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

Program: B. Tech Integrated (Mechanical, Computer, EXTC)				**Semester:** II	
Course/Module: Mathematics-II				**Module Code:** BTIME02001, 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	5	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 and differential equations.

Course Outcomes:

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

1. Identify different types of conics to solve related problems.
2. Distinguish between permutations and combinations and apply the knowledge to solve simple problems.
3. Demonstrate understanding of the fundamental concepts of vector algebra.
4. Solve basic application problems described by first order differential equations.
5. 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.	**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
4.	**Vector Algebra and Three Dimensional Geometry** Definition, scalar product, vector product, algebra of vectors., relation	10

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	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.	
5.	**Permutations and Combinations** Fundamental principle of counting, Factorial n, Permutations and combinations formulae, simple applications.	04
	Total	**45**

Text Books:

1. H. K. Dass (2016), Applied Mathematics for polytechnics", CBS Publishers & Distributors Pvt. Ltd., 11th Edition.

Reference Books:

1. S. P. Deshpande (2013), Mathematics for polytechnic students, *Pune Vidyarthi Griha Prakashan, 9th Edition.*
2. T. Veerarajan (2016), Engineering Mathematics I, *McGraw-Hill Education, 1st edition*
3. H. R. Hass, C. E. Heil, M. D. Weir (2017), Thomas' Calculus, *Pearson, 14th Edition.*
4. Mathematics Textbook for Class XI, *NCERT Publication.*
5. Mathematics Part I - Textbook for Class XII, *NCERT Publication.*
6. Mathematics Part II - Textbook for Class XII, *NCERT Publication.*

Any other information

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Class Test	20
Term Work	30
Total Marks :	**50**

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

Program: B. Tech. Integrated (Mechanical, Computer, EXTC)	**Semester:** II
Course/Module: Applied Physics	**Module Code:** BTICO02009

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	1	5	Marks Scaled to 50	Marks Scaled to 50

Course Objectives:

1. To enable the students to understand and apply 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. Classify the solids according to energy bands; explain the theory of p-n junction, biasing and calculate the conductivity, carrier concentration and position of Fermi level for semiconductors and also identify different types of crystalline materials and imperfections in them.
2. Interpret the laws of electromagnetism and various terms related to electromagnetic properties of matter, and demonstrate its applications and manipulate the displacement of electron.
3. Explain the origin of quantum theory, its basic laws and apply them to solve simple problems.
4. Understand the various properties of advanced materials and their myriad applications.

Detailed Syllabus:

Unit	Description	Duration
1.	**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.	08
2.	**Crystal structure** Lattice, basis, crystal structure, unit cell, Structure of cubic crystals (SC, BCC, FCC). Imperfections in crystals: point, line, surface & volume.	05
3.	**Electrostatics, Magnetostatics :** **Electric charge and fields:** Electric charge, conservation of charge	12

	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, electric Flux. Gauss's Law. **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. Electrostatic and Magnetostatic focussing CRT and application of CRO.	
4.	**Quantum Physics:** The Origin of Quantum theory, Blackbody radiation, Wein's law, Rayleigh Jeans Law, Stefen's Law, Plank's theory, Dual nature of radiation. Wave nature of matter, de Broglie's Hypothesis, Davisson-Germer experiment, the double slit experiment with particles, the need for wave function, Born's interpretation of wave function. Wave packets and uncertainty principle, General statement of Heisenberg's uncertainty principle, Energy time and position momentum uncertainty relation and its application. Introduction to Quantum computing.	10
5.	**Advanced Materials** (properties and its applications): a) Nano material b) Metamaterial c) Superconductors d) Metallic glasses	10
	Total	**45**

Text Books:

1. David Halliday, Robert Resnick, Jearl Walker (2015), Principles of Physics, *Wiley, New Delhi, 10th edition.*
2. Dattu R. Joshi (2017), Engineering Physics, *McGraw Hill Education, 1st edition.*

Reference Books:

1. M. N. Avadhanulu, P.G. Kshirsagar, TVS Arun Murthy (2018), "A Textbook of Engineering Physics", *S. Chand Publishing, 11th edition.*

Any other information :

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of Marks

Description of ICA	Marks
Class Test	20
Term Work	30
Total Marks :	**50**

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

Program: B. Tech. Integrated (Mechanical, Computer, EXTC)				**Semester:** II	
Course/Module: Engineering Drawing-II				**Module Code:** BTIME02006, 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 - 50 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 drawings of machine elements.

Detailed Syllabus:

Unit	Description	Duration
1.	**Orthographic projections:** Projections of various objects having flat and curved surfaces using 1st angle projection method, 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.*

Reference Books:

1. K. Venugopal (2007), "Engineering Drawing and Graphics", *New Age*

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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.*
4. Auto Cad User Guide.

Any other information

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Class Test	20
Term Work	30
Total Marks :	**50**

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

Program: B. Tech. Integrated (Mechanical, Computer, EXTC)				**Semester:** II	
Course/Module: Elements of Electrical Engineering				**Module Code:** BTIME02008, 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:

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

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Class Test	20
Term Work	30
Total Marks :	**50**

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

Program: B. Tech. Integrated (Mechanical, Computer, EXTC)				**Semester:** II	
Course/Module: Programming for Problem Solving				**Module Code:** BTCO02009	
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	4	0	5	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite:- Workshop-I (Computer Workshop)

Course Objectives:

1. This course aims to teach the fundamental concepts of Procedural Programming and helps them to build programming logic. Students will develop problem solving skills by writing computer programs.

Course Outcomes:

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

1. To formulate algorithms and draw flowcharts for arithmetic and logical problems.
2. To implement Decision Making, Nested Control Structures and Iterations.
3. To implement programs using arrays.
4. To implement programs using Functions, structures and pointers.

Detailed Syllabus:

Unit	Description	Duration
1.	**Introduction to Programming:** Algorithm: Steps to solve logical and numerical problems, Flowchart/Pseudo code with examples. From algorithms to programs: Identifiers and Keywords, basic data types, variable and constants, Syntax and Logical Errors in compilation, object and executable code	04
2.	**Basic Programming Constructs:** Operators, Expressions Decision making and Branching: If statements and if else statement, Nesting of if else statements and Else if ladder, Switch statements Continue statement, Break statement, Looping – while, do-while, For loops, Nested loops.	13
3.	**Arrays:** **One dimensional array:** Concept, declaration, initialization, storing values in arrays, accessing array elements of one-dimensional array, Operations on Arrays, Problems solving using one dimensional array. **Two-dimensional array:** Concept, declaration, initialization, accessing array elements of Two-dimensional array, Problems solving using two-dimensional array. Introduction to Strings.	11

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4.	**Functions:** Introduction and need of user defined functions, defining a Function, Function calls and declaration, Category of functions: No argument and no return value, Argument but no return value, Argument with return value, no argument but return value, Passing arrays to functions, Recursion	08
5.	**Structures:** Defining a Structure, declaring structure variables, Accessing structure members, Structure Initialization, Array of Structure, Structure within structure, Difference between Structure and Unions	05
6.	**Pointers and File Handling:** Introduction and basic concepts of Pointers. File handling: Opening and closing of files, I/O operations.	04
	Total	**45**

Text Book:

1. Schaum's Outline Programming with C, 3 e, Byron Gottfried, *McGraw-Hill, 2017.*
2. Programming in ANSI C, 7 e, E. Balaguruswamy, *Tata McGraw Hill Education, 2017.*

Reference Books:

1. The C Programming Language, 2 e, Brian W. Kernighan and Dennis M. Ritchie, *Prentice Hall of India, 1988.*
2. Schaum's Outlines Data Structures, Revised 1 e, Seymour Lipschutz, Tata McGraw Hill.

Any other information:

Total Marks of Internal Continuous Assessment (ICA): 50 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Class Test	20
Term work	30
Total Marks :	**50**

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

Program: B. Tech. Integrated (Mechanical, Computer, EXTC)				**Semester:** II	
Course/Module: Workshop-II				**Module Code:** BTICO02010	
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)**
0	2	0	1	Marks Scaled to 50	--

Course Objectives:

1. To impart hands on safety precaution of different workshop practices on various trades.
2. To impart knowledge of basic tools used for different workshop jobs.
3. To impart hand on plumbing operation by handling various plumbing tools.

Course Outcomes:

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

1. Understand Safety and modern Industry practices.
2. Differentiate various tools used in workshop for fitting, welding and sheet metal fabrication.
3. Differentiate various tools used in workshop for plumbing operation in G.I. and PVC pipe.

Detailed Syllabus:

Unit	Description	Duration
1.	**Introduction** to various workshop trades, layout. General instructions for safety in various Workshop Trades. Common accidents- causes and preventive measures. First Aid.	04
2.	**Safety Measures for Workshop Trades**: **Fitting Shop**: Introduction to fitting shop tools, common materials used in fitting shop. Description and demonstration of various types of safety precaution while work on benches, holding devices, files and hack-sawing. **Welding Shops:** Introduction to welding and its importance in engineering practice; Welding screens and other welding related equipment, accessories and gloves. Safety precautions during welding. Hazards of welding and its remedies. Precautions while using electric arc welding, Practice in setting current and voltage for striking proper arc. Earthling of welding machine. **Sheet Metal Fabrication:** Use of hand tools for sheet metal fabrication. Sheet metal fabrication of jobs involving cutting, shearing, bending, edge folding, soldering, brazing etc. Demonstration of modern tools.	12

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3.	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
4.	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
	Total	**30**

Text Books:

1. K. C. John (2010), "Mechanical Workshop Practice", *Edition-2, PHI Learning Pvt. Ltd.*

Reference Books

1. Hajra Choudhary S. K., Bose S. K., Hajra Choudhary A. K., Roy Nirjhar (2013), "Elements of Workshop Technology-I", *Media promoters and Publications.*

Any other information

Total Marks of Internal Continuous Assessment (ICA) : 50 Marks

Distribution of ICA Marks :

Description of ICA	Marks
Term Work	50
Total Marks :	**50**

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