DEPARTMENT OF APPLIED MATHEMATICS AND COMPUTATIONAL SCIENCE
B.Tech. I YEAR (4YDC)
MA 10001: MATHEMATICS-I

HOURS PER WEEK			CREDITS			MAXIMUM MARKS				
T	P	Tu	T	P	Tu	THEORY		PRACTICAL		TOTAL MARKS
						CW	END SEM	SW	END SEM	
3	--	1	4	--	--	30	70	--	--	100

PRE –REQUISITES: NIL

COURSE OBJECTIVES

Enable the students to apply the knowledge of Mathematics in various engineering fields by making them
- understand the fundamental concepts of differential calculus and their applications for functions of several variables in engineering problems.
- incorporate the knowledge of multiple integral to support the concurrent and subsequent engineering studies.
- learn the basic concept of Boolean algebra and its applications to circuits.

COURSE OUTCOMES

The students will be able to
CO#1 develop competency in applying the ideas of partial derivatives and use Taylor's and Maclaurin's series for series expansions of function and obtain approximate values.
CO#2 apply the knowledge of Lagrange's multipliers for finding the extreme values of functions and understand the concept of curvature and asymptotes.
CO#3 understand the concept of Beta and Gamma function and the basic idea of multiple integrals.
CO#4 use multiple integrals to formulate and solve application problems of area,length and volume .
CO#5 simplify the Boolean expression in normal form and designing the switching circuits .

COURSE CONTENTS

THEORY

UNIT 1   Differential Calculus: Partial derivatives: Definition, Euler's theorem of homogeneous function, Differentiation of implicit function, Total differential coefficients, Jacobians, Expansion of functions by Taylor's and Maclaurin's series of one and two variables .

UNIT 2   Differential Calculus (Continued): Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers and their applications, Curvature in Cartesian and polar coordinates, Asymptotes (Cartesian coordinates).

UNIT 3   Integral Calculus: Beta and Gamma functions, Elementary ideas of multiple integrals, Change of order of integration and change of variables in double integrals using Jacobians.

UNIT 4   Integral Calculus (Continued): Detailed study of tracing of curves, Area, Length of curve, Volume and Surface of revolution.

UNIT 5   Boolean Algebra: Laws of Boolean algebra, Boolean function and Boolean expression, Principle of Duality, Representation of Boolean function, Sum of product function, Application of Boolean algebra in design of switching circuits.

ASSESSMENT
1.   Internal Assessment for continuous evaluation, mid-term tests, tutorials, class performance, etc. (30%)
2.   End semester Theory Exam (70%)

TEXT BOOKS RECOMMENDED
1.   B. V. Ramana, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2006.
2.   H. K. Das, Advanced Engineering Mathematics, S. Chand and Company Ltd., New-Delhi, 2009.

REFERENCE BOOKS
1.   S. S. Sastry, Engineering Mathematics Volume I and Volume II, PHI Learning Private Limited, New Delhi 2008.
2.   Tarit Majumder, Engineering Mathematics Volume-I, New Central Book Agency (P) LTD, Kolkata.
3.   S Pal and S. C. Bhunia, Engineering Mathematics, Oxford University Press, New Delhi, 2015.

PH10006 – Physics

Subject Code	Subject Nomenclature	Contact hrs			Maximum Marks				Credits		
		L	T	P	CW	End	SW	End	T	P	Tot
PH10006	Physics	3	1	2	30	70	20	30	4	1	5

COURSE OBJECTIVES

CO #1 *To provide knowledge and understanding capacity of basic, applied and modern physics.*
CO #2 *To generate attitude and interest to solve problems at macro, micro to nanoscale level systems.*
CO #3 *To update the knowledge of physics tools, instruments and techniques.*
CO #4 *To identify, conduct, formulate and solve engineering problems with the basics and applied knowledge of Physics.*

COURSE CONTENTS

Unit-1. Electrodynamics & STR: *Gradient, divergence and curl; significance. Maxell's equations, em wave equations for plane waves in dielectric medium and free space, Poynting theorem; postulates, time dilation length contraction, twin paradox, mass-energy relation.*

Unit-2. Optics: *Principle of superposition. Conditions for sustained interference, Division of wavefront and amplitude, Newton's rings. Fresnel and Fraunhofer class of diffraction, diffraction at single slit, double and N (grating) slits. Rayleigh's criteria and resolving power.*

Unit-3. Quantum Theory : *Planck's radiation formula, Ultraviolet catastrophe, Compton's effect, de Broglie's concept of matter waves, Heisenberg's uncertainty relations, Schrodinger's wave equation, Physical interpretation of wave function, Particle in a one-dimensional potential well.*

Unit-4. Lasers: *Spontaneous and Stimulated emission, components of lasers, optical resonator, Einstein's A & B coefficients, Population inversion, Ruby and He-Ne lasers, applications.*

Unit-5. Fiber Optics: *Classification, acceptance angle, numerical aperture, V-number, attenuation, ray dispersion in fibers, fiber optics sensors, optical fiber communication system.*

Text Books
1. N. Subramanyam and B. Lal : A Text book of Optics, (S. Chand, New Delhi) 2010.
2. A. Beiser, S. Mahajan, S. R. Choudhary : Concepts of Modern Physics, 6th Edition,(SIE, Tata-McGraw- Hill, New Delhi) 2012.
3. A. Ghatak : Optics, 4th Edition, (Tata McGraw-Hill, New Delhi) 2009.

Reference books
4. H. K. Malik and A. K. Singh : Engineering Physics (Tata McGraw Hill New Delhi) 2010.
5. R.P. Feynman, R.B. Leighton and M.Sands : Feynman Lectures on Physics Vol. 1 -3 (Addison-Wesley,Delhi 1995).
6. W.H. Hayt : Engineering Electromagnetic, 5th Ed. (Tata-McGraw Hill, New Delhi) 1995.
7. M.N.O. Sadiku : Elements of Electromagnetic, 3rd Ed. (Oxford Press, New Delhi) 2000.

COURSE OUTCOME

At the end of one-semester course, the students are armed with
CO #1 *The knowledge of multiphysics to understand engineering problems*
CO #2 *The skills to use logic and attitude towards engineering problems with multiphysics implementation.*
CO #3 *The ability use modern engineering physics techniques and tools including software.*

CIVIL ENGINEERING AND APPLIED MECHANICS DEPARTMENT
B. E. I YEAR (4YDC)
CE: 10003: FUNDAMENTALS OF CIVIL ENGINEERING AND
APPLIED MECHANICS

CREDITS:

PERIOD PER WEEK			CREDITS			MAXIMUM MARKS				
T	P	Tu	T	P	Tu	THEORY		PRACTICAL		TOTAL MARKS
(3+1)	2	-	3	1	-	CW	END SEM	SW	END SEM	200
						30	70	40	60	

PRE-REQUISITE: XII standard (HSSC)

COURSE OBJECTIVES:
1. To study various force systems, equilibrium of force system, frictional forces
2. To learn the concepts of centroids, centers of gravity and moments of inertia of simple and complex geometrical shape. Transmission of power through belt & ropes.
3. To learn the behavior of beams, frames and trusses under different loading conditionsand to determine the shear force and bending moment diagram for beams subjected to simple point loads.
4. To study methods and equipments for chaining, linear & angular measurements.
5. To understand the fundamental concepts of leveling.

COURSE OUTCOMES:
The students shall be able to
1. Identify and analyze system of forces, calculatesupport reactions for beam subjected to various types of loading and determine forces in members of trusses and.
2. Determine the Center of Gravity and moment of Inertia of a given Plane Lamina & Solid Bodies
3. Determine and analyze the Shear force, Bending moment of beams and analyze the trusses and problems related to frictions
4. Understand the working principles of chaining instruments and measuring distance, perpendicular and oblique offsets from the given reference line
5. Apply the knowledge of surveying and leveling in different operations in civil engineering projects.

COURSE CONTENTS:
THEORY:
PART - A: (67 % Weightage)
APPLIED MECHANICS
UNIT-1

Forces and Equilibrium: Graphical and Analytical Treatment of Concurrent and Non-concurrent Co-planner forces, Free Body Diagram, Force Diagram and Bow's notations.
Application of Equilibrium Concepts:, Frictional force in equilibrium problems.
UNIT-2
Centre of Gravity and Moment of Inertia: Centroid and Centre of Gravity, Moment of Inertia of Area and Mass, Radius of Gyration, Introduction to Product of Inertia and Principle Axes.
Power Transmission and its applications
UNIT-3
Beams: Types of Beams: Simply Supported Beam, Overhanging Beam, Cantilever Beam. Types of Supports of a Beam or Frame: Roller, Hinged and Fixed Supports. Load on the Beam and Frame: Different Types of Loading. Support Reaction of a Beam or Frame: Analytical Method. Analysis of Plane Trusses: Method of Joints, Method of Sections. Support Reactions, graphical methods.
Introductions to shear force and Bending Moment and to draw shear force and bending moment diagram for UDL and Point Load for Cantilever and Simply supported beam without overhang.

PART - C: (33 % Weightage)

<u>SURVEYING</u>:
UNIT-4
   Linear Measurements: Chain and Tape Surveying, Errors and Correction, Obstacles, Area Measurement by Planimeter.
   Angular Measurements: Bearing, Prismatic Compass, Local Attraction, Declination, Bowditch rule of correction for traverse, Accuracy and Precision.
UNIT-5
   Levelling: Types of Levels, Levelling Methods, Height of Instrument and Rise and Fall Method, Measurements, Recording, Reciprocal Levelling, Contours and Properties.
<u>ASSESMENT:</u>
   Continuous: Two midterm tests in a semester and a makeup test if required, Evaluation of Practical calculations & drawing sheets, internal submission and Viva Voice examination by internal examiner during. Semester-end: Theory examination of 3 Hours duration and Practical Viva Voice Examination by external examiner

PRACTICALS:

LAB COURSE OBJECTIVES:

1. To acquire practical knowledge on handling basic survey equipment's
2. To possess knowledge about chain, compass surveying and open traverse survey.
3. To have the ability to understand leveling and area of irregular figures.
4. To study the principles of friction for different surfaces on horizontal plane and inclined plane.
5. To study and analyze the polygon law of forces.

LAB COURSE OUTCOMES:-
After performing different experiments, students shall be able to

1. Understand the working principles of chaining instruments and measuring distance, perpendicular and oblique offsets from the given reference line.
2. Understand the principle of prismatic compass, open traverse survey.
3. Compute the RL of different points on the ground by spot leveling and alsocompute the area and volume of irregular figure.
4. Apply the principles of friction for different surfaces on horizontal plane and inclined plane.
5. Apply the analytical method to verify and compare the polygon law of forces.

List of Experiments:

1. To study the colour/sign conventions and various instruments used in chaining.
2. To determine the horizontal distance between two points by doing ranging and chaining.
3. To measure perpendicular and oblique offsets from a given reference line.
4. To study prismatic compass and perform open traverse survey.
5. To do traversing of any regular figure with the help of compass and eliminate local attraction.
6. To determine RL of different points on the ground by fly differential leveling and compute RL's byheight of instrument (HI) method and rise and fall method
7. To determine planimeter constants and area of an irregular figure with the help of a planimeter
8. To verify the principal of moment using bell crank level
9. To determine the coefficient of friction for different surface on horizontal plane.
10. To determine the coefficient of friction for different surface on inclined plane
11. Verify the polygon law of forces and compare with analytical method.

ASSESMENT:
Sessional work will be based on syllabus of Engineering Mechanics and Surveying.

TEXT BOOKS RECOMMENDED:
1. Rajput .R.K*., Engineering Mechanics, Dhanpat Rai and Sons New Delhi.*
2. D.S. Bedi, *Engineering Mechanics*, , Khanna Book Publishing Co. (P) Ltd., Delhi
3. R. S. Khurmi, *Engineering Mechanics*, , S.Chand Publishing
4. R.K. Bansal, *A Textbook of Engineering Mechanics*, , Laxmi Publications
5. Engineering Mechanics, Sharma, Pearson.
6. Prasad I. B., *Applied Mechanics*, *Khanna Publication New Delhi*
7. Rammamurtham S., *Applied Mechanics, Dhanpat Rai and SonsNew Delhi*
8. Duggal S.K., Surveying *Vol. 1, Tata McGraw- Hill Education New Delhi*
9. Punmia, B.C., *Surveying, Laxmi Publications, New Delhi.*

REFERENCE BOOKS:
1. Kumar KL, *Engineering Mechanics*, *Tata McGraw- Hill Education New Delhi, Edition 4th* , 2011
2. Ferdinand.P. Beer. E, Russell, Jr Johnston., David Mazurek, Philip J Cornwell, "*Vector Mechanics for Engineers: Statics and Dynamics", McGraw – Hill Education New DelhiEdition 11th 2005.*
3. Timoshenko, and Young D.H., "*Engineering Mechanics", Tata Mc-Graw Hill Education New Delhi Edition 4th 2007.*
4. Chanchandramouli P.N., *Engineering Mechanics*, *PHI Learning Private Limited New DelhiEdition 2011*

Department of Mechanical Engineering
B. E. 1st Year (Common to all Branches of Engineering and Technology)

ME10650: FUNDAMENTAL OF MECHANICAL ENGG.

CODE	SUBJECT NAME	Hours per Week			Credits			Maximum Marks				
								Theory		Practical		Total
		L	T	P	T	P	Total	Th.	CW	SW	Pr.	
ME 10650	FUNDAMENTAL OF MECHANICAL ENGINEERING	4	-	2	3	1	4	70	30	20	30	150

Course Objectives:

1. Gain fundamental knowledge of Thermodynamics, Fluid Mechanics and I.C. Engines.
2. Develop skills for material selection for different devices/ components.
3. Gain knowledge of steam formation and properties of steam.

Course Outcomes:

CO 1	Enhancement of fundamental knowledge of Thermodynamics.
CO 2	Enhancement of fundamental knowledge of Fluid Mechanics and I.C. Engines.
CO 3	Acquiring knowledge of materials and their properties for engineering applications
CO 4	Enhancement of analytical skills by Learning different mechanism of machines.
CO 5	Evaluate properties of steam. Demonstrate various types of boilers and their relative merits and demerits. Learning problem solving in particular domain.

COURSE CONTENTS

UNIT 1

Thermodynamics: Thermodynamics properties and processes, heat and work. Zeroth law and First law of thermodynamics. Steady flow energy equation, basic concepts of Second law of thermodynamics.

UNIT 2

Fluid Mechanics: Introduction to fluid properties, Newton's law of viscosity, Pascal's law, Hydrostatic law, types of fluid flow. Euler's equation, Bernoulli's equation & its application.

Introduction to I. C. Engine: Classification of IC engines, terminology used in I C engine; Otto, Diesel & Dual cycles; their air standard efficiencies. Principal parts of IC engine, their functions and working.

UNIT 3

Materials: Introduction, properties, crystal structures types, normal tensile shear and thermal stress and their variation in different section of beams, stress-strain diagrams for ductile and brittle materials, elastic constants and relationship between elastic constant.

UNIT 4

Mechanism and Machines: Types of motion, links, kinematic pair, types of joints, degree of freedom, classification of kinematic pairs, kinematic chain, linkage, mechanism and structure, inversions of four-bar and slider crank mechanism.

UNIT 5

(a) Boilers: Classification of boilers, boiler mountings & accessories: function, their construction and working, boiler efficiency, equivalent evaporation, chimney height.

(b) Properties of Steam: Types of steam; enthalpy, volume and internal energy of steam; critical point and triple point of steam; measurement of dryness fraction of steam.

List of Experiments:

1. Introduction of Boiler
2. Study of simple Vertical Boiler
3. Study of Cochran Boiler
4. Study of Boiler Mountings
5. Introduction of Engines
6. Study of Simple Steam Engine
7. Study of Internal Combustion Engine
8. To Study The Cooling and Lubrication System of Internal Combustion Engine
9. Study of Separating and Throttling Calorimeter

Course Assessment: The following methods are adopted for the assessment of this course;

1. **Theory Examination** (70 Marks) on the basis of end term theory paper examination.
2. **Class Work** (30 marks) on the basis of regular evaluation of assignments, two mid semester tests and class attendance.
3. **Sessional Work** (20 marks) on the basis of internal viva and continuous laboratory journal assessment and laboratory attendance.
4. **Practical Examination** (30 Marks) on the basis of evaluating practical knowledge, quiz and viva-voce.

Books Recommended:
1. Nag, P.K., *Engineering Thermodynamics*, Tata McGraw Hill.
2. Bansal R K, *Strength of Materials,* Laxmi Publication
3. Yadav, R., *Thermodynamics*, Standard Publishers.
4. Rattan S S, *Theory of Machine*

Department of Mechanical Engineering
B. E. 1st Year (Common to all Branches of Engineering and Technology)

ME10149: ENGINEERING GRAPHICS

CODE	SUBJECT NAME	Hours per Week			Credits			Maximum Marks				
								Theory		Practical		Total
		L	T	P	T	P	Total	Th.	CW	SW	Pr.	
ME 10149	**Engineering Graphics**	3	-	4	2	2	4	70	30	40	60	200

PRE-REQUISITES:

Course Objectives

1. To familiarize with the drawing instruments, scales and engineering curves.
2. To familiarize with the projection of 1D, 2D and 3D elements.
3. To familiarize with the sectioning of solids and development of surfaces.
4. To familiarize with the conversion of orthographic to isometric views and vice versa.
5. To familiarize with the software for drawing and modern drafting technologies.

Course Outcomes: After completion of this course students will be able to

CO 1	Understand standards drawing conventions, draw curve and scale, use of drawing instruments
CO 2	Apply the concept of projection on lines, planes and solids
CO 3	Draw development of surface and section of solids
CO 4	Draw isometric and orthographic projections
CO 5	Use drafting tools for creating 2-D and 3-D shapes

COURSE CONTENTS

THEORY

Unit 1

Basic Concepts, scales and curves: Principles of Engineering Graphics and their significance, usage of Drawing instruments, lines, lettering and dimensioning, Scales- Plain, Diagonal and Vernier Scales, Conic sections including the Rectangular Hyperbola, Cycloid, Epicycloid, Hypocycloid and Involute.

Unit 2

Projections of Line, Planes and solids: Principles of Orthographic Projections- Conventions , Projection of points and lines inclined to both planes; Projections of planes, inclined Planes -Auxiliary Planes; Solids inclined to both the planes- Auxiliary Views.

Unit 3

Sections of Solids: Section planes- AIP, AVP; Sections of geometrical solids, True shape.

Development of Surfaces: Development of surfaces of Right Regular Solids- Prism, Pyramid, Cylinder and Cone.

Unit 4

Isometric Projections: Principles of isometric projection- isometric Scale, isometric Views, Conventions, Isometric Views of Lines, Planes, Simple and compound Solids: Conversion of Orthographic Views to isometric Views.

Orthographic Projections; Conversion of isometric Views to Orthographic Views of simple machine parts.

Unit 5

Introduction to Drafting Software: Demonstrating knowledge of the theory of CAD software, Ribbon tabs, Menu system, toolbars, Drawing Area, Dialog boxes and windows, Shortcut menus, Command Line, Status bar; Different method of zoom; Select and erase objects; Setting up the drawing page and the printer; Setting up of units and drawing limits; 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 to objects, applying annotations to drawings; Setting up and use of layers; Computer aided Design (CAD) software modelling of parts and assemblies; Demonstration of a simple team design project.

ASSESSMENT:

The following methods shall be adopted for the assessment of this course;

1. **Theory of Examination** (70 marks) on the basis of end term theory paper examination (from Units 1 to 4)
2. **Class Work** (30 marks) on the basis of regular evaluation of assignments, two mid semester tests and classattendance.
3. **Sessional Work** (40 marks) on the basis of assignments, internal viva and attendance. Student are requireto submit at least six imperial drawing sheets/ computer aided drawing print.
4. **Practical examination** (60 marks) on the basis of evaluating practical knowledge, Quiz and viva voce.

TEXT BOOKS RECOMMENDED:

1. N.D. Bhatt and V.M. Panchal, Engineering Drawing Plane and Solid Geometry, Charotar Publishing House.

REFERENCE BOOKS:

1. Agrawal Basant and Agrawal C.M. (2018), Engineering Drawing, McGraw Hill Publishing.

2. Shah, MB & Rana BC (2008), Engineering Drawing and Computer Graphics; Pearson Education.

3. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers

4. (Corresponding set of) CAD Software Theory and User Manuals.

ELECTRICAL ENGINEERING DEPARTMENT
B.TECH FIRST YEAR (4 YDC)
EE10005: FUNDAMENTALS OF ELECTRICAL ENGINEERING

PERIOD PER WEEK			CREDITS			MAXIMUM MARKS				
						THEORY		PRACTICAL		TOTAL MARKS
T	P	TU	T	P	TU	CW	END SEM	SW	END SEM	
4	2		3	1		30	70	20	30	150

PRE- REQUISITE: Basic knowledge of science and mathematics at XII level**.**

COURSE OBJECTIVES:
1. To acquaint students with the basic concepts, elements and properties of electrical circuits and network.
2. To introduce concept of phasor and power factor improvement in sinusoidal steady-state analysis.
3. To explain basics of magnetic circuit and its practical aspects.
4. To impart the knowledge of three-phase system- its generation and analysis.
5. To teach students basic principle of operation, construction, modelling and application of static and rotating electrical machines.

COURSE OUTCOMES:

After completing this course, the student will be able to

EE10005(T).1: Apply knowledge of science and mathematics to explain electrical circuit component characteristics, formulate various circuit describing mathematical models using basic circuit laws and select appropriate solution technique to find dc/ac excitation responses.

EE10005(T).2: Utilize ac excited steady state circuit analysis concepts in real life problems such as need of power factor correction, power factor improvement methods and home energy distribution system.

EE10005(T).3: Carry out practical magnetic circuit calculations and performance analysis of single phase transformer.

EE10005(T).4: Analyse three phase power generation system and perform basic analysis of three phase star/delta circuits.

EE10005(T).5: Do performance analysis of various type of motors and develop ability to identify suitable motor for particular application.

COURSE CONTENTS:

THEORY:

	CO	PO	BTL
UNIT: 1 Voltage and current sources & transformation, various signals & waveform analysis, resistors, effect of temperature on resistance, capacitors and inductors, their v-i relationships. Kirchhoff's laws, Mesh and Nodal analysis, Star Delta transformations, Superposition theorem, Thevenin's and Norton's theorem, Maximum power transfer theorem.	1	1,2	3
UNIT: 2 Circuit analysis in sinusoidal steady state, Concept of phasor,impedance, admittance, phasor diagrams, Complex, real and reactive power in ac circuits, Power factor and power factor corrections, capacitor bank, electricity distribution system in houses.	2	3,6,7	3
UNIT: 3 Magnetic circuits, definitions, B-H curves, Magnetic circuit calculations, laws of electro-magnetic induction. Hysteresis and eddy current losses, single phase Transformer construction, EMF equation, Equivalent circuit, Phasor diagram, regulation and efficiency.	3	5	3
UNIT: 4 Generation of three phase voltages & measurement, star and delta connection, Line and Phase quantities, Three phase power, prime mover, synchronous generator, diesel generator set overview.	4	2	3
UNIT: 5 DC motors, types, speed relation, starting and speed control of dc motors. Principle of rotating magnetic field in 3φ & 1φ induction motor, power flow diagram, losses and efficiency, single phase fan motor.	5	5	3

ASSESMENT:

A. Continuous evaluation through two mid-term test with a weightage of 30% of the total marks. It includes class attendance as well as assignments on the course topics.
B. The end-term theory examination weightage is 70%.

TEXT BOOKS RECOMMENDED:

1. Vincent Del Toro, "Electrical Engineering Fundamentals", Prentice-Hall of India.
2. I. J.Nagarath, "Basic Electrical Engineering", Tata McGraw Hill Publication.

REFERENCES BOOKS:

1. Fitzgerald Higginbotham &Grabel, "Basic Electrical Engineering", Tata McGraw Hill Publication.
2. Joseph Edminister, MahmoodNahvi "Electric Circuits", Schaum's outlines series.
3. J. B. Gupta, "A Textbook of Basic Electrical and Electronics Engineering", S. K. Kataria& Sons.

CO-PO MAPPING:

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2										
CO2			1			1	1					
CO3					3							
CO4		2										
CO5					3							
Average	1	2	1	0	3	1	1	0	0	0	0	0

LABORATORY:

OBJECTIVES: The fundamental of Electrical engineering Laboratory is designed

1. To provide the student with the knowledge to use basic measuring instruments techniques and equipments such as motors, transformers etc with proficiency.
2. In this lab, students are expected to get hands-on experience in using the basic measuring devices used in electrical engineering and in interpreting the results of measurement operations.
3. To develop communication skill through laboratory note book with written descriptions of procedure, result and analysis.
4. To compare theoretical prediction with experimental results and to determine the source of any apparent differences.

LABORATORY OUTCOMES:

1. Visualize constructional features of AC and DC machines by observing cut section of machines; examine characteristics of motor and generator.
2. Determine experimentally circuit parameters of a coil, measure real power in variable load circuit and interpret the importance of power factor.
3. Classify measuring instrument class of accuracy and tell significance of symbols mentioned on their dial. Select appropriate type and range of measuring instrument for a particular experimental setup on motors and transformer based on their name plate ratings.
4. Determine resistance of a colour coded resistor and verify the value by measurement; differentiate the characteristics of resistance with different temperature coefficient and verify the Ohm's law and Kirchoff's laws.
5. Experimentally validate the turn ratio with name plate rating and determine efficiency of single phase transformer at varying load and plot efficiency v/s load curve.

LABORATORY INSTRUCTIONS:

1. In electrical machine laboratory, students will have to work on machines and Equipment's operating on either 220 volts DC supply; 50 Hz, single phase AC supply or 400 Volts, 50 Hz, 3 phase AC supply. As such, utmost care is essential because even 110 volts may give a fatal shock. The danger of shock increases with increase in voltage.
2. Familiarize yourself with the shock-chart instructions, which are provided in the laboratory.
3. Do not touch any terminal or switch without ensuring that it is dead. While performing experiment, make sure to not touch any live terminals.
4. Wearing of shoes with rubber soles is desirable.
5. Make sure that all the electrical connections are right and checked properly by faculty and laboratory assistants, before switching on any circuit. Faulty connections may cause large amount of power, resulting in the damage of parts of the experiment.

S. No.	LIST OF EXPERIMENTS	CO	PO	BTL
1	Introduction to Electrical Machine Laboratory.	CO3	6, 12,	3
2	Verification of Kirchhoff's Voltage Law and Kirchhoff's Current Law.	CO4,CO3	1,2, 10	4
3	To study the variation of resistance with variation in the temperature.	CO4,CO3	1,2, 10	4
4	To measure the power consumed by a single-phase circuit using a Single -phase wattmeter and computation of load power factor.	CO2,CO3	2,5, 10	2
5	Speed control of DC shunt motor by field control method.	CO1,CO3	4, 10	4
6	Speed control of DC shunt motor by armature voltage control method.	CO1,CO3	4, 10	4
7	To determine the inductance and time constant of a choke coil.	CO2,CO3	2,10	2
8	Determination of efficiency of single phase transformer by direct loading.	CO5,CO3	4,10	5
9	To obtain load characteristics of separately excited DC generator.	CO1,CO3	4,10	4
10	To determine the turns ratio of a single phase transformer.	CO5,CO3	2, 10	5
11	To measure the value of resistance with the help colour coding and verify by using multimeter.	CO4	1, 10	4

ASSESMENT:

A. Continuous evaluation of laboratory journals with a weightage of 30%. It includes lab attendance as well as experiments performed in the lab.
B. The end-term practical examination weightage is 70%.

CO-PO MAPPING:

CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				3						3		
CO2		3			3					3		
CO3	3	3		3	3	3				3		3
CO4	3	3								3		
CO5		3		3						3		
Average	3	3	0	3	3	3	0	0	0	3	0	3

DEPARTMENT OF APPLIED MATHEMATICS AND COMPUTATIONAL SCIENCE
B.Tech. II YEAR (4YDC)
MA 10501: MATHEMATICS-II

HOURS PER WEEK			CREDITS			MAXIMUM MARKS				
T	P	Tu	T	P	Tu	THEORY		PRACTICAL		TOTAL MARKS
						CW	END SEM	SW	END SEM	
3	--	1	4	--	--	30	70	--	--	100

PRE –REQUISITES: NIL

COURSE OBJECTIVES

Enable the students to apply the knowledge of Mathematics in various engineering fields by making them
- able to perform elementary operations on matrix and learn to solve systems of linear equations and their application problems.
- solve first order and first degree ordinary differential equations, higher order linear differential equations and their applications .
- understand the basic concepts of probability distributions and curve fitting .
- provide the basic knowledge of functions of complex variable and their applications .

COURSE OUTCOMES

The students will be able to
CO#1 understand the various applications of the theory of matrices to a wide variety of problems like system of linear equations, inverse of a matrix , Eigen values and Eigen vectors.
CO#2 classify differential equations according to certain features and solve first order differential equations .
CO#3 able to solve higher order linear differential equation with applications to simple problems.
CO#4 acquire the basic knowledge of probability distributions (Binomial,Poisson and Normal) with their applications and fitting of curves using method of least squares.
CO#5 understand the concept of various functions of a complex variable with the summation of infinite series as an application

COURSE CONTENTS

THEORY

UNIT 1   Matrices: Review of matrices, elementary operation on rows and columns, inverse of matrix, Normal forms, Linear dependence, Rank, Application to theory of solutions of system of linear equations, linear transformation, orthogonal, Unitary and Hermitian matrices, Characteristic equation, Eigen values and Eigen vectors, Cayley-Hamilton theorem.

UNIT 2   Ordinary Differential Equations: Formation of differential equations, differential equations of first order and first degree (Variable separable, Homogeneous, Linear and Exact)., Linear differential equations with constant coefficients.

UNIT 3   Ordinary Differential Equations (continued): Linear differential equations with variable coefficients, Simultaneous differential equations, Method of variation of parameters, Application to simple problems.

UNIT 4   Probability and Statistics: Binomial, Poisson and Normal distributions and their Mean and Variance, Methods of least squares and curve fitting.

UNIT 5   Complex Numbers: Algebra of complex numbers, Exponential function of a complex variable, Circular function of a complex variable, Hyperbolic function and inverse hyperbolic functions, Logarithmic function of complex variable, Summation of series by C+iS method.

ASSESSMENT
1. Internal Assessment for continuous evaluation, mid-term tests, tutorials, class performance, etc. (30%)
2. End semester Theory Exam (70%)

TEXT BOOKS RECOMMENDED
1. B. V. Ramana, Higher Engineering Mathematics, Tata McGraw Hill Publishing CompanyLtd., New Delhi, 2006.
2. H. K. Das, Advanced Engineering Mathematics, S. Chand and Company Ltd., New-Delhi,2009.

REFERENCE BOOKS
1. Zafar Ahsan, Differential Equation and their Applications, Prentice Hall of India Pvt. Ltd., NewDelhi, 2004.
2. M. Ray, H. S. Sharma and S Chaudhary, Mathematical Statistics, Ram Prasad and Sons, Agra,2004.
3. S Pal and S. C. Bhunia, Engineering Mathematics, Oxford University Press, New Delhi, 2015.

Revised Syllabus (as Passed in BoS Meeting held on 15/07/2022)
S.G.S.I.T.S/Syllabus/Applicable from Session 2022-2023
B.Tech. I Year (4YDC)
CH 10506: Chemistry

*Hours per week			Credits		Maximum marks				
L	T	P	Th.	P	Theory		Practical		Total Marks
3	1	2	4	1	CW	END SEM	SW	END SEM	150
					30	70	20	30	

Pre-requisite: Knowledge of basics of Chemistry studied in Class XI and XII.
Course Objectives: This course aims at imparting knowledge of the subject to the students for making them understand the role of chemistry in the field of engineering. The focus is on developing capabilities of students to use various analytical techniques, their applications in characterization of various materials used in different fields of engineering.
Course Outcomes: The course will enable student to understand:

- Basics of Organic, Inorganic and Physical Chemistry.

- Specifications, testing and treatment of water for industrial and domestic use.

- Concepts, manufacturing and applications of different types of industrially important materials and their maintenance.

- Applications of spectral and analytical techniques in qualitative and quantitative analyses.

- The students will understand the Ethics behind applying Chemical Methods in Industries and day-to-day use.

Course contents:

(i)   Theory:

UNIT I- Basics of Chemistry
Organic Chemistry: Concept of Hybridization, Configuration (including R/S and E/Z nomenclature of isomers) and Conformation (Newman and Sawhorse Projection Formulae, with nomenclature)
Physical Chemistry: Rate Law, Molecularity and Order of Reaction, First Order Kinetics
Inorganic Chemistry: Theories of Chemical Bonding (VBT and MOT)
Green Chemistry :   An overview

UNIT II
Water:
Source, Types of impurities and their effects, Hardness, its expression and determination, Boiler troubles and their causes, Analyses and treatment of water for industrial and domestic purposes, Alkalinity and its determination, Numerical problems. IS Specifications for Water, **Methods for disposal of waste water.**

UNIT III

(a) Lubricants
Types of lubricants and principles of lubrications, properties (test) of lubricants, greases, graphite,cooling liquids and cutting fluids and their applications. Selection of Lubricants**, Ethics code and Ethics management in the oil and lubricant industries.**
(b) Corrosion
Principle of corrosion, types of corrosion, factors affecting and methods of protection. **Ethics for corrosion prevention.**

UNIT IV
Materials Chemistry

(a) Polymers and Polymerization
Introduction, Classification, Types, mechanism, methods of polymerization. Structure-property Relationships, compounding, general applications of polymer materials of industrialimportance. Conceptof Biodegradable polymers, **Environmental regulations for polymer based packaging materials .**
(b) Nanomaterials
Introduction, synthesis, properties, nano-structured materials and their applications. Introduction to Smart materials and their applications.

UNIT V
Spectroscopic Techniques and Applications
Introduction to Spectroscopy, Principal, Instrumentation and Applications of UV, IR and AAS. Introduction to Chromatographic Techniques (Paper, GLC and Column), **Use of non destructive method.**

   Assessment (Theory): Attendance, class test, class ass

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCESI Year BE (4YDC)
HU 10651 TECHNICAL ENGLISH

HOURS PER WEEK			CREDITS			MAXIMUM MARKS				
T	P	Tu	T	P	Tu	THEORY		PRACTICAL		TOTAL MARKS
						CW	END SEM	SW	END SEM	
3	2	-	3	1	-	30	70	20	30	150

PRE-REQUISITE:
The student must possess basic knowledge of English Grammar and basic ability to read, write and speak English language

COURSE OBJECTIVES:
The objective of this course is to enable the students to recognize the relationship of effective communication skills to succeed in academic, work and social environments and to develop both written and oral communication skills to comprehend and produce clear, complete and accurate messages. This course also intends to impart business correspondence and improve English phonetics enabling the students to speak and write English correctly and with confidence.

COURSE OUTCOMES:
After successful completion of the course, *students will develop competency in the following areas:*

CO1: Communicate effectively with good interpersonal skills; speak in public, engage the audience, make a presentation using Power-Point and tackle group discussion.

CO2: Speak English with clarity using correct pronunciation and accent in all situations

CO3:.Comprehend a particular piece of information, absorb what is read and hone the art of condensation and effective writing skills with correct syntax and grammar in all formal situations.

CO4:.Collect, analyze, document, and report information clearly, concisely and logically. Also, apply technical information and knowledge in practical documents.

CO5: Produce clear, complete, concise, concrete and precise messages in day to day business transactions while drafting applications and E-Mails.

COURSE CONTENT:
UNIT I: Communication Skills

(i) Meaning & Process
(ii) Significance of Effective communication.
(iii) Presentation Strategies: Techniques of Oral Presentations, Defining the Purpose, Analyzing the Audience, Establishing the main idea, Selecting the Appropriate Channel and Medium. Power Point Presentation.
(iv) Group Discussion.

UNIT II: Application of Linguistic Ability
(a) English IPA (Types of speech sounds.)
(b) Monophthongs
(c) Diphthongs.
(d) Consonants.
(e) Phonetic Transcription

UNIT III: Advanced Writing Skills:
(i) Composition :
(a) Meaning & Significance
(b) Exercise on free essay writing on technical and current topics with particular   emphasison clear expressions.
(ii) Precis
(a) Reading and Comprehension
(b) Basic rules and practice of writing précis.

UNIT IV: Academic Writing and Technical Report Writing:
(i) Introduction to Technical and Academic Writing
(ii) Features & Principles of Technical Report
(iii) Structure & Format of Technical Report
(iv) Samples & Models for practice

UNIT V: Business Correspondence
(i) Business & Official letters
(ii) Structure & Layout of Business letters
(iii) Types of Letters: Job Application, Letters of enquiry, Quotations, Orders and Complaints.
(iv) E-Mail writing

ASSESSMENT: Through End-Sem. Theory Exam, Theory sessionals, Mid-Sem Tests, Assignments,End-Sem. Practical Exam, Practical sessional, quizzes, and presentations.

BOOKS RECOMMENDED:
1. Sharma, R.C. and Krishna Mohan, *Business Correspondence and Report Writing*, NewDelhi: Tata McGraw-Hill, 2009.
2. Raman, Meenakshi and Sangeeta Sharma, *Technical Communication*, New Delhi: OxfordUniv. Press, 2011.
3. Kapoor A.N., *Business Letters for Different Occasions*, New Delhi: S. Chand & Co. Pvt.Ltd., 2012.
4. Thomson, A.J. and A.V.Martinent, *A Practical English Grammar*, New Delhi: Oxford University Press, 1986.

REFERENCES RECOMMENDED:
1. Lesikar, Petlit, and Flatley, *Lesikar's Basic Business Communication*, New Delhi: Tata McGraw-Hill, 1999.
2. Bhatia, R.C., *Business Communication*, New Delhi: Ane Books Pvt. Ltd., 2012.
3. Magan, Sangeeta, *Business Communication*, New Delhi: Biztantra Publications, 2010.

DEPARTMENT OF COMPUTER ENGINEERING
CO 10504: COMPUTER PROGRAMMING

Hours per Week			Th. Credit	Pr. Credit	MAXIMUM MARKS				
L	T	P			TH	CW	SW	Pr.	Total
3	0	2	3	1	70	30	20	30	150

PRE-REQUISITES: NIL

COURSE OBJECTIVES: This course aims to provide exposure to problem-solving through programming. It aims to train the student to the basic concepts of the C-programming language.

COURSE OUTCOMES:

After completing the course student should be able to:

1. To formulate simple algorithms for arithmetic and logical problems.
2. To translate the algorithms to programs and test and execute the programs and correct syntax and logical errors.
3. To apply programming to solve conditional and iterative statement, function and recursion.
4. To use arrays, pointers and structures to formulate algorithms and programs.

COURSE CONTENTS:

THEORY:

UNIT 1 Block Schematic of digital computer and it's working. Introduction to computer hardware and software, Different number systems. Flowchart and algorithm.

UNIT 2 Structure of C programs, key words and identifiers, constants, variables, Data types, enumerated data types, Strings. Declarations of variables, scope and life of variables. Various types of operators and expressions. Programming errors and their handling.

UNIT 3 Decision making and Branching: if-else, switch-case, Looping: While-do, for, do-while etc., nesting of loops.

UNIT 4 Introduction to Arrays, Structures, Pointers, Files, Functions, Recursion.

UNIT 5 Introduction to Object oriented Programming paradigm, Comparison of Procedural and Object Oriented Programming paradigm.

COURSE ASSESMENT (Th.):
1. Internal Assessment for continuous evaluation, mid-term tests, Tutorials, Quizzes, ClassPerformance, etc. (30%)
2. End semester Theory Exam (70%)

COURSE ASSESMENT (Pr.):

1. Internal Assessment for continuous evaluation (40%): Lab assignments, demonstration,Viva, file etc.
2. End semester Practical Exam (60%): Quiz/Programming test, lab journal, demo, viva etc.

TEXT BOOKS RECOMMENDED:

1. E. Balagurusamy, "Programming in ANSI C", Sevenths Edition, Tata McGraw Hill, 2017.
2. ReemaThareja , "Programming in C", Second Edition , Oxford publication, 2016
3. W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Pearson , 2015

REFERENCE BOOKS:

1. Matthias Felleisen, Robert BruceFindler , Mathew Flatt, ShriramKrishnamurthi, "How to Design Programs: An Introduction to Programming and Computing", Second Edition, MIT Press, 2018.
2. M.Chandwani, A. Jain and N.S. Chaudhary, " Elements of Computer Science" , Jain Publishers 1997
3. E. Balagurusamy, " Object Oriented Programming with C++", Tata McGraw Hill, 2009
4. B.S. Gottfried, "Programming with C", 3rd edition, Tata McGraw Hill, 2018

Shri G.S. Institute of Technology & Science, Indore
{{Industrial & Production Engineering Depatt.}}
B. Tech. I YEAR (4YDC)

Subject Code	Subject Name	L	T	P	Theory Credit	Practical Credit	Maximum Marks				
							Th	CW	SW	Pr	Total
IP -10581	Manufacturing Practices		1	2		1.5	0	0	40	60	100

CO 1	Understanding nature of wood/timber for different wooden products along with proficiency to use different carpentry tools and perform operations related to wood working
CO 2	Basic knowledge of casting process along with use of moulding tools for mould preparation as well as identifying casting defects and their causes during casting process
CO 3	Basic knowledge and performing forging and welding operations using different tools/equipment along with understanding defects and their causes
CO 4	Knowledge of fitting operation and using its tools as well as fundamentals of machining operations and conducting experiments on lathe, drilling, shaper and planner machine tool along with use of single point cutting tools and their materials

Theory and practice:

1. Wood working : Applications of wood/timber as an engineering material, natural wood, their types, hard and soft wood. Growth of trees and their lives. Defects in wood and reasons for their occurrence, conversion of wood into timber, seasoning of timber, introduction to wood working tools for various operations like saw, chisel, jack plane, marking and measuring tools. Types of joints and their use. Manufacture of plywood and ply-boards etc. Preservation of timber, glues and adhesives in wood working, use of nails, screw etc., introduction to paints and varnishes for protection and decorative purposes

2. Foundry process : Introduction to moulding and casting processes. Moulding sand and its main constituents, moulding tools and their use, green sand moulding practice. bench and pit moulding, properties of moulding sand, use of additives in moulding sand, use of patterns and their types, pattern materials. Use of cores and chaplets. Pouring of metal and removal of castings. Casting defects and their remedies.

3. Forging process : Hot and cold working of metals, material suitable for forging operation, simple forging operation with use of tools like hammers, anvil, swage block, dies, tongs, punches, chisel, drifts etc. Forging operation like upsetting, bending and drawing out etc.

4. Welding process : Introduction to welding practice and classification (fusion and pressure welding). Types of electrodes and shielding of arc. Manual Metal Arc Welding (MMAW). AC and DC welding, tools and equipments used in electric arc welding. Types of welded joints, joints preparation and welding positions. Gas welding - Oxyacetylene welding. High and low pressure

gas welding (Constructional features of nozzles used in them). Types of flames and their use. Gas cutting. Defects in welding.

5.   Machine shop : Introduction to chip removal processes, working of simple machine tools like lathe, drill, shaper, planner. Single point cutting tool and their materials and various angles. Simple lathe operations like turning, facing, taper turning, boring, threading, knurling etc. Use of taps and dies, drills and center drills and reamers on lathe. Quick return mechanism used in shaper and planner and simple operations on these machine tools.

6.   Fitting practice : Need of fitting shop, common measuring and marking tools like Engineer's scale, try square, surface plate, marking gauge, V-block, center punch. Use of inside, outside and odd leg callipers, micro meters and verniers, combination set, bevel protector. Use of files of material removal, their types in respect of length and cross section, single and double cut file, filling techniques. Use of hacksaw, drills, tapes and dies.

NOTE : On an average 3 to 4 lectures/demonstrations/practice are to be delivered for each of the above process.