SVKM's Narsee Monjee Institute of Management Studies
Mukesh Patel School of Technology Management & Engineering

Program: B. Tech Integrated (Mechanical, Civil, Computer & EXTC)				**Semester:** II	
Course/Module: Mathematics-II				**Module Code:** BTIME02001, BTICI02001, BTICO02001, BTIET02001	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks- 100 in Question Paper)**
3	0	2	4	Marks Scaled to 50	Marks Scaled to 50

Course Objectives:

1. To provide an understanding and use of vectors and integration.
2. To develop knowledge of co-ordinate geometry, probability and statistics.

Course Outcomes:

After completion of the course, students would be able to:

1. Identify different types of conics and solve related problems.
2. Demonstrate understanding of the fundamental concepts of Vector Algebra
3. Solve problems related to permutation, combination and probability using suitable techniques.
4. Apply Calculus techniques and Algebraic skills to solve real life problems.

Detailed Syllabus:

Unit	Description	Duration
1.	**Co-ordinate Geometry:** Straight line: slope and intercept of a line, equations of straight lines, perpendicular distance between a point and a straight line, perpendicular distance between two straight lines. Conic sections: circle, parabola, ellipse and hyperbola.	10
2.	**Integration:** Integration Basic formulae, Integration using LIATE rule, partial fraction method, trigonometric functions, substitution method. definite integrals, relationship between definite integrals and derivatives, application of definite integration- area under the curve.	14
3.	**Permutations and Combinations**: Fundamental principle of counting, Factorial n, Permutations and combinations formulae, simple applications.	04
4.	**First order and first degree differential equations:** Concept of differential equations, order, degree and formation of differential equation, solution of differential equation - variable separable, homogeneous differential equation, linear differential equation, and applications of differential equations related to real life problems.	07

5.	**Vector Algebra and Three Dimensional Geometry:** Definition, scalar product, vector product, algebra of vectors., relation between direction cosines of a line, equations of lines - passing through a given point and parallel to the given vector, passing through two given points, equations of plane in normal form, equation of a plane passing through a given point and perpendicular to a given vector, distance of a point from a plane and line in space, angle between the planes.	10
	Total	**45**

Text Books:

1. H. K. Dass, "Applied Mathematics for polytechnics"

Reference Books:

1. S. P. Deshpande, Mathematics for polytechnic students, *Pune Vidyarthi Griha Prakashan.*
2. T. Veerarajan, Engineering Mathematics for first year, *Tata McGraw-Hill.*
3. H. R. Hass, C. E. Heil, M. D. Weir, Thomas' Calculus, *Pearson.*

Any other information:

Details of Internal Continuous Assessment (ICA)

Test Marks: 20
Term Work Marks: 30
Details of Term work : Tutorial/Assignments/Presentation/Viva-voce/Quiz

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Program: B. Tech. Integrated (Mechanical, Civil, Computer & EXTC)	**Semester:** II
Course/Module: Physics-II	**Module Code:** BTIME02002, BTICI02002, BTICO02002, BTIET02002

Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per Week)**	**Tutorials (Hours per Week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks - 100 in Question Paper)**
3	2	0	4	Marks Scaled to 50	Marks Scaled to 50

Course Objectives:

1. To enable the students to understand the basic principles of Physics.
2. To enhance the student's ability to meet the needs of engineering applications.
3. To impart training to help the students develop skill sets for creating entities from basic and applied sciences.

Course Outcomes:

After completion of the course, students would be able to:

1. Develop conceptual competence to realize the laws of nature and appreciate the interface of physics with other disciplines.
2. Interpret the relationship and interaction between nature and matter with a scientific outlook, develop scientific aptitude and appreciate the role of physics in improvement of human life and welfare of the society.
3. Explain different processes of physics that have wide applications in industrial and technological sectors.
4. Develop considerable problem solving abilities and scientific skills, viz. experimental, observational, manipulative, decision making and investigatory etc.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	**ELECTRICITY AND MAGNETISM:** **Electric charge and fields:** Electric charge, conservation of charge Coulomb's law between two points charges multiple charges. Electric field, electric field due to point charge, electric dipole and field due to dipole. Electric potential and potential difference. **Magnetic effects and magnetism**: Concept of magnetic field, magnetic dipole and magnetic dipole moment. Biot-Savart's Law, Ampere's Law, Lorentz's force, Faraday's law. Thompson e/m experiment. Electrostatic and Magnetostatic focusing CRT and application of CRO.	10
2.	**WAVE MOTION:** Definition of a wave, wave motion, wave velocity, wave period, wave frequency, wave length, vibratory motion, periodic motion, amplitude of a vibrating particle, derivation of $v = n\lambda$. Simple harmonic motion	10

	(SHM), examples of SHM, equation of SHM, Types of progressive waves: transverse and longitudinal waves with Examples. Stationary wave, formation of stationary wave, examples of stationary wave, characteristics of stationary waves, free and forced vibrations with examples. Simple pendulum derivation of expression for its time period. **Resonance:** definition of resonance, examples of resonance, formula to calculate velocity of sound by resonance tube method. **Acoustics:** Reverberation time, Sabin's formula, conditions for good acoustics. **Ultrasonics:** Frequency of ultrasonic waves, principle of generating ultrasonic waves (Magnetostriction and piezoelectric), application of ultrasonic waves.	
3.	**SEMICONDUCTOR PHYSICS:** Intrinsic semiconductors, Concept of holes, Doping, Extrinsic semiconductors. Concept of Fermi level: P type and N type semiconductors with Fermi level concept, Formation of PN junction with band theory and Fermi level concept. Hall Effect and Applications	09
4.	**LASER AND FIBER OPTICS:** Lasers, spontaneous and stimulated emission, population inversion, pumping and active system. Types of laser: solid laser, gas laser, semiconductor laser, Applications of lasers. Fibre optics, principles of fibre, structure and classification of optical fibres, The numerical aperture, applications and use.	08
5	**CRYSTAL STRUCTURE:** Lattice, basis, crystal structure, unit cell, Structure of cubic crystals (SC, BCC, FCC). Ligancy and critical radius ratio for ionic crystals. Imperfections: point, line, surface & volume (introductory).	08
	Total	**45**

Text Books:

1. David Halliday, Robert Resnick, Jearl Walker (2015), Principles of Physics, *Wiley, New Delhi, 10th edition.*
2. Dattu R Joshi (2010), "Engineering Physics", *Tata McGraw Hill 1st Edition.*

Reference Books:

1. Arther Beiser (2009), "Concept of Modern Physics", *Tata McGraw Hill, 6th edition.*
2. R. K. Gaur and S. C. Gupta (2008), Engineering Physics, *Dhanpat Rai & Co., New Delhi.*
3. H. C. Verma (2010), Concepts in Physics, *Bharti Bhawan Ltd., New Delhi, 3rd edition.*

Any other information:

Details of Internal Continuous Assessment (ICA)

Test Marks: 20
Term Work Marks: 30

Details of Term Work:

1. Minimum Ten experiments.
2. Minimum two assignment covering the prescribed syllabus.

Experiments:

1. Study of CRO.
2. Determination of e/m ratio using Thompson's experiment.
3. Verification of Faraday Effect.
4. Verification of Ampere's law.
5. To find the velocity of sound using Resonance method.
6. To find the frequency of sound waves using Sonometer.
7. Determination of the position of flaw using ultrasound flaw detector.
8. Determination of velocity of sound in air using Kundt's tube.
9. To determine the energy gap of a semiconductor.
10. To determine the Hall coefficient of the given specimen.
11. Determination of angle of deviation of He- Ne laser.
12. Determination of numerical aperture of fibre optic cable.
13. To study different types of cubic lattices.

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Program: B. Tech. Integrated (Mechanical, Civil , Computer & EXTC)				**Semester:** II	
Course/Module: Chemistry-II				**Module Code:** BTIME02003, BTICI02003, BTICO02003, BTIET02003	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks – 50)**	**Term End Examinations (TEE) (Marks – 100 in Question Paper)**
3	2	0	4	Marks Scaled to 50	Marks Scaled to 50

Prerequisite: Chemistry-I

Course Objectives:

1. To familiarize with the treatment of water for human consumption & industrial applications.
2. To learn ore extraction process and understand the importance of alloying and use the knowledge of properties of steel for industrial applications.
3. To comprehend the importance of heat capacity and heats of reactions.
4. To understand the importance of pollution free environment.
5. To get acquainted with the different gas laws, IUPAC nomenclature of organic compounds and nanomaterials.

Course Outcomes:

After completion of the course, students would be able to:

1. Understand the various water treatment methods applied in industries; basic principles of Organic chemistry and interpret IUPAC names of organic compounds.
2. Discuss the different effects of environmental pollution and derive relationships between the pressure, volume, temperature and number of moles of a gas.
3. Understand the industrial application of general chemistry with reference to refractories and cement and important engineering materials.
4. Apply the principles of chemical energetics to determine the heat of a reaction

Detailed Syllabus:

Unit	Description	Duration
1.	**Water Technology:** **Softening Methods:** Different methods of water hardness removal (lime-soda method, zeolite method, ion-exchange method) and their numerical problems. **Drinking water purification:** Removal of microorganisms-Bleaching powder treatment, UV treatment, chlorination, ozonization, Desalination by Reverse Osmosis, Ultrafiltration.	08
2.	**Industrial Chemistry:** Cement: Manufacture of Portland Cement, Chemical Composition and Constitution of Portland Cement, Setting and Hardening of Portland Cement.	06

	Refractories: Preparation, properties and uses of Silica bricks, Dolomite bricks, Silicon Carbide (SiC).	
3.	**Chemical Energetics:** System and surroundings, reversible and irreversible processes, exothermic and endothermic reactions, Internal energy, first law of thermodynamics, enthalpy, heat of the reaction, Hess's law and numericals based on heat of the reaction, heat capacity.	07
4.	**Basic Principles of Organic Chemistry:** General introduction to naming organic compounds-trivial names and IUPAC nomenclature (aliphatic C_1-C_4, aromatic C_6- mono & disubstituted). Tetravalence of carbon, hybridization (sp^3, sp^2, sp hybridization with one example each).	07
5.	**Environmental Chemistry:** Air pollution – Greenhouse effect, acid rain and depletion of ozone layer, smog, photochemical smog – control of air pollution. Water pollution – pollutants from dyeing industries and Tanneries, BOD and COD– waste water treatment (primary and secondary treatment-activated sludge method).	06
6.	**Gases:** Ideal and real gases, Gas pressure units, and numericals based on it, Gas laws-Boyle's Charles, Ammonton`s law, Avogadro's law-numericals based on it, ideal gas equation, determining density and molecular weight of a gas, volume of gases in chemical reactions.	06
7.	**Important Engineering Materials:** i) **Nanomaterials:** Structure, properties, application of CNT`s, Fullerenes, graphite ii) **Liquid crystals:** Definition, classification, properties with applications.	05
	Total	**45**

Text Books:

1. Krishnamurthy N, *et al*, Engineering Chemistry, Prentice Hall of India Pvt. Ltd, New Delhi, 2014.
2. Palanna.O.G., Engineering Chemistry, Tata McGraw Hill Education. Pvt. Ltd, 1st Edition 2009.
3. Jain.P.C & Jain.M, Engineering Chemistry, Dhanpat Rai Publishing Co. New Delhi, 17th Edition, 2017.

Reference Books:

1. De. A. K, Environmental Chemistry, John Wiley & Sons. Inc, 2018.
2. Barrow. G, Physical Chemistry, Tata McGraw Hill, 2007.

Any other information:

Details of Internal Continuous Assessment (ICA)

Test Marks: 20
Term Work Marks: 30

Details of Term Work:

1. Two class tests.
2. Minimum eight lab experiments.
3. Viva-voce to be conducted.

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Program: B. Tech. Integrated (Mechanical, Civil, Computer & EXTC)	**Semester:** II
Course/Module: Workshop Practice-II	**Module Code:** BTIME02004, BTICI02004, BTICO02004, BTIET02004

Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorials (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks - 100 in Question Paper)**
0	2	0	1	Marks Scaled to 50	--

Course Objectives:

1. To impart hand on plumbing operation by handling various plumbing tools.
2. To impart knowledge of basic tools used for plumbing jobs.
3. To introduce basic concepts of electrical and electronic instruments and its applications.

Course Outcomes:

After completion of the course, students would be able to:

1. Differentiate various tools used in workshop for plumbing operation in G.I. and PVC pipe.
2. Perform plumbing operation in G.I. and PVC.
3. Carry out electrical wiring.
4. Prepare PCB layout.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	Descriptions and drawing of various plumbing shop tools such as Pipe Dies, Wrenches, Threading dies and Pipe Vices. Safety precautions while handling plumbing tools. Demonstration and practice of Pipe Fittings such as Sockets, Elbow, Tee, Reducer, Nipple, Union coupling, plug, Bend, Float valves and Taps	04
2.	List different sizes of Galvanized Iron (G.I.) and flexible pipe used for fitting. List different adhesive solvent used for fitting. Introduction to various types of threads (internal and external)- single start, multi-start, left hand and right hand threads. Observe the operation threading to G.I. pipe with jointing & jointing of PVC pipe. Practice for actual pipe line by using PVC pipe and accessories without using adhesive. Practice for actual G.I. pipe with socket, plug, and elbow, with operation of cutting, threading and fitting.	10

3.	**PCB Laboratory Exercises:** Layout drawing, positive and negative film making, PCB etching and drilling, tinning and soldering techniques	08
4.	**Wiring:** Study of cables used in Electrical & Electronic transmissions. Study of Electrical Fittings – Switches, Plugs, Holders, Connectors, Earthing. Electrical Wiring for lighting and appliances Series & Parallel Connections.	08
	Total	**30**

Any other information:

Details of Internal Continuous Assessment (ICA)

Test Marks: --
Term Work Marks: 50
Details of Term Work:

1. Making internal and external threads on a job by tapping and dieing operations (manually)
2. Preparation of job involving thread on GI pipe/ PVC pipe and fixing of different types of elbow, tee, union, socket, stopcock, taps etc.
3. Prepare printed circuit board for small circuits.
4. Classify and summarize different types of cables, connectors and switches.
5. Wiring practice of different types of household wiring.

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Program: B. Tech. Integrated (Mechanical, Civil, Computer & EXTC)				**Semester:** II	
Course/Module: Computer Programming-I				**Module Code:** BTIME02005, BTICI02005, BTICO02005, BTIET02005	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks - 100 in Question Paper)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Pre-Requisite:- Knowledge of Basic Computer Systems

Course Objectives:

1. The course will enable the students to understand the computer programming language, develop and apply logic to solve engineering problems.

Course Outcomes: After completion of the course, students would be able to:

1. Understand problem statement and draw flowchart with algorithm
2. Develop and execute C programs using basic programming constructs.
3. Implement C programs using Arrays, Strings and Structures.
4. Implement C programs using pointers and functions

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	**Introduction to Algorithm & Flowchart :** Properties of algorithm, Developing an algorithm and Flowcharts	02
2.	**Basics of C-programming Language:** History of C, Program Development Life Cycle, Compiling and executing C Program	01
3.	**The Components of a C Program:** Program's Components, Variables, Numeric Data Types, Constants, Statements, Expressions and Operators, Fundamentals of I/O, Formatted Input and Formatted output.	04
4.	**Basic Program Control:** Decision Making and branching, Looping: For, While, Do-While, Nested Loops.	04
5.	**Arrays:** One Dimensional Array, Declaration and Initialization, Multidimensional Array.	04
6.	**Program Decomposition in to modules:** Defining functions in C, Functions & Parameters, and Introduction to recursive functions.	05
7.	**Understanding Pointers:** What is Pointer?, Pointers and Simple Variables, Pointers and Array	04

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8.	**Strings:** Introduction to strings, string. h header functions, Displaying & Reading strings, String operations without using string. h header functions.	04
9.	**Structures:** Introduction to Structures and Unions	02
	Total	**30**

Text Book:

1. E. Balaguruswamy, "Programming in ANSI C", Tata McGraw Hill, 6th Edition, 2012.

Reference Books:

1. Ashok N Kamthane, "Programming in C", Pearson Educations, 2nd Edition, 2011.
2. K. R. Venugopal, S. R. Prasad, "Mastering C", Tata McGraw Hill, 2nd Edition, 2015.

Any other information:

Details of Internal Continuous Assessment (ICA)

Term Test Marks: 20
Term Work Marks: 30
Details of Term Work:

1. At least 10-Experiments covering the entire syllabus.
2. Minimum 3 class assignments.
3. Practical examination

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Program: B. Tech. Integrated (Mechanical, Civil, Computer & EXTC)	**Semester:** II
Course/Module: Engineering Drawing–II	**Module Code:** BTIME02006, BTICI02006, BTICO02006, BTIET02006

Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorials (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks - 100 in Question Paper)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Course Objectives:

1. To get acquainted with the use of drafting software (CAD) in engineering drawing.
2. To acquire the concepts of orthographic projections.
3. To know the concepts of isometric projections.

Course Outcomes:

After completion of the course, students would be able to:

1. Generate orthographic projections of machine components with the help of computer aided drawing (CAD) software.
2. Generate isometric projections of machine components with the help of computer aided drawing (CAD) software.
3. Generate free hand drawings of machine elements.

Detailed Syllabus: (per session plan)

Unit	**Description**	**Duration**
1.	**Orthographic projections:** Projections of various objects having flat and curved surfaces using 1st angle projection method only, Concept of Missing views.	08
2.	**Sectional views of Orthographic Projections:** Conversion of pictorial view with sectional orthographic projection (Full Section Only)	08
3.	**Isometric Projections:** Isometric view and projection of linear and curvilinear features.	08
4.	**Introduction to machine parts:** Types of nuts, bolts, screws, studs and riveted joints.	06
	Total	**30**

Text Books:

1. N. D. Bhatt (2016), "Elementary Engineering Drawing", *Charotar Publishing House.*
2. M. B. Shah and B. C. Rana (2010), "Engineering Drawing", *Pearson Education.*

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Reference Books:

1. K. Venugopal (2007), "Engineering Drawing and Graphics", *New Age International Publishers.*
2. D.M.Kulkarni., A.P. Rastogi, A.K.Sarkar.,"Engineering graphics with Autocad", *Printer Hall India Publisher.*
3. Giesecke, Mitchell, Spencer and Hill (2008), "Technical Drawing", *Macmillan Publishing Co. Inc. New York.*

Any other information:

Details of Internal Continuous Assessment (ICA)

Test Marks: 20
Term Work Marks: 30
Details of Term Work:

1. A3 size drawing sheet (AutoCAD) and Class assignments having 2 to 3 problems on each unit. (Min 4 Sheets)

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Program: B. Tech. Integrated (Mechanical, Civil, Computer & EXTC)	**Semester:** II
Course/Module: Fundamentals of Engineering Mechanics	**Module Code:** BTIME02007, BTICI02007, BTICO02007, BTIET02007

Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks - 100 in Question Paper)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Course Objectives:

1. To develop thorough understanding of centroids of area
2. To get acquainted with the various systems of forces
3. To understand the concept of friction
4. To get acquainted with velocity and acceleration of moving particles
5. To inculcate the ability to conduct experiments for better understanding of various principles of mechanics

Course Outcomes:

After completion of the course, students would be able to:

1. Determine centroid of irregular shape areas
2. Determine the resultant / equilibrant of various coplanar force systems.
3. Analyse the system of forces in equilibrium with and without friction.
4. Determine velocity and acceleration of moving particles at any instance
5. Conduct experiments for better understanding of various principles.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	**Centroid of plane areas and wires:** Application to simple geometrical shapes and wires bent into circular arcs.	06
2.	**System of Coplanar forces:** Introduction to coplanar & non-coplanar force system. Forces and their components. Resultant of coplanar force system -concurrent forces, parallel forces, non-concurrent non-parallel system of forces. Moment of force about a point, couple, Varignon's theorem.	06
3.	**Equilibrium of coplanar force system:** Meaning of equilibrium, free body diagrams, equilibrium of concurrent, parallel and non-concurrent non-parallel (general) system of forces and couples. Types of supports, determination of reactions at supports for various types of determinate beams.	06
4.	**Friction:** Laws of friction, angle of friction, angle of repose, cone of friction, Equilibrium of bodies on rough horizontal and inclined plane, application to problems involving blocks, wedges and ladder.	06

5.	**Kinematics of Particle: Velocity** and acceleration in terms of rectangular coordinate system, rectilinear motion, acceleration - time, velocity- time graphs and their uses, relative velocity, projectile motion.	06
	Total	**30**

Text Book:

1. N. H N. H. Dubey (2014), "Engineering Mechanics", *Tata McGraw Hill*
2. R. C. Hibbler (2004), "Engineering Mechanics", *McMillan Publishers*

Reference Books:

1. F F. L. Singer (1954), "Engineering Mechanics", *Harper & Raw Publication*
2. Beer & Johnson (2011), "Engineering Mechanics", *Tata McGraw Hill*
3. D. S. Kumar (2009), "Engineering Mechanics", *Tata McGraw Hill*
4. Macklin & Nelson (2012), "Engineering Mechanics", *Tata McGraw Hill*
5. A. K. Tayal (2008), "Engineering Mechanics", *Umesh Publication*
6. E. W. Nelson, Charles L. Best, W.G. Mclean, Merle Potter (2010), "Schaum's outlines on Engineering Mechanics -Statics", *Tata McGraw Hill*
7. E. W. Nelson, Charles L. Best, W.G. Mclean, Merle Potter (2010), "Schaum's outlines on Engineering Mechanics -Dynamics", *Tata McGraw Hill*

Any other information:

Details of Internal Continuous Assessment (ICA)

Test Marks: 20
Term Work Marks: 30
Details of Term Work:

1. Minimum five assignments covering the prescribed syllabus.
2. Report of minimum six experiments performed from the list given below.

List of Experiments:

1. To find reactions of simply supported beam (Parallel force system)
2. To verify polygon law of forces (Concurrent & non-concurrent force system)
3. To verify Lami's theorem using simple jib crane
4. Equilibrium of non-concurrent non parallel force system
5. To verify moment equilibrium condition using bell crank lever
6. To determine coefficient of friction using friction plane
7. To determine coefficient of friction using angle of repose method
8. Simple Screw Jack

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Program: B. Tech. Integrated (Mechanical, Civil, Computer & EXTC)				**Semester:** II	
Course/Module: Elements of Electrical Engineering				**Module Code:** BTIME02008, BTICI02008, BTICO02008, BTIET02008	
Teaching Scheme				**Evaluation Scheme**	
Lecture (Hours per week)	**Practical (Hours per week)**	**Tutorial (Hours per week)**	**Credit**	**Internal Continuous Assessment (ICA) (Marks - 50)**	**Term End Examinations (TEE) (Marks - 100 in Question Paper)**
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

Course Objectives:

1. Understand the concept of Electro Motive Force (EMF), potential difference, current, ohm's law, resistivity, power dissipation in resistance, effect of temperature on resistance.
2. Understand the concepts of magnetic field, Faraday's laws of electromagnetic induction and magnetic circuits.
3. Analyze and solve simple ac and dc electrical and magnetic circuits using different theorems and laws.
4. To impart hands-on experience in assembling and testing circuits.

Course Outcomes:

After completion of the course, students would be able to:

1. Analyze dc and ac circuits using network theorems & ac fundamentals.
2. Determine the resonant frequency of any given series or parallel RLC circuit.
3. Compare electric and magnetic circuits.
4. Analyze simple and composite magnetic circuits.

Detailed Syllabus: (per session plan)

Unit	Description	Duration
1.	**Resistance and DC Network:** The idea **of** Electrical Potential, Work, Power, Energy, Resistance, Unit of Resistance, Law of Resistance, Units of Resistivity, Effect of Temperature on Resistance, Ohm's Law, Resistance in Series, Voltage Divider Rule, Resistance in Parallel, Types of Resistors, Nonlinear Resistors, Division of Current Parallel Circuits, Equivalent Resistance, Electric Circuits, Kirchhoff's Law, Maxwell's Loop Current Method, Nodal Analysis	10
2.	**Capacitance:** Capacitor, Capacitance, Parallel-plate Capacitor, Capacitor in composite medium, Capacitors in Series, Capacitors in Parallel, Energy Stored in Capacitor, Current-Voltage Relationships in a Capacitor, Charging of a Capacitor, Time Constant, Discharging of a Capacitor.	06

3.	**Magnetic Circuit:** Laws of magnetic force, Definitions of field Intensity, Magnetic potential, Flux & flux density, Permeability, Intensity of magnetization & susceptibility, comparison between electric and magnetic circuits, leakage flux, Faraday's laws of electromagnetic induction, Induced E.M.F., Inductance: self-inductance, mutual inductance, coefficient of magnetic coupling, Inductances in series and parallel.	08
4.	**AC Fundamentals:** Alternating quantities, RMS & Average values, form factor, frequency, crest factor, series combination of R-L, R-C & RLC (with resonance) & parallel circuits (with resonance).	06
	Total	**30**

Text Books:

1. B. L. Theraja (2012), Fundamentals of Electrical Engineering and Electronics, *S. Chand & Co., 6th Edition.*

Reference Books:

1. Vincent Del Toro (2010), Electrical Engineering Fundamentals, *Prentice Hall India Learning Pvt. Ltd, 2nd Edition.*

Any other information:

Details of Internal Continuous Assessment (ICA)

Test Marks: 20
Term Work Marks: 30
Details of Term Work:

1. At least ten laboratory experiments based on above mentioned units.
2. Minimum 3 assignments based on the prescribed syllabus.

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