekly home work assignments and provide them immediate feedback and support materials.

Tutorial No. 1:	Introduction to Waves, Superposition Principle, Phase Difference, Coherence,
Tutorial No. 2:	Methods of production of Coherent Sources, Division of Amplitude, Division of Wavefront, Interference, Introduction to Diffraction,
Tutorial No. 3:	Problems on Thin Film Interference, Fringe Width,
Tutorial No. 4:	Problems on Newton's Ring Experiment, Problems on Michelson's Interferometer, Antireflection Coatings, Interference Filter
Tutorial No. 5	Problems on Diffraction due to Single Slit, Problems on Diffraction Grating,
Tutorial No. 6:	Problems on Resolving Power of Grating, Telescope and Microscope,
Tutorial No. 7:	Problems on Polarization, Malus Law, Brewster's Law, Retardation Plate etc.
Tutorial No. 8:	Problems on Special Theory of Relativity: Length Contraction, Time Dilation, Relative Mass etc.
Tutorial No. 9:	Problems on de-Broglies Hypothesis, Davisson & Germer Experiment,

Tutorial No. 10: Problems on Heisenberg's Uncertainty Principle, Problems on Normalization and 1 D – Infinite Potential Well,

Tutorial No. 11: Problems on Semiconductor Physics: Conductivity, Hall Effect, Problems on Superconductivity: Critical Field,

Tutorial No. 12: Problems on Superconductivity: Isotope Effect, Penetration Depth, Problems on Nuclear Physics.

Text Books

1. "Engineering Physics", Hitendra K. Malik & A. K. Singh, Tata McGraw Hill, New Delhi, 2010,
2. "Physics for Scientists and Engineers with Modern Physics", Raymond J. Serway & John W. Jewett, Seventh Edition, Thomson / Cengage Learning, New Delhi, 2010,
3. "Concepts of Modern Physics", Beiser Arthur, (6th) New, Tata McGraw Hill Pub. Co, 2005.

Reference Books

1. "University Physics with Modern Physics", Young and Freedman – 12th Ed. (Pearson Education),
2. "Lectures on Physics", Volume 1, 2 and 3 by Richard P. Feynman, Narosa Publisers / Pearson Education.

FF No. : 654

CH10301 :: SCIENCE LABORATORY (HS10103 + CH10101)

Credits: 1	**Teaching Scheme:** - Laboratory 2 Hrs/Week

Prerequisites: Nil

Objectives:

MODERN PHYSICS LABORATORY

- To understand and experience the basics of physics through expert member.
- To learn the proper methods and techniques utilized in gathering experimental data.
- To become familiar with the proper use of basic measuring instruments commonly found in physics laboratory.
- To develop the ability to recognize and apply the appropriate physics introduced in the lecture course to actual experimental situations by taking mini projects.
- To learn how to analyse data and then reach scientific conclusions based on analysis.
- Mapping with PEOs: I, II, III, IV, V : (a, e, h, g, j, o, p)

List of Practical (Experiments to be performed as per following code of conduct)

Sr. No.	Name of the Experiment	Mode of Conduct
1.	Newton's rings experiment (Wavelength, radius, refractive index)	**Experiment no 1:** Any one of two to be performed by students and other for demonstration of working principle.
2.	Michelson's Interferometer.	
3.	Use of diffraction grating for the determination of wavelength of spectral line.	**Experiment no 2:** Any one of four to be performed by the students and any two of remaining for demonstration of working principle.
4.	Determination of thickness of wire using LASER.	
5.	Determination of wavelength of a given laser source.	
6.	Resolving power of a telescope / Grating.	
7.	To verify cosine square law of Malus for plane polarized light using photocell.	**Experiment no 3:** Any one of four to be performed by the students and any two of remaining for demonstration of working principle.
8.	Determination of Brewster's angle for glass surface and refractive index of glass.	
9.	Determination of refractive indices for ordinary, extraordinary rays for a quartz crystal / Prism.	

10.	Demonstration of Lissajous figures using a CRO (Principle of interference) concepts of polarization	
11.	Determination of band gap of a semiconductor.	**Experiment no 4 and 5:** Any two of five to be performed by the students and any two of remaining for demonstration of working principle.
12.	Characteristics of solar cell, calculation of fill factor.	
13.	Hall Effect, determination of Hall coefficient.	
14.	Study of diode characteristics (PN, Zener, Tunnel)	
15.	Characteristics of a photocell.	

Text Books

1. "Engineering Physics", Hitendra K. Malik & A. K. Singh, Tata McGraw Hill, New Delhi, 2010,
2. "Physics for Scientists and Engineers with Modern Physics", Raymond J. Serway & John W. Jewett, Seventh Edition, Thomson / Cengage Learning, New Delhi, 2010.
3. "Concepts of Modern Physics", Beiser Arthur, (6th) New, Tata McGraw Hill Pub. Co, 2005.

Reference Books

1. "University Physics with Modern Physics", Young and Freedman – 12th Ed. (Pearson Education),
2. "Lectures on Physics", Volume 1, 2 and 3 by Richard P. Feynman, Narosa Publisers / Pearson Education.

Objectives:

CHEMISTRY LABORATORY

- To develop an analytical ability
- To integrate chemistry fundamentals with practical applications.
- To understand the chemistry behind physico-chemical phenomena.
- Mapping with PEOs: II, III, V : (a, b, e, h, j, o, p)

List of Practical (any five):

1. Experimental verification of Beer-Lambert's law by determining unknown concentration of solution of ferric ammonium sulphate using colorimeter.
2. To find out the heat of neutralization of sodium hydroxide and hydrochloric acid.
3. To determine the value of rate constant (k) for the hydrolysis of ethyl acetate catalyzed by hydrochloric acid.
4. Preparation of acetanilide from aniline.
5. Preparation of benzoic acid from ethyl benzoate.
6. Preparation of *tris*- (ethylenediamine) nickel thiosulphate.

Text Books

1. "Lab manual on Engineering chemistry", Dr. S Rani, Dhanpat Rai Publication,
2. "Applied Chemistry Theory and Practical", O P Virmani and A K Narola New Age International Publication.

Reference Books

1. "Practical Inorganic Chemistry", Vogel, Prentice Hall Publication,
2. "Practical Organic Chemistry", Vogel, Prentice Hall Publication.

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666, Upper Indiranagar, Bibwewadi, Pune – 411 037.

FF No. : 654

ME 10301 :: ENGINEERING GRAPHICS LABORATORY

Credits: 1	Teaching Scheme: - Laboratory 2 Hrs/Week

Prerequisites: Nil

Objectives:

- To learn various standard practices of Engineering Drawing.
- To develop an imagination for 3D objects
- To study Engineering curves and their applications.
- To learn basic concepts of Projections of lines, planes and solids.
- To learn development of lateral surface of solids, interpenetration of solids and their engineering applications.
- To understand the basic principles of orthographic and isometric projections.
- Mapping with PEOs: I, II, III, V : (c, e, f, h, j, p)

List of Practicals:

1. **Lines, Lettering, Dimensioning** **(2 Sessions)**
   Various types of lines and applications, Various standard practices of dimensioning and Lettering.

2. **Orthographic Projections.** **(2 Sessions)**
   a. Orthographic projections of a given Machine Component. (2 Problems)
   b. Orthographic projections with sectional views. (1 Problem)

3. **Projections of Lines, Planes.** **(2 Sessions)**
   a. Projections of line inclined to both the reference plane. (3 Problems)
   b. Projections of plane inclined to both the reference plane. (2 Problems)

4. **Projections & Sections of Solids.** **(2 Sessions)**
   a. Projections of Solids inclined to both the reference plane. (2 Problems)
   b. Projections of Solids with sectional views. (2 Problems)

5. **Development of Lateral Surfaces & Inter-Penetration of Solids.** **(2 Sessions)**
   a. Development and anti Development of lateral surface. (2 Problems)
   b. Interpenetration of solids. (2 Problems)

6. **Isometric Drawings.** (3 Problems) **(2 Sessions)**

7. **Introduction to AUTOCAD** **(2 Sessions)**
   Minimum one drawing to be completed using basic commands of AUTOCAD.

Text Books:

1. "Engineering Drawing", N. D. Bhatt, 50th edition, Charotar Publication.
2. "Engineering Drawing with an introduction to AUTOCAD" by Dhananjai A. Jolhe, 5th edition, Tata McGraw Hill education pvt.ltd., New Delhi.
3. "Engineering Graphics", by C. M. Agawal, Basant Agrawal, 2nd edition,Tata McGraw Hill education pvt.ltd., New Delhi.

Reference Books:

1. "Fundamental of Engineering Drawing", Warren J. Luzzader, Prentice Hall of India, New Delhi.
2. "Engineering Drawing and Graphics", by Venugopal K., New Age Internation Publishers.
3. "Text book of Engineering Drawing", K. L. Narayana & P. Kannaiah, Scitech Publications, Chennai.

MODULE II

FF No. 653

Issue 4, Rev. 1 , Dt. 01/03/2014

F.Y. B. Tech. Structure with effect from Academic Year 2014-15

Module 2

Code	Subject	Type	Teaching Scheme			Assessment Scheme						Credits
			L	P	Tut.	ISA					ESA	
						Test 1	Test 2	HA	Tut.	CA	ESE	
HS10102	Differential Integral and Calculus	Theory - Core	3	-	1	10	20	5	5	-	60	4
HS10104	Engineering Mechanics	Theory – Core	3	-	1	10	20	5	5	-	60	4
HS10108	Electrical Engineering Fundamentals	Theory – Core	3	-	-	15	20	5	-	-	60	3
CS10102	Computer Programming	Theory – Core	3	-	-	15	20	5	-	-	60	3
HS16102 HS16104 HS16106 HS16108	Economics Management Technology Cost & Acc. Business Law	Theory – OE	2	-	-	15	20	5	-	-	60	2
CS10302	Computer Programming	Lab – Core	-	2	-	-	-	-		70	30	1
HS10306	Engineering Lab	Lab – Core	-	2	-	-	-	-		70	30	1
HS17402	Mini Proj.	Project	-	4	-	-	-	-		70	30	2
		TOTAL	**14**	**08**	**2**							**20**

HS10102 :: DIFFERENTIAL AND INTEGRAL CALCULUS

Credits: 03	**Teaching Scheme:** - Theory 3 Hrs/Week

Prerequisites: Nil.

Objectives:

This course is about the understanding and application of fundamental techniques involved in the analysis of engineering systems. This aims to equip the students with mathematics needed to analyze and solve a range of engineering problems with focus on conceptual understanding.

- To make aware students about the importance and symbiosis between Mathematics and Engineering.
- Achieve a fluency with Mathematical tools which is an essential weapon in modern Graduate Engineer's Armory.
- Balance between the development of understanding and mastering of solution techniques with emphasis being on the development of student's ability to use Mathematics with understanding to solve Engineering problems by retaining the philosophy of **"learning by doing".**
- Mapping with PEOs: I, III V: (a, k, p)

Unit I

Differential calculus **(08 Hrs)**

A. Successive differentiaon and Leibnitz theorem for nth derivative of product of two functions. Sequence and Infinite series, tests for convergence (Comparison test, Ratio tests). Power series and its region of convergence. Taylor and Maclaurin's series.

B. Indeterminate forms, L'Hospital rule.

Unit II

Partial Derivatives **(08 Hrs)**

A. Functions of two or more variables. Partial derivatives. Differentials, Theorem on differentials. Differentiation of composite functions. Euler's theorem on homogeneous functions. Jacobian and its properties. Partial derivatives of implicit functions using Jacobians. maxima and minima of functions of two variables.

B. Method of Lagrange's undetermined multipliers for maxima and minima.

Unit III

Integral Calculus **(08 Hrs)**

A. Introduction to special functions: Gamma function and Beta function. Introduction to curve tracing. Tracing of Cartesian curves and its rectification. Standard Polar and parametric curves (equations and diagram),

B. Tracing and rectification Standard Polar and parametric curves.

Unit IV

Multiple Integrals **(08 Hrs)**

A. Double Integrals. Triple Integrals and Transformation of multiple integrals. Areas by double integration and volume of solids by triple integration.

B. centroid and moment of Inertia of plane lamina and solids.

Unit V

Ordinary differential equations **(08 Hrs)**

A. Exact differential equations and reducible to exact differential equations. Linear differential equations and equations reducible to linear form.

B. Application of ordinary differential equations to orthogonal trajectories and Electrical circuit.

Note: Five assignments on self-study, comprising of one assignment from each unit.

Text Books

1. "Text book of Calculus", Ron Larson and Bruce H. Edwards, Brooke/Cole, a part of Cengage Learning (Indian Edition), 1st Indian reprint 2010.
2. "Higher Engineering Mathematics", B.S. Grewal, Khanna Publishers, 40th Edition 2007.

Reference Books

1. "Calculus" Volume I: One Variable Calculus with an Introduction to Linear Algebra, 2nd Edition, Reprint 2011, Tom M. Apostal, Wiley.
2. "Calculus" Volume II: Multi Variable Calculus and Linear Algebra with Application to Differential Equations and Probability, 2nd Edition, Reprint 2011, Tom M. Apostal, Wiley.
3. "Calculus" , 4th Edition, Robert T. Smith and Roland B Minton, Mc Graw Hill Education (Indian Edition)
4. "Higher Engineering Mathematics", B. V. Ramana, Tata McGraw Hill, 5th reprint 2012.

FF No. : 654

HS 10104:: ENGINEERING MECHANICS

Credits: 03	**Teaching Scheme:** - Theory 3 Hrs/Week

Prerequisites: Nil

Objectives:

- To understand and predict physical phenomena to lay the foundation for engineering applications.
- To develop logical approach and reasoning for analysis and design of engineering applications / unfamiliar situations.
- To provide necessary background for the study of mechanics of deformable bodies and mechanics of fluids.
- To promote processes of problem solving abilities, experimental, observational, manipulative, decision making and investigatory skills in the learners.
- Mapping with PEOs: I, II, III, V : (a, c, e, h, k, o, p)

Unit I:Basics of Statics: **(9 Hrs)**

[A]

Statics Of Particles

Forces In Plane: Resolution of a force in to rectangular and skew components, Resultant and Equilibrant, Equilibrium of a particle.

Forces In Space: Rectangular component of a force in a space, Addition of concurrent forces in space to find resultant, equilibrium of particle in a space.

Statics of Rigid bodies:

Forces In Plane: Moment of a force about a point, couple, moment of couple, properties of couple, Varignon's theorem of moments, Resultant of parallel and non concurrent non parallel force systems.

Forces In Space: Moment of force about a point and about an axis, moment of a couple.

[B] Self Study: Six fundamental principles of mechanics, Principle SI units used in mechanics, SI prefixes and its rules for using.

Vectors: Force as a vector, triangle law for addition and subtraction of vectors, law of polygon of forces, vector product, scalar product.

Unit II: Equilibrium of Rigid Bodies: **(7 Hrs)**

[A]

Forces in Plane: Conditions of equilibrium, Free body diagrams, Types of support and support reactions, Types of loading and its reduction to point loading, Concept of two and three force equilibrium, Equilibrium of simple beams, and mechanisms.

Distributed Forces: Centroid of area and line.

[B] Self Study: Derivation of formulas for centroidal distances of standard areas and lines by integration method.

Forces In Space: Types of support and support reactions, Equilibrium of Parallel force system.

Unit III: Analysis of Structures and Friction **(8 Hrs)**

[A]

Analysis of structures: Assumptions in analysis of truss, Analysis of simple truss by a method of joint and method of section , Two force and multi force members, difference between truss and frame , analysis of simple frames (maximum number of 09 unknown)

Friction: Variation of frictional force for various condition viz. (No friction, No motion, Impending motion, and Motion conditions) , Problems involving dry friction, Application to inclined planes, wedges, Belt friction, Band brake,

[B]Self Study: Theory and derivation of relation between tight side and slack side of flat and V belt, concept of Square threaded Screws, Journal bearings, Thrust bearings, Wheel friction.

Unit IV: Kinematics of particles **(8 Hrs)**

[A]

Rectilinear Motion: Variable acceleration, Motion curves, concept of relative motion and simple dependent motion.

Curvilinear Motion: Concept of position, velocity and acceleration vectors, components of velocity and acceleration in three systems (i). Rectangular co-ordinate (x-y) system, (ii) normal and tangential (n-t) system, (iii) Radial and Transverse (r-θ) system, Projectile motion.

[B] Self Study: Rectilinear Motion: Concept of position, Displacement, Distance, Speed, instantaneous and average velocity and acceleration , Uniform motion, Uniformly accelerated motion, Motion under gravity

Curvilinear Motion: Derivation of component of velocity and acceleration in three system (x-y,n-t,r-θ), projectile on horizontal ground –derivation of equations of trajectory, time of flight, maximum range, maximum height, Projectile on inclined ground-derivation for sloping range, time of flight and maximum sloping range.

Unit V: Kinetics of Particles **(8 Hrs)**

[A]

Force and acceleration: Dynamic equilibrium, D'Almbert's principle, Application of F= ma in three systems (i) rectangular co-ordinate (x-y) system, (ii) normal and, tangential (n-t) system, (iii) Radial and Transverse (r-θ) system.

Work Energy: Work of a Force, power and efficiency, work energy principle, Conservative and non Conservative forces, Principle of conservation of energy.

Impact: Impulse momentum principle, direct and oblique impact.

[B] Self Study: Force and acceleration: Numerical on F= ma, in r-θ system.
Impact: derivation of coefficient of restitution for direct and oblique impact.

Note: Five assignments on self-study, comprising of one assignment from each unit.

Text Books

1. "Vector Mechanics for Engineers", F. P. Beer and E. R. Johnston, 9th Edition –Mc Graw Hill Publications,
2. "Engineering Mechanics Statics and Dynamics", R. C. Hibbler, Ashok Gupta, 11th Edition – Pearson Publications,

Reference Books

1. "Engineering Mechanics Statics", J. L. Meriam, L. G. Kraige – 5th Edition, John Wiley & Sons,
2. "Engineering Mechanics Dyanamics", J. L. Meriam, L. G. Kraige – 5th Edition, John Wiley & Sons.
3. "Engineering Mechanics Statics and Dynamics", E.W. Nelson, C. L. Best, W. G. McLean, 5th Edition – Tata McGraw Hill.
4. "Engineering Mechanics Statics and Dynamics", A. P. Boresi, R. J. Schmidt,– Thomson/Cangage Publications,

FF No. : 654

HS10108 : ELECTRICAL ENGINEERING FUNDAMENTALS

Credits: 03 | **Teaching Scheme:** - Theory 3 Hrs/Week

Prerequisites: Nil

Objectives:

- Understand basic concepts of electrical engineering.
- Gain knowledge of solving numerical problems related to electrical circuits.
- Understand basic concepts about conversion of energy from one form to another.
- Understand basic concepts of electrical energy scenario.
- Mapping with PEOs: I, II, III, V : (a, e, g, i, l, m, p)

Unit I – Network Theorems (8 Hrs)

[A] Ohm's law, simplification of networks using series - parallel combinations and star - delta transformations, current and voltage sources, Kirchhoff's laws, superposition theorem, Thevenin's theorem, Norton's Theorem.

[B] Self Study: Maximum power transfer theorem.

Unit II – AC Circuits – I (8 Hrs)

[A] Concept of phasor representation of AC quantity, concept of instantaneous, peak, average and RMS value of AC quantity, peak factor, form factor, study of AC through purely resistive, inductive and capacitive circuits, concept of impedance, concepts of active, reactive and apparent power, power factor.

[B] Self Study: Concept of AC quantities, concepts of cycle, period, frequency, phase difference as related to sinusoidal voltages and currents.

Unit III - AC Circuits – II (8 Hrs)

[A] Study of single phase RLC series and RLC parallel circuits, concept of three phase supply, phase sequence, concepts of line, phase, neutral etc., power relations in a three phase balanced star and delta connections, three phase phasor diagrams.

[B] Self Study: Power factor improvement in a three phase circuit.

Unit IV - Work, Power and Energy (8 Hrs)

[A] Energy conversions from one form to another such as electrical, heat, potential, kinetic, linear, rotational, solar, wind etc. and numerical problems based on different energy conversions in real life cases.

[B] Self Study: Collection of data related to energy scenario in India, study of a domestic electricity bill.

Unit V – Electrical Energy Scenario, Batteries and Electrical Safety (8 Hrs)

[A] Electrical power generation scenario in India, grid system, different terms associated with energy and its utilization. Electrical cells and batteries, different terms associated with cells and batteries, types, construction, chemicals used maintenance procedure. Electrical safety, different terms associated with safety, safety gadgets, concept of earthling. Conservation of electrical energy.

[B] Self Study: Types and procedure of earthing.

Note: Five assignments on self-study, comprising of one assignment from each unit.

Text Books

1. Electrical Technology by Edward Hughes, 7th Edition,
2. Electrical Technology - vol.- I and II by B. L. Theraja.

Reference Books

1. Basic Electrical Engineering by Nagarath and Kothari.
2. Principals of Electrical Engineering by Vincent Del Toro, PHI publications.
3. Basic electrical Engineering by V.K.Mehta, S. Chand Publications.

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666, Upper Indiranagar, Bibwewadi, Pune – 411 037.

FF No. : 654

CS 10102 :: COMPUTER PROGRAMMING

Credits: 3	**Teaching Scheme:** - 3 Hrs/Week

Prerequisites: Nil

Objectives:

- To understand use of efficient programming and documentation.
- To understand C programming language.
- To learn problem solving skills using C
- Understand of how several fundamental algorithms work, particularly those concerned with string operations, sorting and searching.
- Mapping with PEOs: I, II, IV, V : (a, d, e, g, k, p)

Unit I **(8 Hrs)**

A. Introduction to Programming: Problem solving using computers and logic design. Algorithms and their representations: flowcharts, pseudo code. Designing algorithms for problems like finding min-max, mean, median, mode, mensuration and roots of a quadratic equation. Concept of programming languages for implementing algorithms – levels of languages. Role of assemblers, compilers, linker, loader, interpreter in program execution.

Introduction to C: "Hello World" in C – editor, compiler, execution environment. C as a middle level language. Basic structure of C program, standard library and header files, Syntax and Semantics. Variable, constant (literal and named), Data types, variable declaration. Assignment. Operators: Arithmetic, logical, relational, Expressions, Precedence & Associativity. Input and output statements, escape sequences.

B. Bits and bytes – importance of digital representation in computers. Number System and algorithms for inter conversions.C programming on Linux and Windows.

Unit II **(8 Hrs)**

A. Flow of Control: Selection Statement: if, nested if –else, Conditional Expression, Switch statements. Iteration Statements: for loop, while loop, do -while loop, nested loop. Statements: go to, break & continue. Common programming errors. Application of C constructs in solving problems like generating arithmetic and geometric progression, prime numbers.

Arrays: Concept, declaration and initialization of arrays, accessing individual elements of array. Use of arrays in sorting, searching. Concept of 2-D array (Matrix), row major and column major representation of array, address calculation for accessing the individual element.

B. Static variables and constants in C language.

(8 Hrs)

Unit III

A. Functions: Need of functions, function declaration, definition and call. Inbuilt functions and user defined functions. Passing arguments to a function, returning values from a function. Scope of variable, local and global variable. Access specifiers.Passing arrays to functions.

Recursive Functions: Need of Recursion, direct recursion, indirect recursion, impact of recursion on local& global variables, examples of recursive programs – factorial, progressions, towers of Hanoi. Recursive vs Iterative solutions. Disadvantages of recursion.

B. Preprocessor and preprocessor directives: macro substitution, difference between macro and functions.

Unit IV **(8 Hrs)**

A. Pointers: Concept of pointers, relevance of data type in pointer variable, pointer arithmetic. Pointer to pointer. Pointers and functions (passing pointers to functions, returning pointers from functions). Pointers and arrays. Pointers and strings. Pointer constants. Array of pointers, pointer to array. Various alternatives of accessing arrays (1-D and 2-D) using pointers.

Strings: Strings as arrays, character array versus strings, reading strings, writing strings, user defined functions for string operations – copy, concatenate, length, reverse, converting case, appending, comparing two string, extracting a substring. Array of strings.

B: Const keyword in C, standard string library functions in string.h for string manipulation.

Unit IV **(8 Hrs)**

Structures: Notion, declaration and initialization, structure variables, accessing and assigning values of the fields, "size of" operator, functions and structures, arrays of structures, nested structures, pointers and structures, passing structure to a function and returning structure from function. Dynamic memory allocation, type casting, Introduction to self referential structures, linked list as a dynamic alternative to arrays.

File Handling in C: file types, file opening modes, file handling I/O – fprintf, fscanf, fwrite, fread, fseek. File pointers. Implementing basic file operations in C.

B. Typedef keyword. Union, Nesting of Structure and Union. Enumerated data types

Note: Five assignments on self-study, comprising of one assignment from each unit.

Text Books

1. "Programming with C- Schaum's outline Series", B. Gottfried, Second edition, Tata McGraw Hill Publication, ISBN 0-07-463491-7,
2. "Let us C", Y. Kanetkar, Second Edition, BPB Publication. ISBN: 8176566217.

Reference Books

1. "Programming language – ANSI C", Brain W Kernighan and Dennis Ritchie, Second edition ISBN 0-13-110370-9

Additional Reading

1. "A first book of C- Fundamental of C Programming", Gary Bronson and Stephen Menconi, ISBN: 0314073361,

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FF No. : 654

HS10202 :: DIFFERENTIAL AND INTEGRAL CALCULUS
(Tutorial)

Credits: 01	**Teaching Scheme:** - - Tutorial 1 Hr/Week

Prerequisites: Nil.

Objectives:

This course is a full one semester course taken by all engineering students. This course emphasizes theoretical foundations of partial derivatives, integral calculus, multiple integral, ordinary differential equations and their applications, to real world problems. It is also intended to enable students to recognize mathematical structures in practical problems, to translate real world problems into mathematical language and to apply "Differential and Integral calculus" to solve real them.

Upon completion of this module students will be able to:

- Recognize mathematical structures in practical problems.
- Translate problems into mathematical language and analyze problems using methods from all the units.
- Mapping with PEOs: I, III, V : (a, k, p)

List of Contents

In this module students will work on problems to practice and apply methods introduced in the theory lectures. Discussions of problems in small groups is always encouraged and facilitated and students are asked to submit weekly home work assignments and provide them immediate feedback and support materials.

Tutorial No. 1: Summary on successive differentiation and Libnitz's Rule, problems solving.

Tutorial No. 2: Summary on Taylor and Mclaurin's series and problems solving.

Tutorial No. 3: Summary on sequence and infinite series and test for its convergence, comparison, ratio test, power series and its convergence and problems solving.

Tutorial No. 4: Summery on partial derivatives, theorem on differentials, Euler's theorem on homogeneous functions and problems solving.

Tutorial No. 5: Summery on Jacobians and their applications, maxima and minima and problems solving.

Tutorial No. 6: Beta and gamma function

Tutorial No. 7: Summery on rules to find curves in Cartesian. parametric and form and problems solving.

Tutorial No. 8: Tracing of curves in polar co-ordinate system, Rectification.

Tutorial No. 9: Summery on double integration, and problems solving.

Tutorial No. 10: Summery on triple integration, transformation of multiple integrals (Jacobian) and problems solving. Summery on application of multiple integration and problems solving.

Tutorial No. 11: Summery on revision of ODE and exact DE, reducible to exact DE and problems solving.

Tutorial No. 12: Summery on LDE, Bernoulli's total and simultaneous total DE and problems solving.

Text Books

1. Text book of Calculus", Ron Larson and Bruce H. Edwards, Brooke/Cole, a part of Cengage Learning (Indian Edition), 1st Indian reprint 2010,
2. "Higher Engineering Mathematics", B.S. Grewal, Khanna Publishers, 40th Edition 2007.

Reference Books

1. "Calculus" Volume I: One Variable Calculus with an Introduction to Linear Algebra, 2nd Edition, Reprint 2011, Tom M. Apostal, Wiley.
2. "Calculus" Volume II: Multi Variable Calculus and Linear Algebra with Application to Differential Equations and Probability, 2nd Edition, Reprint 2011, Tom M. Apostal, Wiley.
3. "Calculus" , 4th Edition, Robert T. Smith and Roland B Minton, Mc Graw Hill Education (Indian Edition)
4. "Higher Engineering Mathematics", B. V. Ramana, Tata McGraw Hill, 5th reprint 2012.

FF No. : 654

HS10204 :: ENGINEERING MECHANICS (TUTORIAL)

Credits: 01	**Teaching Scheme:** - Theory 1 Hr/Week

Prerequisites: Nil

Objectives:

At the end of the course, students will be able to:

- Understand the fundamentals of statics and dynamics.
- Analyze a given problem and solve it confidently.
- Calculate the unknown parameters/ quantities involved in physical phenomena.
- Apply the principles, laws and fundamental equations of mechanics for particles & rigid bodies.
- Develop their communication (intra-personal and interpersonal) skills
- Mapping with PEOs: I, II, III, V : (a, c, e, h, k, o, p)

List of Contents:

All tutorials will be conducted in a group of about 20 students. These students will work on the problems/numericals to practice and apply methods taught in the theory lectures. Discussions of problems and its solution in small groups is always encouraged and will facilitate building of confidence in the minds of students.

Tutorial No.1: Revision of basic Mathematical and Computing Skills:

Students will answer the questions framed by the faculty on properties of circle, lines, triangles, basic trigonometry, solving simultaneous equations and quadratic equations, logarithms, and determinant etc.

Tutorial No.2: Revision of Vector operations and fundamental principles of mechanics:

Students will answer the questions framed by the faculty on scalars, vectors, unit vector, direction angles, direction cosines, expressing force as a vector, Addition/ Subtraction of vectors, dot and cross product of vectors, angle between vectors, Newton's three law of motion, and Newton's law of gravitation.

Tutorial No.3: Statics of Particles:

- Problems on resolution and composition of forces (Rectangular and non rectangular components)
- Resultant or equilibrant of concurrent coplanar force system.
- Resultant or equilibrant of non coplanar concurrent force system.

Tutorial No. 4: Statics of Rigid bodies:

- Moments of a force about a point-(scalar treatment).
- Resultant of parallel and non concurrent non parallel coplanar force system.
- Moment of non coplanar force about a point and about an axis.

Tutorial No: 5: Equilibrium of Rigid bodies:

- Drawing free body diagrams of given coplanar force system.
- Problems on equilibrium of simple beams.
- Problems on three force equilibrium.

Tutorial No. 6: Equilibrium of Rigid bodies and centroid

- Problems on general equilibrium / mechanisms of coplanar force system.
- Problems on Centroid of area.
- Problems on Centroid of line.

Tutorial No.7: Analysis of truss and frames.

- Analysis of simple trusses by method of joint
- Analysis of simple trusses by method of section.
- Analysis of simple frames.

Tutorial No.8: Applications of Friction:

- Problems on wedge friction
- Problems on belt friction and band/brake
- Problems involving dry friction on rod/ bar/ ladder inclined planes.

Tutorial No.9: Kinematics of particles: (Rectilinear motion)

- Problems on variable acceleration, constant acceleration.
- Problems on motion curves.

Tutorial No.10: Kinematics of particles: (Curvilinear motion)

- Problems on Rectangular co-ordinate (x-y) system
- Problems on Normal and tangential (n-t) system.
- Problems on Radial and transverse (r-θ).
- Problems on Projectile motion.

Tutorial No.11: Kinematics of particles: (Force and acceleration)

- Problems on application of Newton's 2nd law of motion using FBDE approach in rectangular co-ordinate (x-y) system- motion on horizontal and inclined plane, particles connected by in extensible cord.
- Normal and tangential (n-t) system.

Tutorial No.12: Kinetics of particles: (Work energy)

- Problems on application of work energy principle involving spring force, friction force, externally applied force.
- Problems on direct central and oblique impact.

Text Books

1. "Vector Mechanics for Engineers", F. P. Beer and E. R. Johnston, 9th Edition –Mc Graw Hill Publications,
2. "Engineering Mechanics Statics and Dynamics", R. C. Hibbler, Ashok Gupta, 11th Edition – Pearson Publications,

Reference Books

1. "Engineering Mechanics Statics", J. L. Meriam, L. G. Kraige – 5th Edition, John Wiley & Sons,
2. "Engineering Mechanics Dyanamics", J. L. Meriam, L. G. Kraige – 5th Edition, John

Wiley & Sons.
3. "Engineering Mechanics Statics and Dynamics", E.W. Nelson, C. L. Best, W. G. McLean, 5th Edition – Tata McGraw Hill.
4. "Engineering Mechanics Statics and Dynamics", A. P. Boresi, R. J. Schmidt,– Thomson/Cangage Publications,

FF No. : 654

HS10306 :: ENGINEERING LABORATORY (HS10104 + HS10108)

Credits: 1	Teaching Scheme: - Laboratory 2 Hrs/Week

Prerequisites: Nil

Objectives:

ENGINEERING MECHANICS LABORATORY

- To understand and predict physical phenomena to lay the foundation for engineering applications.
- To develop logical approach and reasoning for analysis and design of engineering applications / unfamiliar situations.
- To promote processes of problem solving abilities , experimental, observational, manipulative, decision making and investigatory skills in the learns by using concept of Newtonian Mechanics
- To develop the ability to recognize and apply the appropriate physics introduced in the lecture course to actual experimental situations by taking mini projects.
- Mapping with PEOs: I, II, III, V : (a, c, e, h, k, o, p)

List of Practical: Any five from following

1. (A) Verification of Lami's theorem.
   (B) Verification of Varignon's Theorem
2. Reactive forces in beams (A) Simple, (B) Compound.
3. Equilibrium of spaces force system: (A) Concurrent, (B) Parallel.
4. Study of dépendent Motion.
5. Study of (A) Coefficient of Restitution.
   (B) Curvilinear Motion.
6. Solution of two problems each from statics and dynamics using computer application software.

Text Books

1. "Vector Mechanics for Engineers", F. P. Beer and E. R. Johnston, 9th Edition –Mc Graw Hill Publications,
2. "Engineering Mechanics Statics and Dynamics", R. C. Hibbler, Ashok Gupta, 11th Edition – Pearson Publications.

Reference Books

1. "Engineering Mechanics Statics", J. L. Meriam, L. G. Kraige – 5th Edition, John Wiley & Sons,
2. "Engineering Mechanics Dyanamics", J. L. Meriam, L. G. Kraige – 5th Edition, John Wiley & Sons.
3. "Engineering Mechanics Statics and Dynamics", E.W. Nelson, C. L. Best, W. G. McLean, 5th Edition – Tata McGraw Hill.
4. "Engineering Mechanics Statics and Dynamics", A. P. Boresi, R. J. Schmidt,– Thomson/Cangage Publications,

ELECTRICAL ENGINEERING FUNDAMENTALS LABORATORY

Objectives:

- Understand connections of an electrical circuit
- Develop hands on experience of handling electrical appliances and instruments.
- Understand testing procedure of electrical motors.
- Mapping with PEOs: I, II, III, V : (a, e, g, i, l, m, p)

List of Practical – (Any 6 experiments from the list below.)

1. Study of wires and wiring components.
2. Wiring Exercise - 1.
3. Wiring Exercise - 2.
4. Making of a single phase extension board.
5. Study of RLC series circuit.
6. Study of three phase circuits.
7. Study of a domestic electricity bill.
8. Study of batteries and cells.
9. Study of earthing and safety equipments.

Text Books

1. Electrical Technology - vol.- I and II by B. L. Theraja.
2. Wiring, estimation and costing by S. L. Uppal

Reference Books

1. Fractional and sub fractional horse power electrical motors - C.E. Veinou and J.E. Martits , McGraw Hill

FF No. : 654

CS10302 :: COMPUTER PROGRAMMING LAB

Credits: 1	**Teaching Scheme:** - Laboratory 2 Hrs/Week

Prerequisites: Nil

Objectives:

- To understand use of efficient programming and documentation.
- To explore C programming language.
- Understand of how several fundamental algorithms work, particularly those concerned with sorting and searching.
- To learn basics of C++ programming language.
- Mapping with PEOs: I, II, IV, V : (a, d, e, g, k, p)

List of Practical

1. Study of DOS/UNIX commands.
2. Write a program in C to accept a character from user and display it in opposite case/ to generate a simple mathematical calculator.
3. Write a program in C to find largest element / average of given N elements/ sum/reverse of a given integer.
4. Write a program in C to read an integer and display each of the digits of an integer in English.
5. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
6. Write a program in C that use both recursive and non-recursive functions to find the Factorial / GCD (greatest common divisor) of two given integers / Fibonacci series etc.
7. Write a program in C to sort n integers using bubble / merge sort.
8. Write a program in C to search a number in a given list using linear / binary search.
9. Write a program in C to perform Addition / Subtraction / Multiplication of two Matrices. Also determine whether the matrix is symmetric / skewed.
10. Write a program in C to carry out following operations on strings using library function.
    a. Length of a sting. b. Copy of string. c. Concatenation of strings.
11. Write a program in C to carry out following operations on strings without using library function.
    a. Compare two strings. b. Reverse given string.
    c. To check if the given string is a palindrome or not.
12. Write a program in C to carry out following operations on strings using pointers.
    a. Length of a sting. c. Copy of string.
    b. Concatenation of strings. d. Compare two strings.

13. Write a C program that represents complex number using a structure. Perform the following operations:
    a. Reading a complex number.
    b. Addition of two complex numbers.
    c. Writing a complex number.
    d. Multiplication of two complex numbers.
14. Write a C program to create a database of students by using array of structure and perform following operations on it.
    a. Accept record of student
    b. Search a particular record
    c. Display all records
    d. Modify a particular record.
15. Write a C++ program to demonstrate the use of constructor, destructor.
16. Write a C++ program to demonstrate multi-level inheritance and multiple inheritance.
17. Write a C++ program to demonstrate polymorphism

Note: Faculty members should frame 14 assignments from the above list.
First assignment and any two C++ assignments in the list are compulsory.

Text Books

1. "Programming with C- Schaum's outline Series", B. Gottfried, Second edition, Tata McGraw Hill Publication, ISBN 0-07-463491-7,
2. "Let us C", Y. Kanetkar, Second Edition, BPB Publication. ISBN: 8176566217.

Reference Books

1. "Programming language – ANSI C", Brain W Kernighan and Dennis Ritchie, Second edition ISBN 0-13-110370-9,
2. " Object Oriented Programming with C++", E. Balaguruswamy, Tata McGraw Hill Publication, ISBN 0-07-462038-x.

Additional Reading

1. "A first book of C- Fundamental of C Programming", Gary Bronson and Stephen Menconi, ISBN: 0314073361,
2. "C++ Program Design: An introduction to Programming and Object-Oriented Design", Cohoon and Davidson, 3rd Edition, Tata McGraw Hill. 2003, ISBN-13: 978-0-07-122649-3.

Bansilal Ramnath Agarwal Charitable Trust's
VISHWAKARMA INSTITUTE OF TECHNOLOGY – PUNE
(An autonomous Institute affiliated to Savitribai Phule Pune University)
666, Upper Indiranagar, Bibwewadi, Pune – 411 037.

FF No. : 654

HS10107 :: COMMUNICATION SKILL

Credits: 01	**Teaching Scheme: -** Theory 2 Hrs/Week

Prerequisites: Nil

Objectives:

- To understand the basics of eight parts of speech.
- To guide the students with apt expressions in English language (both words and sentence construction).
- To improve reading, writing and listening skills.
- To make the students confident and impressive in front of a group.
- Mapping with PEOs: I, II, III, V : (j, k, n, o, p)

Unit I **(4 Hrs)**

[A] Self introduction, eight parts of speech, Use of Phrases, Clauses, Use of abbreviations and acronyms, Forms of sentences

[B] To find phrases, abbreviations, acronyms and clauses used in any science subject (10 each)

Unit II **(5 Hrs)**

[A] Revision of basic rules related to grammar with respect to:

a) ***nouns and pronouns*** followed by exercises (min 20 sentences),
b) ***determiners and adjectives*** followed by exercises (min 20 sentences),
c) ***prepositions and conjunctions*** followed by exercises (min 20 sentences)

[B] Home Assignments related to the above topics (minimum 25 sentences on each topic).

Unit III **(5 Hrs)**

[A] Revision of basic rules related to grammar with respect to:

a) ***verbs and adverbs*** followed by exercises (min 20 sentences)
b) ***tense*** followed by exercises (min 20 sentences)
c) ***subject verb agreement*** followed by exercises (min 20 sentences)

[B] Home Assignments related to the above topics (minimum 25 sentences on each topic).

Unit IV **(5 Hrs)**

[A] Developing Language Skills:

a) Developing Reading Skills, To read, take notes and interpret the given information (text / diagrams / flow chart etc)
b) Developing listening skills, How to be a good listener. Exercises with respect to listening,
c) Developing writing skills, To compose emails, Business correspondence
d) Developing formats.

[B] Home Assignments related to the above topics (Read the newspaper and write the gist of topic given by teacher, Listen to BBC, Doordarshan English News, Assignments related to non technical writing).

Unit V **(5 Hrs)**

[A] Vocabulary Building. Glimpses of tests / exams organized by UPSC / Bank for Probationary officer/ TOEFL/IELTS

[B] Home Assignments related to the above topics (Puzzles, Quizzers, Previous years question papers of UPSC, Bank, TOEFL, IELTS).

Text Books

1. "Business communication" K.K.Sinha 2001 Revised Edition GALGOTIA Publishing Company, Delhi.
2. "Communication Skills" by Dr PC Pardeshi 2005 Nirali Prakashan Pune
3. "Funcations of English "Student's edition Leo Jones , 2nd edition Cambridge University press Delhi

Reference Books

1. "High School English Grammar " with key Renin Martin 1989 S Chand & Co ltd Mumbai
2. "Punctuation Book " Nidhi Pathak 2010 published by Lotus Press Delhi
3. "English for competitive examinations " Swarna Chawla , Vikas publishing house pvt ltd , UBS Publisher's distributors – Pune

FF No. : 654

HS 14301 :: ENGINEERING WORKSHOP

Credits: 1	**Teaching Scheme:** - Laboratory 2 Hrs/Week

Prerequisites: Nil

Objectives:

- To give students 'hands on experience' of craftsmanship
- To make students familiar with different work trades
- To develop quality and safety consciousness amongst the students
- To develop awareness of fire safety amongst the students
- To develop respect towards labor work amongst the students.
- Mapping with PEOs: I, II, IV, V : (b, c, f, g, i, j, m)

Practical Details:

1. **Carpentry**
   Introduction, use of marking tools and hand tools such as marking gauge, try squares, steel rules, saws, jackplane, chisels, etc. Use of power tools, safety precautions.

   Practical
   One job involving different operations such as sawing, planning, chiseling, etc.

2. **Welding**
   Introduction, principle of manual metal arc welding, equipment and it's operation, welding electrodes, welding joints, welding symbols, safety precautions.

   Practical
   One job on mild steel.

3. **Mini Project**
   Besides the above jobs, students in groups will make an article / gadget / model / setup involving the work of above work trades and / or other work trades.

Demonstrations

1. **Fire Safety**
   Introduction, fire prevention precautions, necessity of fire fighting, fire extinguishers, rules of fire fighting, risk elements in fire fighting and demonstration of use of fire extinguishers.

2. **Gas Cutting**
   Introduction, principle, equipment and it's operation, safety precautions and demonstration of Oxy-Acetylene Gas cutting process.

Note:- Students should wear safety apron and safety shoes during the practicals.

Text Books

1. S. K. Hajra Choudhary, Elements of Workshop Technology, Media Promoters and Publishers Pvt. Ltd.,
2. K.T. Kulkarni, Introduction to Industrial Safety, K.T. Kulkarni, Pune.

Reference Books

1. Hwaiyu Geng, Manufacturing Engineering Handbook, McGraw Hill Publishing Co. Ltd.,
2. Lawrence E. Doyle, Manufacturing Processes and Materials for Engineering, Prentice Hall Inc.

FF No. : 654

HS10107 :: GENERAL SEMINAR I

Credits: 01	**Teaching Scheme:** - Theory 2 Hrs/Week

Prerequisites: Nil

Objectives:

- To improve pronunciation.
- To improve oral communication.
- To guide the students with apt expressions in English language (both words and sentence construction).
- To improve reading, writing and listening skills.
- To make the students confident and impressive in front of a group.
- Mapping with PEOs: I, II, III, V : (j, k, n, o, p)

List of Demonstration and Practical Sessions

Sr. No.	Name of the Experiment	Mode of Conduct
1.	Phonetics – vowels and diphthongs,	Demonstration and practice sessions
2.	Phonetics – consonants,	
3.	Elements of good presentation skills,	
4.	Elements of communication process, barriers and how to overcome barriers,	
5.	Presentations by 6 – 7 students (1st Topic)	**Student activities in groups:** Each student must present any topic for 10 min followed by an evaluation by the teacher for 5 min using evaluation criterion. All other non participating must attend and can give suggestions. Each student will give minimum of two presentations per semester.
6.	Presentations by 6 – 7 students (1st Topic)	
7.	Presentations by 6 – 7 students (1st Topic)	
8.	Presentations by 6 – 7 students (1st Topic)	
9.	Presentations by 6 – 7 students (2nd Topic)	
10.	Presentations by 6 – 7 students (2nd Topic)	
11.	Presentations by 6 – 7 students (2nd Topic)	
12.	Presentations by 6 – 7 students (2nd Topic)	

Text Books

1. "Developing communication skills " – Krishna Mohan & Meera Banerji , 2008 Mcmilan Publishers Delhi
2. "Speaking and writing for effective business communication " Francis Sounderaraj 2009 , Mcmilan Publishers India ltd, delhi

Reference Books

1. " Cambridge English for engineering " Mark Ibbotson , Cambridge university press Delhi
2. " Professional presentations Malcolm Goodale ", Cambridge university press 2009

FF No. : 654

HS 14302 :: TRADE WORKSHOP

Credits: 1	**Teaching Scheme:** - Laboratory 2 Hrs/Week

Prerequisites: Nil

Objectives:

- To give students 'hands on experience' of craftsmanship
- To make students familiar with different work trades
- To develop quality and safety consciousness amongst the students
- To develop respect towards labour work amongst the students
- To apply Workshop skills in various engineering disciplines
- Mapping with PEOs: I, II, IV, V : (b, c, f, g, i, j, m)

Practical Details:

Students from various groups of engineering disciplines like group of Mechanical, Industrial, Production, Chemical / Computer, Information Technology / Electronics, Electronics & Telecommunication, Instrumentation will perform different jobs / exercises / mini projects in Workshop out of which, one would essentially involve application of Workshop trades in their respective group of discipline. The jobs / exercises / mini projects etc. will be done individually or in group in consultation with the Workshop staff.

Demonstrations

1. **Plastic Injection Moulding:** Introduction, principle, equipment and it's operation, mould introduction and settings, safety precautions and demonstration of plastic injection moulding process.

2. **Electroplating:** Introduction necessity, principle, safety precautions and demonstration of electroplating process.

3. **Press Work:** Introduction, die and punch, basic operations such as punching, bending, shearing, etc. safety precautions and demonstration of press working.

Note:- Students should wear safety apron and safety shoes during the practicals.

Text Books

1. S.K. Hajra Choudhary, Elements of Workshop Technology, Media Promoters and Publishers Pvt. Ltd.,
2. K.T. Kulkarni, Introduction to Industrial Safety, K.T. Kulkarni, Pune.

Reference Books

1. Hwaiyu Geng, Manufacturing Engineering Handbook, McGraw Hill Publishing Co. Ltd.,
2. Lawrence E. Doyle, Manufacturing Processes and Materials for Engineering, Prentice Hall Inc.

Bansilal Ramnath Agarwal Charitable Trust's
VISHWAKARMA INSTITUTE OF TECHNOLOGY – PUNE
(An autonomous Institute affiliated to Savitribai Phule Pune University)
666, Upper Indiranagar, Bibwewadi, Pune – 411 037.

List of General Proficiency Courses offered to F.Y. B.Tech. AY 2014-15

Course Code	Name of Course
HS15311	Flute
HS15312	Guitar
HS15313	Tabla
HS15314	Bharat Natyam
HS15315	Kathak
HS15316	Classical Vocal
HS15317	Yoga
HS15318	Pranayam
HS15319	Aerobics
HS15320	Rational Emotional Beh. Therapy
HS15321	Photography
HS15322	Digital Photography
HS15323	Volleyball
HS15324	Chess
HS15325	Taekwondo
HS15326	Film Appreciation
HS15327	Shares and Stocks
HS15328	Fundamentals of Banking
HS15329	Nutrition and Fitness

*Please see the GP/OE/Language Course Booklet for Syllabi