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

Program:	B. Tech Integrated (Mechanical, Computer, EXTC)	Semester: I	
Course/Module:	Mathematics-I	Module Code: BTIME01002, BTICO01002, BTIET01002	
	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 familiarize students with the concept of functions, limits and continuity.
2. To provide an understanding of trigonometric and inverse trigonometric functions.
3. To introduce calculus and impart knowledge of basic techniques in differential and integral calculus.

Course Outcomes:

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

1. Define and relate basic notions of sets and functions.
2. Apply basic facts, concepts and principles of trigonometry to solve physical problems.
3. Evaluate matrices, determinants, limits and examine continuity of a function.
4. Find derivatives of functions and also apply the knowledge of first and second order derivatives to analyse the function.

Detailed Syllabus:

Unit	Description	Duration
1.	**Matrices and determinants** Definition, Algebra of matrices, types of matrices, determinant, properties of determinant, minor and cofactors, adjoint and inverse of a square matrix, concept of elementary row and column operations, Inverse by row operations.	10
2.	**Sets and Functions** Definition of set and function, types of function.	05
3.	**Trigonometry** Relation between degree and radian, trigonometric ratios of compound allied and multiples angles, factorization and defactorisation, inverse trigonometric functions.	10
4.	**Limits and Continuity** Limits, method of factorization, rationalization, infinity type, limits based on formula, continuity.	07

5.	**Derivatives and its applications** Derivatives for exponential, logarithmic, implicit, inverse, parametric, composite functions, increasing, decreasing functions, maxima and minima.	13
	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) : <u>50 Marks</u>

Distribution of ICA Marks :

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

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Program: B. Tech Integrated (Mechanical, Computer, EXTC)				Semester: I	
Course/Module: Fundamentals of Physics				Module Code: BTCS01005	
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	1	5	Marks Scaled to 50	Marks Scaled to 50

Pre-requisite: 10th Standard Science

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 successful completion of the course the students will be able to
1. Develop conceptual competence to realize the need and significance of measurement, dimensional analysis of any physical quantity, understand the mechanics of different materials and illustrate their applications in different engineering sectors.
2. Explain the concepts and applications of simple harmonic motion and waves in engineering.
3. Apply the concepts of Interference and Diffraction in various engineering applications.
4. Develop considerable problem solving abilities and scientific skills, viz. experimental, observational, manipulative, decision making and investigatory etc.

Detailed Syllabus:

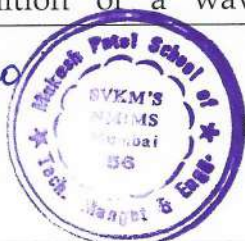| Unit	Description	Duration
1.	**Physical World and Measurement:** a) Need of measurements and units in engineering and science Definition of unit; fundamental and derived units; systems of units (CGS, MKS and SI), examples of conversions into different unit systems.	07

	b) Error calculations: Accuracy and precision of measuring instruments; errors in measurement; rules for rounding off the numbers and identification of significant figures with illustrations. c) Dimensional formulae and applications: Dimensions of physical quantities, dimensional analysis and its applications.	
2.	**Mechanics of fluids:** a) Viscosity in fluids: Viscous force, definition of viscosity, velocity gradient, Newton's law of viscosity, coefficient of viscosity and its SI unit. Streamline and turbulent flow with examples, critical velocity, Reynold's number, and its significance. Up thrust force, terminal velocity, Stokes law, and derivation of coefficient of viscosity by Stoke's method, effect of temperature and adulteration on viscosity of liquid. b) Surface tension in liquids: Molecular Force, Cohesive and adhesive force, surface tension definition and unit, Laplace's molecular theory of surface tension, effect of temperature and impurity on surface tension, Angle of contact, Capillarity and examples of capillary action, derivation of expression for surface tension by capillary rise method, applications of surface tension.	07
3.	**Mechanics of solids:** a) Elasticity in solids Deforming force, restoring force, Elastic and plastic bodies, explanation of stress and strain with their types, Hooke's law, elastic limit, Young's modulus, Bulk modulus, Rigidity modulus, Poisson's ratio, their units and numerical problems. b) Rotational Motion and Torque Vector product of two vectors, angular velocity, angular acceleration, angular momentum and torque definition. c) Moment of inertia Definition, unit, Moment of inertia of plane figures like triangle, rectangle.	07
4.	**Wave Motion:** a) Basics properties of waves Definition of a wave, wave velocity, wave period, wave	12

	frequency, wavelength, amplitude of a vibrating particle, derivation of $v = n\lambda$. b) **Wave motion** Vibratory motion, periodic motion, explanation of Simple harmonic motion (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. c) **Resonance** Definition of resonance, examples of resonance, formula to calculate velocity of sound by resonance tube method. d) **General Applications (Acoustic, Ultrasonics)**	
5.	**Properties of light waves:** a) **Interference** Principle of superposition, definition of interference, coherent sources, methods to produce coherent sources, young's double slit experiment, analytical treatment of interference, fringe width derivation, explanation of thin film interference in reflected systems (no derivation of path difference), Applications of thin film interference: wedge shape and newton's rings. b) **Diffraction** Definition of diffraction, types of diffraction: Fresnel and Fraunhofer diffraction, Explanation of Fraunhofer diffraction at single slit, double slit and multiple slit (no derivations), diffraction grating and its applications, dispersive and resolving power of grating.	12
	Total	45

Text Books:

1. David Halliday, Robert Resnick, Jearl Walker (2015), Principles of Physics, *Wiley, New Delhi, 10th edition.*
2. Paul G. Hewitt (2015), Conceptual Physics, *Pearson education.*

Reference Books:

1. R. K. Gaur and S. C. Gupta (2008), Engineering Physics, *Dhanpat Rai & Co., New Delhi.*
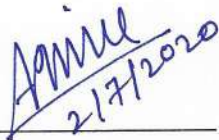2. Verma, H. C. (2010), Concepts in Physics, *Bharti Bhawan Ltd., New Delhi, 3rd edition.*

Any other information:

Total Marks of Internal Continuous Assessment (ICA): <u>50 Marks</u>

Distribution of ICA Marks :

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

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Program: B. Tech. Integrated (Mechanical, Computer, EXTC)					Semester: I	
Course/Module: Chemistry					Module Code: BTCO02010	
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	1		5	Marks Scaled to 50	Marks Scaled to 50

Prerequisite: 10th Standard Science

Course Objectives:

1. To introduce basic principles of chemistry- atom structure, gas laws, chemical energetic and environmental chemistry.
2. To familiarize with the concepts and applications of water technologies, engineering materials like metals, alloys and understand electrochemistry & corrosion.

Course Outcomes:

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

1. Understand water technologies applied in industries.
2. Apply principles of engineering materials like metals and alloys and apply principles of electrochemistry, corrosion theories and interpret the chemical energetic theories in various real time problems.
3. Develop interest in the fundamental structure of matter, which governs the properties of matter and mole concept.
4. Discuss the different effects of environmental pollution and derive relationships between the pressure, volume, temperature and number of moles of a gas.

Detailed Syllabus:

Unit	Description	Duration
1.	**Atom Structure:** Dalton's Atomic Theory, Rutherford's Scattering Experiment, Bohr's Theory of an atom, Orbits and orbitals, shapes of s, p, d orbitals, Pauli's exclusion principle, Hund's rule, Aufbau principle, Electronic configuration of first twenty elements, Definition and types of valency - electrovalency, covalency, co-ordinate valency. Avogadro's number, molecular and equivalent weight, molar mass	07
2.	**Gas Laws:** 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

3.	**Water:** Sources of water, Impurities in water, hardness of water, causes of hardness, Numerical problems based on hardness calculations, Estimation of hardness of water by EDTA method, Numerical problems based on EDTA method. Disadvantages of hard water – for domestic and industrial purposes, **Softening Methods:** Different methods of water hardness removal (lime-soda method, zeolite method, ion-exchange method) and their numerical problems.	08
4.	**Electrochemistry & Corrosion:** Nernst theory, Mechanism of electrolysis, degree of ionization. Faraday's Laws of Electrolysis-Statements and numerical problems. Dry or Chemical corrosion, Wet or Electro chemical corrosion. Types of corrosion: concentration cell corrosion, galvanic corrosion.	06
5.	**Metals and Alloys:** Types of metals, properties of metals-Hardness, Ductility, Malleability, Tensile Strength, Soldering. Alloys: Introduction, Alloys of Al, Cu (brass, bronze) (Composition, properties and uses)	06
6.	**Chemical Energetic:** 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.	06
7.	**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
	Total	45

Text Books:

1. Jain. P.C & Jain. M, Engineering Chemistry, *Dhanpat Rai Publishing Co. New Delhi*, 17th Edition, 2017.
2. Rao. A.A, Polytechnic Chemistry (Theory and Practical), *New Age International*, 2010.
3. Shete. S.D, Applied Chemistry, *S. Chand & Co*, 2018.

Reference Books:

1. Ball. D, Physical Chemistry-, Cengage Learning Inc, 2nd edition, 2015.
2. Weiner. S.A, Harrison.B, Introduction to Chemical Principles-A Laboratory Approach, 7th edition, Cengage Learning, 2010.

Any other information

Total Marks of Internal Continuous Assessment (ICA) : <u>50 Marks</u>

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: I	
Course/Module: Engineering Drawing-I				Module Code: BTIME01006, BTICO01006, BTIET01006	
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 - 50 in Question Paper)
2	2	0	3	Marks Scaled to 50	Marks Scaled to 50

* Practical Examination conducted by school level.

Course Objectives:
1. To describe scientific facts, principals and technique of drawing in order to visualize and express the ideas.
2. To know different curves used in engineering
3. To acquire the concepts of projections of an object

Course Outcomes:
After completion of the course, students would be able to:
1. Draw the different curves used in engineering.
2. Draw the projections of points and lines.
3. Draw the projections of solids and section of solid of machine component.

Detailed Syllabus:

Unit	Description	Duration
1.	**Introduction:** Importance of Engineering Drawing for the study of technical course, Types of lines and dimensioning, Geometric construction. **Curves: Involute, Conics**-Parabola, Ellipse (*Oblong method, General method*), Hyperbola and Parabola (*Rectangle, General method*). **Cycloidal Curves: Cycloid, Epicycloid & Hypocycloid.**	08
2.	**Projection of Lines:** Inclined to both the reference planes (No traces and both ends of lines in one quadrant only). **Projection of Planes:** Inclined to both the reference planes for regular polygons and circles.	08
3.	**Projections of Solids:** Projection of solids like Prism, Pyramid, Cylinder and Cone inclined to both the reference Planes.	08

4.	**Section of Right Regular Solids**: Sections of solids cut by inclined planes (Prism, Pyramid, Cone and Cylinder) With its true shape of section. **Development of Surfaces**: Development of Lateral surfaces of solids cut by inclined plane (Prism, pyramid, cone and cylinder)	06
	Total	30

Text Books:

1. M. B. Shah and B. C. Rana (2010), "Engineering Drawing", *Pearson Education.*

Reference Books:

1. N. D. Bhat (2016), "Elementary Engineering Drawing", *Charotar Publishing House.*
2. K. Venugopal (2007), "Engineering Drawing and Graphics", *New Age International Publishers.*
3. Giesecke, Mitchell, Spencer and Hill (2008), "Technical Drawing", *Macmillan Publishing Co. Inc. New York.*

Any other information:

Total Marks of Internal Continuous Assessment (ICA) : <u>50 Marks</u>

Distribution of ICA Marks :

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

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Program:	B. Tech. Integrated (Mechanical, Computer, EXTC)		Semester: I	
Course/Module: Communication Skills			Module Code: BTIME01001, BTICO01001, BTIET01001	
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)
1	0	2	3	Marks Scaled to 50	--

Course Objectives:

1. To equip students with critical thinking abilities through diverse reading exercises.
2. To enhance students' communication skills by giving adequate exposure in writing, listening and speaking skills.
3. To support students' language skills requirements such as vocabulary and grammar.
4. To build students' confidence in participating in formal communication such as speeches and presentations as well as informal communication such as conversations.
5. To help students understand and navigate online communication with confidence and care.

Course Outcomes:

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

1. To understand the basics of communication and use this understanding to communicate effectively in a range of contexts.
2. To gain confidence and competence in oral communication including speaking and listening skills.
3. To apply the rules of English language correctly for effective written communication.
4. To create formal and persuasive presentations

Detailed Syllabus:

Unit	Description	Duration
1.	Basics of Communication 1.1 Process of communication 1.2 Modes of communication: Verbal/Non-verbal, Oral/Written, Formal/Informal, Textual/Visual/Multimodal 1.3 Levels of communication: Intrapersonal, Interpersonal, Group, Mass Communication	02

	1.4 Effective communication and its barriers	
2.	Oral Communication 2.1 Attention in communication 2.2 Listening: Difference between hearing and listening, types of listening, barriers to good listening, virtues of good listening skills 2.3 Understanding dialogic communication 2.4 Characteristics of a good public speaker (Rhetoric)	03
3.	Written Communication 3.1 7C's of Effective Writing 3.2 Common grammar mistakes 3.3 Sentence Construction 3.4 Paragraph Writing 3.5 Writing effective answers 3.6 Letter Writing	03
4.	Reading Comprehension 4.1 Vocabulary 4.2 Reading strategies: Close reading, scanning, interpretation	01
5.	Communicating Online 5.1 Possibilities, Rights, Privacy 5.2 Netiquette 5.3 Writing a formal email 5.4 Using social media for formal communication	02
6.	Power Point Presentations 6.1 Planning: context, purpose, audience, scope 6.2 Visual Slide Design 6.3 Oral Communication	02
7.	Technical Communication 7.1 Characteristics of technical writing 7.2 Writing definitions 7.3 Writing object and process description	02
	Total	15

Text Books:

1. Dr Meenakshi Raman and Dr Sangeeta Sharma (2015 3rd Ed. 2017 Reprint), 'Technical Communication', *Oxford University Press*.

Reference Books:

1. Jonathan McKee (2017) The Teen's Guide to Social Media and Mobile Devices: 21

Tips to Posting in an Insecure World', *Shiloh Run Press*.
2. David Bohm (1996) 'On Dialogue', *Routledge*.

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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Program: B. Tech. Integrated (Mechanical, Computer, EXTC)		Semester: I	
Course/Module: Workshop-I		Module Code: BTICO01010	
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)
0	2	0	1	Marks Scaled to 50	--

Course Objectives:
1. To familiarize students with assembling and troubleshooting of PC.
2. 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. Develop the skill required to assemble components to build the personal computer functional
2. Develop the skill required to troubleshoot and maintain computer system.
3. Carry out electrical wiring.
   Prepare PCB layout.

Detailed Syllabus:

Unit	Description	Duration
1.	**Assembling and Configuring Personal Computer:** Introduction : Dismantling of a Personal Computer (PC), Identification of Components of a PC such as power supply, motherboard, processor, hard disk, memory (RAM, ROM), CMOS battery, CD drive, monitor, keyboard, mouse, printer, scanner, pen drives, disk drives etc **Assembling of PC** -CPU installation : Installation of power supply unit installation, heat sink and cooling fan, memory module, hard disk, optical drive ,Mounting motherboard, Connecting motherboard power supply cables, Connecting to front panel, Connecting mouse, keyboard and monitor. Power on of computer, Configuring BIOS. **Installation of Operating System** (Any one) and Device drivers, Boot-up sequence. Installation of application software (at least one)	08
2.	**Networking** Identification of network components: LAN card, wireless card, switch, hub, router, different types of network cables (straight cables, crossover cables, rollover cables) Basic networking and crimping.	04

3.	**Troubleshooting and Maintenance:** Safety precautions, Configuring using BIOS parameters, Power on self test, Devices and drivers, Working with windows registry, Performance improving steps, Overclocking the system, Diagnosing general problems, Computer system: common problems and solutions, Preventive maintenance, Replacing CMOS battery, Clearing BIOS password, Flashing BIOS	04
4.	**PCB Laboratory Exercises:** Layout drawing, positive and negative film making, PCB etching and drilling, tinning and soldering techniques	08
5.	**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.	06
	Total	30

Text Books:

1. K. L. Jame (2013), "Computer Hardware": Installation, Interfacing, Troubleshooting and Maintenance, *PHI Publication.*
2. Printed Circuit Boards: Design, Fabrication, assembly and testing, 1 e, R.S. Khandpur, Tata McGraw Hill, 2005

Reference Books:

1. 1. Anita Goel (2010), "Computer Fundamentals", *Pearson Publication First Edition.*
2. Electrical Workshop: Safety, Commissioning, maintenance and testing of electrical equipment, 3 e, R.P. Singh, *IK International Publishing House Pvt. Ltd., 2012.*

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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