



B.Tech

**First Year Teaching Scheme
and
Syllabus**

INDUS UNIVERSITY, AHMEDABAD													
EC+EL+CE+CSE+IT+META SEMESTER-I SCHEME W.E.F. YEAR 2017-18													
Sr. No.	Sub. Code	Name of the subject	CREDIT	Teaching scheme (per week)				Examination Scheme					Total Marks
								Theory			Practical		
				MID	CIE	End Sem	CIE	End Sem	Th.	Th.	Th.	Pr.	
1	SH0101	Differential Calculus & Matrix Algebra	05	04	02	00	06	30	10	60	00	00	100
2	SH0001	Engineering Physics	04	03	00	02	05	30	10	60	40	60	200
3	EL0001	Electrical Workshop	01	00	00	02	02	00	00	00	40	60	100
4	EL0002	Elements of Electrical Engineering	04	03	00	02	05	30	10	60	40	60	200
5	ME0001	Engineering Graphics	04	01	06	00	07	30	10	60	00	00	100
6	EC0001	Basic Electronics	03	02	00	02	04	30	10	60	40	60	200
7	MT0001	Materials Science	03	03	00	00	03	30	10	60	00	00	100
8	SH0102	Technical English	02	01	02	00	03	30	10	60	00	00	100
TOTAL			26	17	10	08	35	210	70	420	200	300	1100

INDUS UNIVERSITY, AHMEDABAD													
EC+EL+CE+CSE+IT+META SEMESTER-II SCHEME W.E.F. YEAR 2017-18													
Sr. No.	Sub. Code	Name of the subject	CREDIT	Teaching scheme (per week)				Examination Scheme					Total Marks
								Theory			Practical		
				MID	CIE	End Sem	CIE	End Sem	Th.	Th.	Th.	Pr.	
1	SH0201	Integral Calculus and Linear Algebra	05	04	02	00	06	30	10	60	00	00	100
2	SH0002	Engineering Chemistry	04	03	00	02	05	30	10	60	40	60	200
3	ME0004	Mechanical Workshop	01	00	00	02	02	00	00	00	40	60	100
4	ME0002	Elements of Mechanical Engineering	04	03	00	02	05	30	10	60	40	60	200
5	CE0001	Computer Programming	04	03	00	02	05	30	10	60	40	60	200
6	CV0002	Engineering Mechanics	04	03	02	00	05	30	10	60	00	00	100
7	CV0001	Environmental Science	02	01	00	02	03	30	10	60	40	60	200
8	SH0202	Business Communication and Presentation Skill	02	01	02	00	03	30	10	60	00	00	100
TOTAL			26	18	06	10	34	210	70	420	200	300	1200

INDUS UNIVERSITY, AHMEDABAD													
ME+CVL+AUTO SEMESTER-I SCHEME W.E.F. YEAR 2017-18													
Sr. No.	Sub. Code	Name of the subject	CREDIT	Teaching scheme (per week)				Examination Scheme					Total Marks
								Theory			Practical		
				MID	CIE	End Sem	CIE	End Sem	Th.	Th.	Th.	Pr.	
1	SH0101	Differential Calculus & Matrix Algebra	05	04	02	00	06	30	10	60	00	00	100
2	SH0002	Engineering Chemistry	04	03	00	02	05	30	10	60	40	60	200
3	ME0004	Mechanical Workshop	01	00	00	02	02	00	00	00	40	60	100
4	ME0002	Elements of Mechanical Engineering	04	03	00	02	05	30	10	60	40	60	200
5	CE0001	Computer Programming	04	03	00	02	05	30	10	60	40	60	200
6	CV0002	Engineering Mechanics	04	03	02	00	05	30	10	60	00	00	100
7	CV0001	Environmental Science	02	01	00	02	03	30	10	60	40	60	200
8	SH0102	Technical English	02	01	02	00	03	30	10	60	00	00	100
TOTAL			26	18	06	10	34	210	70	420	200	300	1200

INDUS UNIVERSITY, AHMEDABAD													
ME+CVL+AUTO SEMESTER-II SCHEME W.E.F. YEAR 2017-18													
Sr. No.	Sub. Code	Name of the subject	CREDIT	Teaching scheme (per week)				Examination Scheme					Total Marks
								Theory			Practical		
				MID	CIE	End Sem	CIE	End Sem	Th.	Th.	Th.	Pr.	
1	SH0201	Integral Calculus and Linear Algebra	05	04	02	00	06	30	10	60	00	00	100
2	SH0001	Engineering Physics	04	03	00	02	05	30	10	60	40	60	200
3	EL0001	Electrical Workshop	01	00	00	02	02	00	00	00	40	60	100
4	EL0002	Elements of Electrical Engineering	04	03	00	02	05	30	10	60	40	60	200
5	ME0001	Engineering Graphics	04	01	06	00	07	30	10	60	00	00	100
6	EC0001	Basic Electronics	03	02	00	02	04	30	10	60	40	60	200
7	MT0001	Materials Science	03	03	00	00	03	30	10	60	00	00	100
8	SH0202	Business Communication and Presentation Skill	02	01	02	00	03	30	10	60	00	00	100
TOTAL			26	17	10	08	35	210	70	420	200	300	1100

Subject: Differential Calculus and Matrix algebra

Program: **B.Tech. All**

Subject Code: **SH0101**

Semester: **I**

Teaching Scheme

Examination Evaluation Scheme

Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
4	2	0	5	24/60	-	16/40	-	100

Course Objectives

1. To analyze mathematical knowledge and skills needed to support their concurrent and subsequent engineering studies.
2. To analyze knowledge of basic science and engineering fundamentals.
3. To describe an ability to undertake problem identification, formulation and solution.
4. To analyze different mathematical models within science and technology and work creatively, systematically and critically.
5. To describe the solution of different types of mathematical models using knowledge about the possibilities and limitations of the different methods and tools.
6. To analyze an ability to develop abstract, logical and critical thinking and the ability to reflect critically upon their work and work of others.
7. To analyze their strengths and weakness as learners and to appreciate the value of errors or mistakes as powerful motivators to enhance learning and understanding.

CONTENTS

UNIT-I

[10 hours]

Differential Calculus

Derivatives of nth Derivative of some Elementary Functions

Leibnitz's Theorem

Taylor's Series and Maclaurin's Series Expansions

Indeterminate Forms.

Functions of Several Variables: Limit and Continuity

UNIT-II

[13 hours]

Partial Differentiation and its Applications

Partial Differentiation

Variable Treated as Constant, Total Derivative

Partial Differentiation of Composite Functions: Change of Variable-Differentiation of an

Implicit Function -Euler's Theorem
Jacobian, Error and Approximations
Taylor's Theorem for Function of two Variables
Maxima and Minima of Functions of two Variables: with and without constraints
Lagrange's Method of Undetermined Multipliers.

UNIT-III

[13 hours]

Basic of Matrix algebra

Concepts of Determinants and Matrices, Types of Matrices
Row Echelon and Reduced Row Echelon form
Inverse of a Matrix, Rank of a Matrix, Normal Form
System of Linear Homogeneous Equations
System of Non-Homogeneous Equations, Gaussian Elimination Method

UNIT-IV

[12 hours]

Vector Differential Calculus

Curvilinear coordinate system, Cartesian, Spherical and Cylindrical coordinate system
Vector Differentiation, Directional Derivative, Gradient of a Scalar Function and Conservative Field
Directional Derivative, Gradient of a Scalar Function and Conservative Field
Divergence and Curl, Related Properties of Gradient, Sums of Divergence and Curl

Course Outcomes

1. Apply the knowledge of multivariable calculus for solving various practical & engineering problems.
2. Apply the concept of power series expansion of one and two variable functions in Taylor's and Maclaurin's series.
3. Apply the basic concept of partial derivatives and their applications.
4. Apply the knowledge of Lagrange's method of undetermined multipliers.

Text Books

1. B.V.RAMANA: "HIGHER ENGINEERING MATHAMATICS", TATA McGraw Hill. 6th Edition", 2006, ISBN: 007063419X
2. R K Jain, S R K Iyengar: " Advanced Engineering Mathematics. Narosa Publishing House, 3rd Edition", 2002, ISBN: 817319730X

Reference Books

1. Erwin Kreyszig: "Advanced Engineering Mathematics (8th Edition) ",Wiley Eastern Ltd., New Delhi. 8th Edition , 2004, ISBN: 9971512831

2. Dr. B.S. Grewal : “Higher Engineering Mathematics”, Khanna Publishers, New Delhi , 44th Edition, 2010, ISBN:8174091955
3. Murray Spiegel : “Advanced Mathematics for Engineering & Science: Schaum’s Outline Series” ,Tata - McGraw Hill Publication 3rd Edition, 2010, ISBN: 9780071623667
4. Merel C Potter, J L Goldberg: “Advanced Engineering Mathematics (3rd Edition)”Oxford India Publication. . 3rd Edition, 2005, ISBN: 0195681428

Web Resources

1. Calculus by IIT Kanpur (<https://www.youtube.com/watch?v=0lzOAW8yMTc>)
2. Linear Algebra by Prof. K. C. Shivakumar (<http://nptel.ac.in/courses/111106051/>)

Subject: Engineering Physics								
Program: B.Tech. All				Subject Code: SH0001			Semester: I / II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
3	0	2	4	24/60	24/60	16/40	16/40	200

Course Objectives

1. To describe the basic laws of Physics, mathematical foundations and Engineering theory and to apply the knowledge in modeling and designing a real-world problem (fundamental engineering analysis skills).
2. To analyze a problem, identify and formulate using the concept of physics and to solve engineering problem (engineering problem solving skills).
3. To analyze and interpret experimental data using concepts of Physics (information retrieval skills).
4. To analyze and use current techniques, skills and tools necessary for Physics and engineering practice (practical engineering analysis skills).

CONTENT

UNIT-I

[12 hours]

Wave motion and Sound

Propagation of waves, longitudinal and transverse waves, mechanical and non-mechanical waves

Introduction to sound waves, Characteristics and Properties of Sound, Absorption coefficient, Reverberation time, Sabine's formula (without derivation), Factors affecting architectural acoustics,

Introduction of Ultrasonic waves, Generation of ultrasonic waves, Detection of ultrasonic waves, Applications of Ultrasonic waves: NDT, SONAR & others.

Optics

Introduction to Reflection, Refraction and Total Internal Reflection;

Wavefront and Huygen's principle; Interference: Types of interferences, Thin film interference, Newton's rings and its applications

Diffraction of light waves: Types of Diffraction, Single-slit Fraunhofer diffraction, Plane diffraction grating, Resolving power of grating, Rayleigh Criterion, Optical polarization (Introduction)

UNIT-II

[11 hours]

Quantum Mechanics

Black body radiation: Planck's law (without derivation), Wien's displacement law and Rayleigh – Jeans' law from Planck's theory; Compton effect (Theory and experimental verification), De-Broglie theorem, Uncertainty principle; Schrodinger's wave equation – Time independent and time dependent equations – Physical significance of wave function, Particle in one dimensional rigid box.

Laser

Energy levels in atoms, Absorption, Spontaneous Emission and Stimulated Emission of light, Relation between Einstein's Coefficients, Population Inversion, Metastable State, Pumping Mechanism, Optical Resonators, Fundamentals of LASER, Characteristics of Laser radiation

Types of Laser: Solid State Laser (Nd-YAG laser), Gas laser (He-Ne laser), Applications of Laser: Medical, Industrial, Holography (introduction).

UNIT-III

[12 hours]

Electromagnetism & Dielectrics

Coulomb's law for distribution of charges, Gauss's law and applications, Electric current and Equation of continuity, Electric field intensity, Electric flux, Electric dipole moment, Electric field due to dipole, Introduction to dielectrics, Polarizability, Types of polarization – electronic, ionic, orientational, Polarization of dielectrics, Gauss's law in presence of dielectric, Dielectric constant, Electric susceptibility and Permittivity, Internal (Local) field in dielectric, Clausius Mossotti equation (with derivation)

Magnetic field, Steady current, Biot-Savart law, Ampere's law and applications, Faradays law of Induction, Lenz's Law; Effect of magnetic field on current carrying conductor, Lorentz force

Magnetism

Basic important terms and units in Magnetism, Concept and origin of magnetic moment, magnetic susceptibility, Total angular momentum, Diamagnetism, Paramagnetism, Ferromagnetism, Ferrimagnetism, Antiferromagnetism, Domain theory of Ferromagnetism, Curie temperature and hysteresis loss

UNIT-IV

[10 hours]

Superconductivity

Superconductivity: Zero resistance, Critical temperature, Meissner effect, Critical field, General properties of superconductors, Type-I and Type-II superconductors, BCS theory of Superconductor, High temperature superconductors

Applications of Superconductors: SQUID, Maglev

Nanophysics

Nanoscale, Surface to volume ratio, Surface effects on nanomaterials, Quantum size effect, Electron confinement, Nanoparticles and Nanomaterials, Properties of Nanomaterials

Advantages & Disadvantages of Nanomaterials,

Synthesis of nanomaterials: Laser ablation, ball milling, chemical vapor deposition, sol gel, Carbon nanotubes: structure, synthesis, properties and applications, Applications of Nanomaterials.

Course Outcomes

1. To apply the concepts of Physics in various branches of Engineering.
2. To apply the knowledge of Physics to formulate and solve Engineering problems through numerical analysis & laboratory methods.
3. To apply the techniques, skills and modern tools of Physics necessary for Engineering applications.
4. To apply the basic idea of Physics to design and conduct experiments, analyze and interpret data.
5. To apply the concepts of Physics to design a system, a component, a process or a measurement technique to meet specific criteria
6. To apply the knowledge of contemporary issues and to function on multidisciplinary teams

Text Books

1. Engineering Physics by Rajendran ,Tata Mc Graw-Hill Education Pvt. Ltd., First edition, 2010, ISBN: 0071070141/9780071010140.
2. Engineering Physics by D.K. Bhattacharya, Poonam Tandon ,Oxford University Press, First published, 2015, ISBN-13:978-0-19-945281-1

Reference Books

1. Engineering Physics;Fundamentals and Modern applications by P. Khare & A. Swarup ,Jones & Bartlett Learning, 2009, ISBN-13: 978-0763773748
2. A textbook of Engineering Physics by S.O. Pillai and Sivakami,New Age International, Third edition, 2011, ISBN:978-81-224-3162-9
3. An introduction to Electrodynamics by David Griffiths,Pearson Education, 3th edition, 1999,ISBN:9780138053260
4. Optics by A. Ghatak , McGraw-Hill Education India Private Limited, 6th edition, 2017, ISBN-13:978-9339220907
5. Engineering Electromagnetics by W H Hayt & J A Buck, McGraw-Hill Education, 8th edition, 2017, ISBN-13:978-9339203276
6. Engineering Physics by K. Rajagopal ,Prentice Hall of India Pvt. Ltd., 2007, ISBN: 9788120332867
7. A Textbook of Engineering Physics by M. N. Avadhanulu, P. G. Khirsagar , S.Chand Pub., Revised edition, 1992, ISBN: 9788121908177
8. University Physics, Sears and Zemansky, Pearson Education India, 13th edition, 2013, ISBN-13:978-8131790274

Web resources

1. Topics: Acoustics & Optics (http://www.nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Guwahati/engg_physics/index_cont.htm)
2. Course: Engineering Physics (<http://www.nptelvideos.in/search?q=engineering+physics>)
3. Topic: Laser(<http://science.howstuffworks.com/laser1.htm>)
4. Topic: Optics(<http://www.pitt.edu/~poole/physics.html#light>)
5. Topic: Magnetism (<https://www.khanacademy.org/science/physics/magnetic-forces-and-magnetic-fields>)
6. Topic: Interference(<https://www.khanacademy.org/science/physics/light-waves>)
7. Topic: Quantum Mechanics(<https://ocw.mit.edu/courses/physics/8-04-quantum-physics-i-spring-2016/index.htm>)

MOOCs:

1. <https://www.edx.org/course/subject/physics>

LIST OF EXPERIMENTS

Experiment no.	Title	Learning Outcomes
1	<u>Photocell</u> : To verify the inverse square law using photocell.	a) To understand the relation between current and the distance between photocell and source b) To understand the inverse square law and photoelectric effect
2	<u>Ultrasonic Interferometer</u> : To determine the wavelength and velocity of ultrasonic wave through ultrasonic interferometer.	a) To calculate wavelength and velocity of ultrasound in liquid medium b) To understand the properties of Ultrasonic wave
3	<u>Determination of Refractive index</u> : To determine the refractive index of a given material (prism) using spectrometer.	a) To familiarize with spectrometer b) To understand the phenomenon of polychromatic light source c) To calculate refractive index of prism
4	<u>Resolving power of grating</u> : To determine resolving power of a diffraction grating.	a) To understand the diffraction phenomena of light b) To understand the use of diffraction grating
5	<u>Newton's Ring</u> : To determine the wavelength of monochromatic light	a) To familiarize with travelling microscope b) To understand the phenomena of monochromatic light & calculating wavelength of it c) To understand the use of optical lenses

6	<u>Planck's Constant:</u> To determine the Planck's Constant using LED	<ul style="list-style-type: none"> a) To study V-I characteristics of different LED b) To find the variation of current with temperature c) To see the relation between band gap and Planck's constant & calculating the value of it
7	<u>Determination of Wavelength of Laser:</u> To determine the wavelength of LASER using diffraction grating.	<ul style="list-style-type: none"> a) To understand the properties of Laser b) To understand the diffraction phenomena of light c) To study the use of diffraction grating
8	<u>Determination of wavelength of laser using single slit</u>	<ul style="list-style-type: none"> d) To calculate the wavelength of laser e) To study the use of single slit
9	<u>Dielectric constant:</u> To determine the dielectric constant of a dielectric substance.	<ul style="list-style-type: none"> a) To understand the properties of dielectric material b) To study the dielectric constant with respect to capacitance of variable and test capacitor c) To understand the difference between variable and test capacitor
10	<u>Hysteresis loss:</u> To determine the Hysteresis loss in a Ferromagnetic material.	<ul style="list-style-type: none"> a) To study hysteresis loss for ferromagnetic material b) To understand the hysteresis curve for ferromagnetic material c) To understand the use of CRO
11	<u>To determine the magnetic field at the center of a coil and its variation with distance and radius of the coil.</u>	<ul style="list-style-type: none"> a) To see the effect of magnetic field with different radius of coil b) To verify Biot-Savart law c) To study the use of tangent galvanometer
12	<u>To verify the Faraday's law of electromagnetic induction.</u>	<ul style="list-style-type: none"> a) To study the Faraday's law b) To understand the variation of magnetic field

Subject: Electrical Workshop								
Program: B.Tech. All				Subject Code: EL0001			Semester: I / II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
0	0	2	1	-	24/60	-	16/40	100

Course Objectives

1. Describe and apply basic symbols and abbreviations and IE rules used in electrical engineering.
2. Describe, apply and analyze different types of cables/wires, switches, fuses, and circuit breaker.
3. Describe and analyze Measuring instruments like Ammeter, Voltmeter, Wattmeter, Watt-hour Meter, and Megger.
4. To analyze and apply domestic wiring.

LIST OF EXPERIMENTS

Experiment No.	Title	Learning Outcome
1	Introduction to symbols and abbreviations used in electrical engineering.	a) Basic knowledge of symbols and abbreviations that are used in electrical engineering
2	Introduction to IE rules.	a) Understanding of safety rules b) Safety precautions to be taken in the laboratory
3	Identify different types of cables/wires, switches, fuses, MCB, ELCB, MCCB with their ratings and usage.	a) To understand basic working principle of different protective devices b) To recognize the practical applications of these protective devices by their demonstration
4	Performance of Electric shock phenomena, precautions, preventions, earthing.	a) To identify the importance of earthing in electric network. b) To understand, how earthing works
5	Measuring instruments like Ammeter, Voltmeter, Wattmeter, Watt-hour Meter, and Megger with their	a) To get familiar with different measuring devices b) To understand the working principle on which these devices work

	description and usage.	
6	To measure earthing resistance using insulation tester (Megger).	a) Basic knowledge of earthing resistance b) Working principle of insulation tester (megger)
7	Wiring of power distribution arrangement using single phase MCB distribution board with ELCB, Main switch and Energy meter.	a) To identify different components used in wiring scheme b) Basic knowledge of designing a simple wiring scheme c) To identify the principle and working of energy meter
8	Wiring of light/fan circuit using Two way switches (Staircase wiring), Wiring of fluorescent lamps and light sockets (6 A)	a) Basic knowledge of staircase wiring b) Wiring of fluorescent lamps c) Identification of sockets
9	Wiring of backup power supply including inverter, battery and load for domestic installations.	a) To have the basic idea of inverter and battery b) Basic knowledge of back-up power supply
10	Demonstration and measurement of power consumption of Electric Iron, Mixer Grinder, Single phase pump, exhaust fan or other home appliance.	a) To have the knowledge of working of electric iron, mixer grinder and pump b) To demonstrate the power consumption by these devices
11	Preparing the drawing for wiring a newly built room, without any electrical wiring along with a bill of materials with specifications; the room may be a class-room, an office, a shop, a clinic, a small workshop etc.	a) Exercise for students to make a wiring scheme for any of the given example b) To estimate the total cost of appliances, materials and wiring

Course Outcomes

1. To apply electrical symbol and IE rules for safety.
2. To apply power distribution arrangement for house hold application.
3. To apply power consumption calculation for house hold appliances.
4. To apply power back up using inverter for domestic purpose.

Subject: Elements of Electrical Engineering

Program: **B.Tech. All**

Subject Code: **EL0002**

Semester: **I / II**

Teaching Scheme

Examination Evaluation Scheme

Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
3	0	2	4	24/60	24/60	16/40	16/40	200

Course Objectives

1. Describe, apply and analyze basic network concepts emphasizing series and parallel combination of passive components.
2. Describe, apply and analyze laws of electrostatics, charging and discharging of capacitor and magnetic circuit.
3. To analyze and apply single phase and three phase AC circuit with RL, RC and RLC.
4. To analyze and apply construction and working of transformer, DC machine and Induction Motor.

CONTENTS

UNIT-I

[07 hours]

Elementary Concepts:

Ohm's Law and Kirchhoff's Laws, Analysis of series, parallel and series-parallel circuits; Star-Delta conversion; Nodal analysis, Mesh analysis, voltage sources and current sources, Super position theorem, Thevenin's theorem, Norton's theorem, Equivalence of thevenin's and norton's theorem, Maximum power transfer theorem.

UNIT-II

[12 hours]

Electrostatics:

Electric charge and Laws of electrostatic, Capacitor; Capacitor in series and parallel, variable capacitor, Instantaneous voltage and current in capacitor, charging and discharging of capacitor, Energy stored in a capacitor, types of capacitor.

Magnetic Circuit:

Magneto motive force, magnetic field strength, reluctance, Relation between magnetic circuit parameter, Laws of magnetic circuit, composite magnetic circuit: series magnetic circuit, parallel magnetic circuit, comparison of Electric and magnetic circuit, Effect of magnetic field on current carrying conductor; Statically and dynamically induced EMF; Concepts of self inductance, mutual inductance, energy stored in inductor, coefficient of coupling; Inductance in series and parallel; Hysteresis and Eddy current losses.

UNIT-III

[16 hours]

Single Phase A.C. Circuits:

Generation of sinusoidal voltage, Definition of average value, root mean square value, form factor and peak factor; Phasor representation of alternating quantities; Analysis with phasor diagrams of R, L, C, R-L, R-C and R-L-C circuits; Concepts of Real power, Reactive power, Apparent power and Power factor, methods to improve power factor, Series, Parallel and Series - Parallel circuits; Power in AC circuit, Resonance in series and parallel circuits

Three Phase A.C. Circuits:

Necessity and Advantages of three phase systems, Generation of three phase power, definition of Phase sequence, balanced supply and balanced load; Relationship between line and phase values of balanced star and delta connections; Power in balanced three phase circuits, measurement of power by two wattmeter method; Work, Power, Energy, Problems

UNIT-IV

[13 hours]

Transformers:

Principle of operation and construction of single phase transformers (core and shell types). EMF equation, losses, efficiency.

DC Machines:

Working principle of DC machine as a generator and a motor; DC series motor, DC shunt motor, DC compound motor constructional features.

Induction Motor:

Concept of rotating magnetic field; Principle of operation, types and constructional features, slip and its significance.

Course Outcomes

1. To apply various circuit theorem like Thevenin, Norton, Super position.
2. To apply electrostatic and electromagnetic laws.
3. To apply RL, RC and RLC relationship in single phase and 3 phase circuit
4. To apply machine principle for transformer, DC machines and Induction Motor.

Text Books

1. A. Chakrabarti, "Basic Electrical Engineering", 1st Edition Tata McGraw Hill, 2009, ISBN: 9780070669307.

Reference Books

1. A.E Fitzgerald, David E. Higginbotham, Arvin Grabel, "Basic Electrical Engineering", 5th Edition, Tata McGraw Hill- 2009, ISBN 9780070682566
2. Vincent Del. Toro "Principles of Electrical Engineering", 2nd Edition Prentice Hall, India- 2012, ISBN 812030599X

3. J.N. Swamy, "Elements of Electrical Engineering" 3rd Edition, Mahajan Publishing House, 2009, ISBN: 9788189050986
4. Nagrath I.J. and D. P. Kothari "Basic Electrical Engineering", 3rd Edition Tata McGraw Hill, 2009, ISBN: 9780070146112

Web Resources

1. KCL, KVL and Network Analysis (<https://www.youtube.com/watch?v=QYE6uZIPqZY>)
2. Single phase AC circuit (<https://www.youtube.com/watch?v=VMBEOfjgn0A>)
3. Magnetic Circuit (<https://www.youtube.com/watch?v=RxbJo2kDRxE>)
4. DC machine construction (<https://www.youtube.com/watch?v=IC-PWxtcirl>)
5. Induction motor construction (<https://www.youtube.com/watch?v=CL2YEx4ul80>)

LIST OF EXPERIMENTS

Experiment No.	Title	Learning Outcomes
1	To determine V-I characteristics of lamp	Understanding of voltage current relationship
2	To verify Kirchhoff's current law and Kirchhoff's voltage law.	Understanding of basic circuit law.
3	To verify Super position theorem.	Understanding of circuit analysis for multiple sources.
4	To verify Thevenin's and Norton's theorem.	Understanding of circuit analysis for multiple sources.
5	To measure current, power, voltage and power factor of series RL circuit.	Understanding of voltage and current relationship and power factor for R-L circuit.
6	To measure current, power, voltage and power factor of series RLC circuit.	Understanding of voltage and current relationship and power factor for R-L-C circuit.
7	To measure the resonance frequency in series R-L-C circuit.	Understanding of series resonance circuit.
8	To verify voltage and current relationship of star connection of 3-phase AC	Understanding of voltage and current relationship for star connected system.

9	To verify voltage and current relationship of delta connection of 3-phase AC.	Understanding of voltage and current relationship for delta connected system.
10	To measure 3-phase power by two wattmeter method.	Understanding of 3 phases measurement.
11	To perform ratio test of single phase transformer.	Understanding of transformer.
12	To study construction of D.C. machine.	Understanding of DC machine.

Subject: Engineering Graphics								
Program: B.Tech. All				Subject Code: ME0001			Semester: I / II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
1	6	0	4	24/60	-	16/40	-	100

Course Objectives

1. Analyze the conventions and the methods of engineering drawing.
2. Describe the technical communication skill in the form of communicative drawings.
3. Analyze engineering drawings using fundamental technical mathematics.
4. Describe to construct basic and intermediate geometry.
5. Analyze the visualization skills so that they can apply these skills in developing new products.

CONTENTS

UNIT – I

[06 hours]

Introduction to engineering graphics

Principles of Engineering Graphics and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions- Dimensioning systems – polygons-types of lines.

Engineering curves

Classification and application of Engineering Curves, Construction of different methods of Ellipse, parabola and Hyperbola, construction of Conics, Cycloid Curves – Cycloid, Hypocycloid, Epicycloids, Involutives and Spirals.

UNIT – II

[08hours]

Projections of Points and Lines

Introduction to principal planes of projections, Projections of the points located in same quadrant and different quadrants, Projections of line with its inclination to one reference plane and with two reference planes. True length and inclination with the reference planes.

Projections of Planes

Projections of planes (polygons, circle, and ellipse) with its inclination to one reference plane and with two reference planes, Concept of auxiliary plane method for projections of the plane.

UNIT – III

[05hours]

Projections of Solids

Classification of solids. Projections of solids (Cylinder, Cone, Pyramid, Prism) along with frustum of cone and pyramid with their inclinations to one reference plane and with two reference planes.

UNIT – IV

[15hours]

Orthographic And Sectional Orthographic Projections

Fundamental of projection along with classification, Projections from the pictorial view of the object on the principal planes for view from front, top and sides using first angle projection method and third angle projection method, introduction of section of objects, full sectional view.

Isometric Projections

Isometric Scale, Conversion of orthographic views into isometric projection, isometric view or drawing.

Course Outcome

1. Apply the theory of projection.
2. Apply vision to view different views of the object like front, top, side views from isometric drawing.
3. Apply methods of construct an isometric view from given orthographic views.
4. Apply work on different sheet metal job.

Text Books

1. P.J. Shah, “A Text Book of Engineering Graphics” Publication: S.Chand, ISBN: 9788121929677, edition 2015.

Reference Books

1. N.D.Bhatt , “Elementary Engineering Drawing”, Charotar Publishing House, Anand ISBN: 9789380358963, 53rd edition -2014.
2. P.D.Patel, “ Engineering Graphics” Publication: Mahajan, ISBN:9789381256756 , 5th edition -2017.
3. A text book of Engineering Drawing by P.S.Gill, S.K.Kataria & sons, Delhi, ISBN: 9788185749624, 13th Edition- 2016.

Web Resources

1. Types of Projections, Basics of orthographic projection (<http://nptel.ac.in/courses/112103019/14>)

Subject: Basic Electronics								
Program: B.Tech. All				Subject Code: EC0001			Semester: I/II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
2	0	2	3	24/60	24/60	16/40	16/40	200

Course Objectives

1. To describe the concepts of semiconductor physics.
2. To analyze and recognize basic electronic components and devices used for different electronic functions.
3. To analyze the design and test basic electronic circuits using active components.
4. To describe problem solving techniques in simple electronic circuits

CONTENTS

UNIT-I

[10 hours]

Energy Bands in Solids

Charged Particles, Field Intensity, Potential Energy, The eV Unit of Energy, Nature of Atom, Atomic Energy Levels, Electronic Structure of the Elements, Energy distribution of electrons, Fermi-Dirac function, Energy Band Theory of Crystals, Insulators, Semiconductors and Metals

Transport Phenomena in Semiconductors

Mobility and Conductivity, Electrons and Holes in an Intrinsic Semiconductor, Donor and Acceptor Impurities, Charge Densities in a Semiconductor, Electrical properties of Ge and Si, Hall Effect, Conductivity Modulation, Generation and Recombination of Charges, Diffusion, The Continuity Equation, Injected Minority–Carrier Charge, Potential variation within a Graded Semiconductor.

UNIT-II

[10 hours]

Junction –Diode Characteristics

Open circuit p-n Junction, p-n Junction as a Rectifier, Current Components in a p-n diode, Volt-Ampere Characteristic, Temperature Dependence of the V/I Characteristic, Diode Resistance, Space Charge, Transition Capacitance, Charge-Control Description of a Diode, Diffusion Capacitance, Junction Diode Switching Times, Breakdown Diodes, Tunnel Diode, Semiconductor Photodiode, Photovoltaic Effect, Light –Emitting Diodes, Schottky diode, varactor diode, GUNN diode, SCR

Diode Circuits:

Diode as a Circuit Element, Load-Line Concept, Piecewise Linear Diode Model, Clipping Circuits, Clipping at Two Independent Levels, Comparators, Sampling Gate, Rectifiers, Other Full-Wave Circuits, Capacitor Filters, Additional Diode Circuits

UNIT-III**[07 hours]****Transistor Characteristics**

Junction Transistor, Transistor Current Components, Transistor as an Amplifier, CB Configuration, CE Configuration, CC Configuration, Analytical Expressions for Transistor Characteristics Maximum Voltage Rating, Phototransistor, Transistor biasing.

UNIT-IV**[05 hours]****Field Effect Transistors:**

Junction FET, JFET Volt-Ampere Characteristics, MOSFET

Operational Amplifiers:

Introduction to Op Amps, Inverting Amplifier, Non-inverting amplifier, Op Amp applications

Introduction to Data converters:

ADC & DAC

Introduction to Microprocessors and Microcontrollers:

Basic digital ICs, Architecture of processors and controllers

Course Outcomes

1. Able to recognize various electronics components and understand their applications for various applications.
2. Able to analyze and test basic electronics circuits.
3. Able to solve basic design problem related to basic electronic circuit.

Text Books

1. Integrated Electronics' By J. Millman and C. C. Halkias, Chetan Parikh, 2nd Ed., Tata McGraw Hill Publication.

Reference Books

1. 'Electronic Principles' by Albert Malvino and David Bates, 7th Ed., Tata McGraw Hill Publication
2. 'Electronic Devices and Circuit Theory' by Robert Boylestad and Louis Nashelsky, 9th Ed., Prentice Hall India
3. "Digital Electronics" by Morris Mano, 2006, Pearson Education Asia.

Web Resources

1. NPTEL MOOC course on the Basic Electronics
(https://onlinecourses.nptel.ac.in/noc17_ee02/preview)
2. NPTEL MOOC course on the Solid State Physics
(https://onlinecourses.nptel.ac.in/noc17_ph08/preview)

LIST OF EXPERIMENTS

Experiment No.	Title	Learning Outcomes
1	To plot VI characteristics of PN junction diode	Basic knowledge about the semiconductor PN junction diode and its behavior.
2	To plot VI characteristics of Zener diode	Basic knowledge about the zener diode, its characteristics and its use as a voltage regulator.
3	To plot VI characteristics of Tunnel diode	Basic knowledge about the tunnel diode and its behavior.
4	To measure ripple factor of a rectifier	Understanding about the rectifier, its applications and performance
5	Build and test wave shaping circuits	Understanding about diode based wave-shaping circuits and its applications in electronic circuits.
6	To plot input and output VI characteristics of CB configuration using BJT	Basic knowledge about the semiconductor NPN transistor in common base configuration and applications in this mode,
7	To plot input and output VI characteristics of CE configuration using BJT	Basic knowledge about the semiconductor NPN transistor in common emitter configuration and applications in this mode,
8	To plot input and output VI characteristics of CC configuration using BJT	Basic knowledge about the semiconductor NPN transistor in common collector configuration and applications in this mode,
9	To plot drain and transfer characteristics of a JFET	Basic knowledge about the semiconductor JFET transistor and its behavior.
10	To build and test inverting and non-inverting amplifier	Basic knowledge about operational amplifier and its application as an amplifier.
11	To build an LED driver circuit and test	Basic understanding of an transistor based driver circuit and its application as LED driver.
12	To build and test an integrator and differentiator with Op Amp	Application of the operational amplifier as an integrator and differentiator circuit.

Subject: Materials Science								
Program: B.Tech. All				Subject Code: MT0001			Semester: I/II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
3	0	0	3	24/60	-	16/40	-	100

Course Objectives

1. To evaluate different materials for engineering applications.
2. To categorize material according to their properties and requirement.
3. To classify materials and understand the importance of each material in order to find applications in other fields of engineering.

CONTENTS

UNIT-I

[08 hours]

Materials

Introduction, Engineering requirement of different materials, Classification of Engineering materials, Properties of engineering materials , Criteria for selection of materials for engineering application.

Crystal Physics

Structure of crystalline solids; Lattices, unit cells; Indexing of directions and planes, notations, Interplanar spacings and angles, Crystalstructure analysis - Bragg's law for X-ray diffraction..

UNIT-II

[12 hours]

Ferrous metals & Alloys

Pig iron, cast iron, carbon steel, alloy steels- Classification, properties, composition and applications.

Non-Ferrous Metals & Alloys

Important non-ferrous metals (Al, Cu, Pb, Zn, Sn, Mg, Ti, Ni,), Non-ferrous alloys (Cu alloys, Al alloys, Mg-alloys, Ni-alloys) – Composition, properties, classification and applications.

UNIT-III

[12 hours]

Ceramics

Introduction, Simple crystal structure, Classification- Traditional (clay-products, refractories, abrasives, cement) and Engineering Ceramics- Glass Ceramics, Properties

of ceramics, Application of Ceramics, Glasses, Glass structure, Properties and application of Glass, Types of glass.

Polymers

Introduction, Classification and forms of Polymers, Thermosetting & thermoplastic polymer, types of polymerizations, Molecular weight, Plastics, Natural rubber and synthetic rubber, Applications of polymeric materials.

UNIT-IV

[14 hours]

Composites

Introduction, Classification & Applications, Dispersion-strengthened, Composites, Particulate Composites, Fiber-reinforced Composites: Influence of Fiber Length, Influence of Fiber Orientation and Concentration, The Fiber Phase, The Matrix Phase, Polymer-Matrix.

Composites, Metal-Matrix Composites, Ceramic - Matrix Composites, Carbon–Carbon Composites, Processing of Fiber-Reinforced Composites.

Advanced Materials

Smart materials (Shape memory material, Piezo electric material) Photoconductors, Bio-materials, Nano materials, Dielectric materials, magnetic materials, metamaterials, Cryogenics, Optical Fiber.

Course Outcomes

1. To apply the fundamentals of mass, matter and materials in daily life.
2. To acquaint the student with applications and properties of materials used from engineering aspects.
3. To apply student's knowledge about advanced materials to be used in futuristic applications.

Text Books

1. O. P. Khanna, "Material Science and Metallurgy", Dalpat Rai Publications, 2nd Edition, 2014, ISBN: 9789383182459.
2. R. K Rajput, "Engineering Materials", S. Chand Publications, 4th Edition, 2000, ISBN: 9788121919609.
3. W.D. Callister, "Material Science & Engineering – An Introduction", John Wiley Publishers, 7th Edition, 2007, ISBN: 9780471736967.

Reference Books

1. James Shackelford, "Introduction to Materials Science for Engineers", Pearson-Prentice Hall Publications, 8th Edition, 2006, ISBN: 8131700909.
2. L.H. Vanvlack, "Elements of Materials Science and Engineering", Pearson Education India, 6th Edition, 2002, ISBN: 8131706001.
3. D. Swarup, "Elements of Metallurgy", Rastogi Publications, 2005, ISBN: 8171338135.
4. V. Raghavan, "Materials Science and Engineering – A First Course", Prentice Hall India Learning Private Limited, 6th Edition, 2015, ISBN: 8120350928.

Web Resources

1. MOOC Course on "Materials Science and Engineering"
(<https://www.edx.org/course/materials-science-engineering-misisx-mse1x>)

Subject: Technical English								
Program: B.Tech. All				Subject Code: SH0102			Semester: I	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
1	2	0	2	24/60	-	16/40	-	100

Course Objectives:

1. To describe comprehension and soft skills to students.
2. To analyze and increase student's ability to improve and utilize the technical skills necessary for reading and writing.
3. To analyze and improve students' communication skills in both technical and professional contexts.

CONTENTS

UNIT I

[05 hours]

Business Communication

Role of Communication in Information Age
 Concept and meaning of communication
 Skills necessary for technical communication
 Communications in a technical organization
 Barriers to the process of communication
 Style and organization in technical communication covering
 Language skills- Objectivity, clarity, precision, and organizational etiquettes as defining features of technical communication.

UNIT II

[15 hours]

Effective Presentation Skills

Sub-Verb-Agreement
 Tenses
 Numerical Adjectives
 Conjunction
 Preposition clauses
 Noun and adjective clauses and Relative clauses
 Imperative and infinitive structures
 Question pattern
 Auxiliary verbs (Yes or No questions)

Contrasted time structures
Adverbial clauses of time, Intensifiers and Simple, Complex & Compound
Constructions

UNIT III

[05 hours]

Reading

Intensive reading
Predicting content
Interpretation
Inference from text
Skimming & Scanning techniques of reading
Critical Interpretation & Editorial of newspapers.

UNIT IV

[10 hours]

Writing

Basic Writing skill development
Paragraph development (Unity, coherence, cohesive devices),
Letters: Inquiry- reply to inquiry, Complaint, Request
Business Letters
Using e-mail for business communication
Language in e-mail.

Course Outcome

1. To apply familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concrete type.
2. To apply the knowledge of English language in describing experiences and events, dreams, hopes and ambitions and briefly give reasons and explanations for opinions and plans.
3. Can introduce themselves and others and can ask and answer questions about personal details such as where he/she lives, people they know and things they have.

Reference Books

1. English for Engineers and Technologists, Volumes 1 and 2, Department Humanities and Social Sciences, Anna University, Chennai, O Longmans Publication, 2008. ISBN: 9788125017240
2. Balasubramanyam, M and Anbalagan, G., Perform in English, Anuradha Publications, Kumbakonam, 2010.
3. Meenakshi Raman and Sangeetha Sharma, Technical Communication: Principles and Practice, Oxford University Press, New Delhi, 2004. ISBN: 9780199794576
4. KiranmaiDutt, P. et al., A Course on Communication Skills, Edition Founc Books, New Delhi, 2007. ISBN: 9780521369589
5. Ashraf Rizvi, M., Effective Technical Communication, Tata McGraw Hill Publication, New Delhi, 2008. ISBN: 9780097057997

6. Geoffrey Leech, Jan Swartvik, 'A Communicative Grammar of English', ELBS – Longman. ISBN: 9781138836891
7. Norman and Lewis, 'English Made Easy', Oxford Publication. ISBN : 9780804845243
8. E- Writing: 21st –Century Tools for Effective Communication, Dianna Booher, Macmillan India Ltd., 2007, ISBN – 1403932026

Web Resources

1. Business Conversation Rule 1 :<https://www.youtube.com/watch?v=wB8mr4iViy0>
2. Business English Conversations Rule
2:<https://www.youtube.com/watch?v=wB8mr4iViy0>
3. Business English Conversations
3:<https://www.youtube.com/watch?v=wB8mr4iViy0>
4. Business English Conversations Rule
4:<https://www.youtube.com/watch?v=wB8mr4iViy0>
5. Business English Conversations Rule
5:<https://www.youtube.com/watch?v=wB8mr4iViy0>
6. English Presentation Video:<https://www.youtube.com/watch?v=wB8mr4iViy0>
7. Powerful Presentation Skills: Body
Language:<https://www.youtube.com/watch?v=wB8mr4iViy0>
8. Make Body Language Your
Superpower:<https://www.youtube.com/watch?v=wB8mr4iViy0>
9. Make a Presentation Like Steve
Jobs:<https://www.youtube.com/watch?v=wB8mr4iViy0>

Subject: Integral Calculus and Linear Algebra								
Program: B.Tech. All				Subject Code: SH0201			Semester : II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
4	2	0	5	24/60	-	16/40	-	100

Course Objectives

1. To analyze mathematical knowledge and skills needed to support their concurrent and subsequent engineering studies.
2. To describe knowledge of basic science and engineering fundamentals.
3. To analyze different mathematical models within science and technology and work creatively, systematically and critically.
4. To describe solution of different types of mathematical models using knowledge about the possibilities and limitations of the different methods and tools.
5. To analyze abstract, logical and critical thinking and the ability to reflect critically upon their work and work of others.
6. To analyze their strengths and weakness as learners and to appreciate the value of errors or mistakes as powerful motivators to enhance learning and understanding.

CONTENTS

UNIT-I

[08 hours]

Infinite Series

Standard Infinite Series: Geometric Series and Harmonic Series

Tests for Convergence and Divergence

Comparison Test, Cauchy's Integral test, D'alembert's ratio Test, Cauchy's nth Root Test

Alternating Series Leibnitz's Theorem, Absolute Convergence and Conditionally Convergence, Power Series

UNIT-II

[13 hours]

Multiple Integration

Curve Tracing: Curves in Cartesian and Polar Form

Reduction Formulae

Double Integral, Change of order of Integration in Double integral

Change of Variables in Double Integral from Cartesian to polar

Application of Double Integral to find area and volume

Triple Integral

UNIT-III

[14 hours]

Linear Algebra

Eigen Values and Eigen Vectors - Properties of Eigen Values and Eigen Vectors
Cayley-Hamilton Theorem – Diagonalization, Powers of a Matrix
Real Matrices: Symmetric, Skew Symmetric, Orthogonal
Complex Matrices: Hermitian, Skew Hermitian, Unitary Matrices.

UNIT-IV

[13 hours]

Vector Integral Calculus

Vector Integration: Integration of a Vector Function of a Scalar Argument
Line Integrals: Work Done, Potential, Conservative Field and Area
Introduction to Surface Integrals, Volume Integrals
Green's Theorem in Plane, Stokes' Theorem, Gauss Divergence Theorem

Course outcomes:

1. Apply basic concepts of convergence and divergence of infinite series
2. Apply and analyze various tests to investigate the convergence of the series.
3. Apply the knowledge of curve tracing in solving various problems.
4. Apply the concept of double integrals to find area and volumes.
5. Apply the knowledge of multiple integrals, line integrals, surface integrals.

Text Books

1. B.V.RAMANA: "HIGHER ENGINEERING MATHAMATICS", TATA McGraw Hill. 6th Edition", 2006, ISBN: 007063419X
2. R K Jain, S R K Iyengar: " Advanced Engineering Mathematics. Narosa Publishing House, 3rd Edition", 2002, ISBN: 817319730X

Reference Books

1. Erwin Kreyszig: "Advanced Engineering Mathematics (8th Edition) ",Wiley Eastern Ltd., New Delhi. 8th Edition , 2004, ISBN: 9971512831
2. Murray Spiegel : "Advanced Mathematics for Engineering & Science: Schaum's Outline Series" ,Tata - McGraw Hill Publication 3rd Edition, 2010, ISBN: 9780071623667
3. Dr. B.S. Grewal : "Higher Engineering Mathematics", Khanna Publishers, New Delhi , 44th Edition, 2010, ISBN:8174091955
4. Merel C Potter, J L Goldberg: "Advanced Engineering Mathematics (3rd Edition)"Oxford India Publication. . 3rd Edition, 2005, ISBN: 0195681428

Web Resources & Moocs:

- 1.Calculus by IIT Kanpur (<https://www.youtube.com/watch?v=0IzOAW8yMTc>)
2. Linear Algebra by Prof. K. C. Shivakumar (<http://nptel.ac.in/courses/111106051/>)

Subject: Engineering Chemistry								
Program: B.Tech. All				Subject Code: SH0002			Semester : I/II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
3	0	2	4	24/60	24/60	16/40	16/40	200

Course Objectives

1. To describe the basic concepts of chemistry & Engineering Applications of Chemistry.
2. To describe the principles of general chemistry and specific topics relevant to various engineering disciplines, wherein the students should apply this learning in their respective areas of expertise.
3. To describe the role of Applied Chemistry in the field of science and engineering.
4. To describe the problem solving techniques to identify, formulate & solve engineering chemistry related problems.

CONTENTS

UNIT-I

[13 hours]

Electrochemistry

Electrochemical Cell, Galvanic Cell, Electrolytic Cell, Types of electrodes, Single electrode potentials, Reference Electrodes, Standard Hydrogen Electrode (SHE), Standard Calomel Electrode (SCE), Glass Electrode, Quinhydrone Electrode, Nernst equation, Conductance, Cell constant and its determination, Conductometric titrations, Numerical.

Corrosion

Definition and types of corrosion water line, pitting, stress, erosion and soil corrosion, Caustic embrittlement, Factors affecting on corrosion (Metallic and Environmental), Pourbaix diagram, Protective measures to control Corrosion, Sacrificial anode and Cathode process for corrosion control., Dry (chemical corrosion), Wet (Electrochemical corrosion) and its mechanisms; Types of electrochemical corrosion, (differential aeration, galvanic, concentration cell).

UNIT-II

[10 hours]

Water Treatment Technology

Sources of water, Soft Water & Hard Water, Types of hardness, Units of hardness measurement, Impurities in water, Disadvantages of hard water, Determination of water hardness by EDTA method, Alkalinity of water and its significance, Boiler feed water,

Scale and sludge formation in boilers and pipes etc , Boiler Corrosion, Water softening through Soda lime process, Zeolite Process & Ion-exchange Process, Characteristics of Potable water, Sources and quality of drinking water, Treatment of water for domestic use: Filtration, Coagulation, Sedimentation and Disinfection, Desalination through Electro Dialysis & Reverse Osmosis, Numerical problems.

UNIT-III

[12 hours]

Dimensions, Units & Energy balances

Dimensions and Units: Basic chemical calculations – atomic weight, molecular weight, equivalent weight, Mole concept, Inter-conversion of concentration units. Material Balance without chemical reactions: Flow diagram for material balance, simple material balance. Numerical problems. Material Balance involves chemical reactions: concept of limiting reactant, conversion, yield, selectivity, unit process for chemical reactions. Numerical problems.

Instrumental Techniques

Fundamentals of Spectroscopy; Principles and applications of UV-visible, IR, NMR, Mass & Atomic absorption Spectroscopy; Principles and applications of Chromatographic techniques including TLC, PC, Gas, HPLC.

UNIT-IV

[13 hours]

Advance Organic Materials

Liquid Crystals: Introduction, classification and applications, Organic Electronic Materials: Introduction, types and applications, Chemical Sensors: Introduction, types and applications, Ionic Liquids: Introduction and applications, Chromic Materials: Introduction, types and applications.

Catalysis & Adsorption

Catalysis: Types of catalysis, Positive & Negative catalysis, Homogeneous and Heterogeneous catalysis, Characteristics of Catalytic action, Poisoning of catalysis, Promoters, Auto Catalysis, Acid-Base Catalysis, Theories of Catalysis process, Industrial Applications of Catalysts.

Adsorption: Types of adsorption, adsorption isotherm: Freundlich adsorption isotherm, Langmuir adsorption Isotherm, Determination of surface area by BET method, Application of adsorption.

Course Outcomes

1. To apply the various basic concepts used in engineering and process calculations.
2. To apply the fundamental chemistry concepts with direct application to the built environment.
3. To apply the basics of electrochemistry process in practical applications.
4. To apply consciousness about the quality of water for industrial process, problems and troubleshooting techniques.
5. To apply the understanding of various smart organic materials and their applications in different engineering fields.

Text Books

1. P.C. Jain, M. Jain, Engineering Chemistry 15th edition, Dhanpat Rai Publishing Company, New Delhi, 2005. ISBN 8187433175
2. Shashi Chawla, Textbook of Engineering Chemistry, Dhanpat Rai Publishing Co. 2004. ISBN 9788126519880

Reference Books

1. Dara, S.S., Umare S.S.; A Text Book of Engineering Chemistry (Twelfth edition); S. Chand. Co. 2014, ISBN: 8121903599.
2. P. Atkins, J.D. Paula, Physical Chemistry, Oxford University Press, 2017, ISBN :9780198769866.
3. A. J. Mee, Physical Chemistry, 6th Ed. English Language Book Society and Heinemann Educational Books Ltd. London, 1962. ISBN: 0435665766
4. Douglas A. Skoog, Donald M. West, Fundamentals of Analytical Chemistry, Cengage Learning, Ninth Edition, 2014. ISBN: 9780495558347
5. Puri B. R., Sharma L. R. , Pathania M.S; Principles of Physical Chemistry; Vishal Publishing Co. (46th Edition), 2013. ISBN :9789382956013.
6. Arthur E. Morris, Gordon Geiger and H. Alan Fine, Handbook on Material & Energy Balance Calculations in Material Processing, Third Edition, 2011. ISBN:9781118065655

Web Resources

1. Electrochemistry (http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/Course_home_Lec22.html,
http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/Course_home_Lec24.html)
2. Corrosion
(http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/Course_home_Lec25.html)
3. Water Treatment (<https://www.youtube.com/watch?v=O-MRC0dskHg>,
<https://www.youtube.com/watch?v=SvClfcovf9k>)
4. Spectroscopic methods
(http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/TOC-mainM3.htm)
5. Adsorption
(http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/Course_home_Lec36.html)

LIST OF EXPERIMENTS

Experiment No.	Title	Learning Outcomes
1	Determination of the alkalinity of unknown water sample.	a) Able to find out alkalinity in water sample. b) Aware about limit of alkalinity in potable water. c) To gain knowledge about acid-base titration.
2	Estimation of hardness of water sample by EDTA method.	a) Able to find out total ,permanent & temporary hardness in unknown water sample. b) To gain knowledge about complex-metric titration.
3	Estimation of dissolved oxygen in water sample.	a) Able to find out dissolved oxygen in unknown water sample. b) Significance of dissolved oxygen. c) To gain knowledge about redox titration.
4	Determination of metal ions ($\text{Ca}^{2+}/\text{Zn}^{2+}$) from the mixture by EDTA titration.	a) Able to find out Ca & Zn ions in unknown water sample containing mixture of metal ions.
5	Determination of metal ions ($\text{Pb}^{2+}/\text{Mg}^{2+}$) from the mixture by EDTA titration.	a) Able to find out Pb & Mg ions in unknown water sample containing mixture of metal ions.
6	Determination of the concentration of chloride ions in unknown water sample.	a) Able to find out chloride ions in unknown water sample. b) Awareness about limits of chloride ions in potable water. c) To gain knowledge about precipitation titration.
7	Thin Layer Chromatography (TLC) and Paper Chromatography (PC).	a) Able to find out separate component from given mixture of pigments. b) To understand principle of absorption & partition chromatography.
8	Determination of strength of Acid or Base by pH meter.	a) Understanding of calibration of pH 'meter. b) Able to find out strength or conc. of unknown acid & base. c) To understand construction of glass electrode.

9	Determination of strength of Acid or Base by Conductometer.	<ul style="list-style-type: none"> a) Understanding of calibration of conductometer. b) To gain knowledge conduction of ions in aqueous sample. c) To identify strong or weak acid & base.
10	To calculate the Acid value of the given sample of oil.	<ul style="list-style-type: none"> a) Able to check quality of lubrication oil used for industrial purpose.
11	Determination of iron content from unknown sample by spectrophotometer.	<ul style="list-style-type: none"> a) Able to find out iron content in unknown water sample. b) Understanding of spectro-photometer.
12	Determination of the saponification value of a given oil sample.	<ul style="list-style-type: none"> a) Able to find out the saponification Value of lubricating oil sample. b) To gain knowledge about esterification process.

Subject: Mechanical Workshop								
Program : B.Tech. All				Subject Code: ME0004			Semester : I/II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
0	0	2	1	-	24/60	-	16/40	100

Course Objectives

1. Analyze various basic Manufacturing/Fabrication processes involved in Mechanical Workshop.
2. Describe various shops like Carpentry, Fitting, Welding in Mechanical Workshop.
3. Describe use of various tools and equipments used in different shops.
4. Describe rules and regulations to follow safety in mechanical workshop.

CONTENTS

UNIT-I

[02 hours]

Introduction

Introduction to Mechanical Workshop, Safety, and Safety rules, Safety Slogans, Tools and Equipments used for safety purpose.

UNIT-II

[14 hours]

Fitting Shop

Introduction, Fitting materials, Tools and Equipments used in Fitting, Fitting Joints.

1 Job in for practical demonstration

UNIT-III

[04hours]

Carpentry Shop

Introduction, Carpentry materials, Tools and Equipments used in Carpentry, Carpentry Joints.

1 Job in for practical demonstration

UNIT-IV

[11 hours]

Welding Shop

Introduction, Welding Tools, Equipments and Machines, Various Welding Joints

1 Job in for practical demonstration

Course Outcomes

1. Apply hand tools and power tools in various shops like Carpentry, Fitting, Welding, used in Mechanical Workshop.
2. Apply various operations involved in different shops in workshop.
3. Apply appropriate tools required for specific operation in different shops.

Text Books

1. Workshop Technology Vol. 1 and 2, by Raghuvanshi B.S. Dhanpat Rai & Sons ISBN: 1234567144613 (10th Edition, 2009).

Reference Books

1. Workshop Technology by Chapman W.A. J and Arnold E. Viva low priced student ISBN13: 9780713132724 edition, 1998.
2. Workshop Practices, H S Bawa, Tata McGraw-Hill, ISBN: 9780070671195, 2009.

LIST OF EXPERIMENTS

Experiment No.	Title	Learning Outcomes
1	To Study Safety Rules in Mechanical Workshop.	<ol style="list-style-type: none">a) Students will able to understand the mean of safety and its importance.b) Students will able to understand use of tools and equipments used for safety.c) Students will able to understand general precautions should be taken care while working in workshop and also on various machines.
2	An Introduction to Mechanical Workshop.	<ol style="list-style-type: none">a) Students will able to understand the importance of various motions involved in various machine tools.b) Students will able to understand the general classification of Machine tool.
3	To Prepare a Job in Carpentry Shop.	<ol style="list-style-type: none">a) Students will able to understand the basic use of tools and equipments used in Carpentry work.b) Students will able to understand various operations and the different methods involved in the Carpentry work.
4	To Prepare a Job in Fitting Shop.	<ol style="list-style-type: none">a) Students will able to understand the basic use of tools and

		<p>equipments used in Fitting work.</p> <p>b) Students will able to understand various operations and the different methods involved in the Fitting work.</p>
5	To Prepare a Job in Welding Shop.	<p>a) Students will able to understand the basic use of tools and equipments used in welding shop.</p> <p>b) Students will able to understand various operations and the different methods involved in the Welding shop.</p>

Subject: Elements of Mechanical Engineering								
Program : B.Tech. All				Subject Code: ME0002			Semester : I/II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
3	0	2	4	24/60	24/60	16/40	16/40	200

Course Objectives

1. To describe the basic concept of thermodynamic law.
2. To analyze the properties of fuels and measuring of calorific value.
3. To describe the basic gas laws and thermodynamics for mechanical engineering applications.
4. To describe the concept of power generation by steams its properties and basics of steam boilers.
5. To describe the concept of converting energy into work efficiently.
6. To describe the concept of power and motion transfer.

CONTENTS

UNIT – I

[11 hours]

Basic Concepts of Thermodynamics

Basic units and dimensional analysis, Intensive and Extensive Properties, Energy, heat, temperature, specific heat capacity, Interchange of heat, change of state, mechanical equivalent of heat, Internal energy, enthalpy, entropy, efficiency, Open and Closed systems, statements of Zeroth Law, First law and its limitations, Second law of Thermodynamics.

Properties of Gases

Ideal and Real Gases, Gas laws, Boyle's law, combined gas law, gas constant, Internal energy, Relation between C_p and C_v , Enthalpy, Non flow process, constant volume process, Constant pressure process, Isothermal process, Poly-tropic process, Adiabatic process.

UNIT – II

[08 hours]

Fuels and Lubricants

Different types of fuels, their properties and applications. Different types of lubricants, their properties and applications.

Internal Combustion Engines

Classifications, Difference between I.C. and E.C. , Otto four-stroke engine, Diesel-four-stroke engine, Difference between Otto cycle and Diesel engine, Two-stroke engines, Difference between two- stroke and four-stroke engines, indicated power (ip), Brake power (bp), Efficiencies.

UNIT – III

[08 hours]

Properties of Steam

Introduction, steam formation, types of steam, enthalpy, specific volume of steam and dryness fraction of steam, Internal energy, steam tables, Measurement of dryness fraction throttling calorimeter, separating calorimeter, Combined calorimeter.

Steam Boilers

Introduction, Classification, Simple vertical and horizontal boiler, Boiler details, Boiler performance. Functioning of different mountings and accessories.

UNIT – IV

[04 hours]

Refrigeration and Air-conditioning

Introduction, Refrigerant, Vapor compression & absorption cycles & system, basic applications.

Transmission of Motion and Power

Introduction, Couplings methods of drive, power transmission elements, shaft and axle, Belt-drive, pulleys, power transmitted by a belt, Chain drive, Friction drive, Gear drive.

Course Outcomes

1. Apply the knowledge of basics of thermodynamics in understanding various thermal systems.
2. Apply the knowledge of various gas laws and thermodynamic processes in developing engineering projects.
3. Apply the knowledge in measuring the calorific value of fuel by Bomb calorimeter.
4. Apply the knowledge in measuring the power developed by internal combustion engine and its efficiency.
5. Apply the developing speed controlling devices used in internal combustion engine.
6. Apply the knowledge in understanding the working and constructing of boiler and its mounting and accessories.

Text Books

1. Elements of Mechanical Engineering, Prof. N M Bhatt, Publisher: Mahajan Publishing, Ahmedabad, ISBN: 978-93-81256-35-0, 6th edition, 2012.
2. Elements of Mechanical Engineering, Prof. S M Bhatt, Shri H.G. Katariya, Shri J. P.

Hadiya Publisher: Mahajan Publishing, Ahmedabad, ISBN: 9789380867649 2nd edition 2009.

Reference Books

1. Elements of Mechanical Engineering by K.P. Roy and Prof. S.K. Hajra Chaudhary, Media Promoters and publishers Pvt. Ltd. Bombay, ISBN 13: 1234567145210, 7th Edition.
2. Basant Agrawal 'Basic mechanical Engineering' Wiley-India, 2008, ISBN: 9788126518784 First India Edition, November 2008.
3. Basic & Applied Thermodynamics by P K Nag - Tata McGraw Hill Pvt. Ltd., Mumbai, ISBN: 9780070151314, 2nd edition, 2009.

LIST OF EXPERIMENTS

Experiment No.	Title	Learning Outcomes
1	To Study of Otto , Diesel & Carnot Cycles.	Students will have knowledge regarding the pressure, volume, temperature and entropy change during different cycles.
2	To Study of Working of two stroke & four stroke IC Engine.	Students will become learn the working of different engines. (Two and Four Stroke).
3	To determine the Swept & Clearance Volume of IC Engine.	Students will come about the difference between actual volume and swept volume.
4	To understand Methods of Lubrication in IC Engine.	Students will understand the Importance of lubrication in IC engine.
5	To understand Construction & Working of Various types of Boilers.	Students will learn the construction and working of various types of boilers.
6	To understand Construction & Working of Mountings & Accessories of the Boiler.	Students will have know the importance of installing mountings and accessories of the boiler.
7	To Study of Vapour Compression Refrigeration Cycle.	Students will learn the working of vapour compression refrigeration systems.
8	To Study of Vapour Absorption Refrigeration Cycle.	Students will learn the working of vopur absorption refrigeration system.

9	To Study Various Types of Gears & Pulleys.	Students will know regarding different ways to transmit power.
10	To Study Various types of Bearings.	Students will know regarding different types of bearings.
11	To study various types of Brakes, Couplings & Clutches.	Students will know regarding different types of brakes, couplings and clutches.
12	To determine Velocity Ratio of Belt drive & Gear drive systems.	Students will have knowledge that belt drive is used for low speed and less power transmission while gear drive is used for more speed and more power transmission.

Subject: Computer Programming								
Program : B.Tech. All				Subject Code: CE0001			Semester : I/II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
3	0	2	4	24/60	24/60	16/40	16/40	200

Course Objectives

1. To describe the parts of the computer system.
2. To describe functioning of computer components.
3. To describe the process of problem solving using computer
4. To describe the design an algorithmic solution for a given problem
5. To describe a writing method for maintainable C program for a given algorithm.
6. To describe the method to trace the given C program manually.
7. To describe the importance of C program for simple applications of real life using structures and files.

CONTENTS

UNIT-I

[12 hours]

Introduction to Programming

What is programming? Problem solving methods with Examples-Algorithm and Flowchart, Types of Programming languages, Characteristics of higher level language, Some Programming languages

Introduction to 'C'

Introduction, Importance of C, Sample C programs, Basic structure of C programs, Programming style, executing a C program.

Introduction, Character Set, C tokens, Keywords and Identifiers, Constants, Variables, Data types, Declaration of Variables, Defining symbolic constants

Operators and Expression:

Introduction, Arithmetic of Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of expressions, Precedence of arithmetic operators, Type conversions in expressions, Mathematical function

UNIT-II

[12 hours]

Decision Making Statements

Introduction, Decision making with IF statement, Simple IF statement, the IF ELSE statement, Nesting of IF ... ELSE statements, The ELSE IF ladder, the switch statement, the ternary (? :) Operator, the GOTO statement

Looping

WHILE statement, the DO statement, The FOR statement, Jumps in loops Break and continue

Array & Handling of Character strings:

Introduction, One-dimensional arrays, Two-dimensional arrays, Initialization of two dimensional arrays, Concept of Multidimensional arrays

UNIT-III

[12 hours]

Handling of Character strings:

Introduction, Declaring and initializing string variables, reading string from terminal, writing string to screen, Arithmetic operations on characters, Putting string together, String Operations: String Copy, String Compare, String Concatenation and String Length, String Handling functions, Table of strings

User-Defined Functions:

Introduction, need for user-defined functions, return values and their types, calling a function, category of functions, no arguments and no return values, Arguments with return values, Handling of non-integer functions, Nesting of functions, Recursion, Functions with arrays, The scope and Lifetime of variables in functions

UNIT-IV

[12 hours]

Pointers:

Introduction, understanding pointers, Accessing the address of variable, Declaring and initializing pointers, Accessing a variable through its pointer, Pointer expressions, Pointer increments and scale factor, Pointers and arrays, Pointers and character strings, Pointers and Functions, Pointers and structures

Structures and Unions:

Introduction, Structure definition, Giving values to members, Structure initialization, Comparison of structures, Arrays of structures, Arrays within structures, Structures within Structures, Structures and functions, Unions.

Introduction to Object Oriented Concepts & Programming

Review of fundamental concepts of Object-oriented programming, Introduction to C++, class and objects, Functions in C++, Constructors & Destructors

Course Outcomes

1. To apply basic programming principles using C language.
2. To apply basic C program structure in software development
3. To apply fundamental principles of problem solving in software engineering through various programming languages.

Text Books

1. Programming in ANSI C, by Balagurusamy, Publisher - Tata McGraw Hill, 6th edition, 2008 ISBN: 1259004619
2. Object-oriented programming with C++, E. Balagurusamy, 2nd Edition, TMH. ISBN: 9780070669079

Reference Books

1. Introduction to C by Reema Thareja, Publisher-Oxford, 2nd Edition, 2012. ISBN : 0198086393
2. Programming with ANSI and Turbo C, by Ashok N Kamthane, Publisher –Pearson Education, 6th edition, 2009. ISBN: 9788131704370
3. Let us C, by Yashwant Kanitkar, Publisher – BPB Publication 15th edition, 2017 ISBN : 9788183331630

Web Resources

1. <http://nptel.ac.in/courses/106105085/2>
2. https://onlinecourses.nptel.ac.in/iitk_cs_101/preview
3. https://onlinecourses.nptel.ac.in/noc15_cs15/preview

LIST OF EXPERIMENTS

Experiment No.	Title	Learning Outcomes
1.1	Write a program to print the address of INDUS	Basic knowledge of C programming syntax, Variable, and I/P, O/P. Keywords.
1.2	Write a program to perform basic arithmetic operators on given two numbers.	Basic knowledge of C programming syntax, Variable, and I/P, O/P. Keywords.

1.3	Find the area and perimeter of square and rectangle and circle. Input the side(s) through the keyboard. (use PIE as symbolic constant)	Basic knowledge of C programming syntax, Variable, and I/P, O/P. Keywords.
1.4	Write a program to swap values of 2 variables (i) with extra variable and (ii) without using an extra variable.	Basic knowledge of C programming syntax, Variable, and I/P, O/P. Keywords.
1.5	Write a program to print the ASCII value of a given character.	Basic knowledge of C programming syntax, Variable, and I/P, O/P. Keywords.
1.6	Write a program to enter two numbers. Make the comparison between them with conditional operator. If the first number is greater than second perform multiplication otherwise division operation.	Basic knowledge of C programming syntax, Variable, and I/P, O/P. Keywords.
1.7	Take two binary numbers and show the use of bitwise AND, OR, NOT, XOR , Left shift and Right shift.	Basic knowledge of C programming syntax, Variable, and I/P, O/P. Keywords.
2.	Using conditional statements	
2.1	Write a program to check whether the given character is a vowel or not.	Knowledge of conditional statements
2.2	Write a program to check whether a given value is even or odd.	Knowledge of conditional statements
2.3.	Write a program that reads a number from 1 to 7 and accordingly it should display MONDAY to SUNDAY (if- else if).	Knowledge of conditional statements

2.4	Write a program to print number of days in a given month using switch statement. The program requires month number (between 1 to 12) as an input and then displays number of days in that month.	Knowledge of conditional statements												
2.5	Write a menu driven program to perform the arithmetic operations.	Knowledge of conditional statements												
2.6	Write a program to calculate total salary of an employee. total salary = basic + da + hra + ta. da = 50% of basic. <table style="margin-left: 40px;"> <tr> <td>Basic</td> <td>hra</td> <td>ta</td> </tr> <tr> <td><6000</td> <td>400</td> <td>100</td> </tr> <tr> <td>6001>= & <10000</td> <td>1400</td> <td>300</td> </tr> <tr> <td>>=10000</td> <td>2400</td> <td>700</td> </tr> </table>	Basic	hra	ta	<6000	400	100	6001>= & <10000	1400	300	>=10000	2400	700	Knowledge of conditional statements
Basic	hra	ta												
<6000	400	100												
6001>= & <10000	1400	300												
>=10000	2400	700												
3.	Using control statements													
3.1	Write a program to read any 7 numbers and print the average value using for loop.	Knowledge of control & looping statements												
3.2	Write a program to reverse a given integer number.	Knowledge of control & looping statements												
3.3	Write a program to print Fibonacci series of given number.	Knowledge of control & looping statements												
3.4	Write a program to find factorial of a number.	Knowledge of control & looping statements												
3.5	Write a program to check whether the number is Armstrong or not. Example: 153---- $1^3 + 5^3 + 3^3 = 1 + 125 + 27 = 153$	Knowledge of control & looping statements												
3.6	Write a program to list all prime numbers within given range.	Knowledge of control & looping statements												

3.7	Write a program to draw different types of patterns	Knowledge of control & looping statements
4	Array And Strings	
4.1	Write a program to find number of odd and even elements from the 1-D array.	concepts of array & strings
4.2	Write a program to sort elements of array.	concepts of array & strings
4.3	Write a Program to print Multiplication of two matrices.	concepts of array & strings
4.4	Write a program to reverse the string.(without inbuilt Function)	concepts of array & strings
4.5	Write a program to convert a string in to lower case and upper case.	concepts of array & strings
4.6	Write a menu driven program for the implementation of all build-in string functions.	concepts of array & strings
4.7	Find out occurrence of each character in a given string.	concepts of array & strings
5.	Structure & Union	
5.1	Write a program to define structure with tag state with fields state name, number of districts and total population. Read and display the data.	Knowledge of structure and union
5.2	Write a program to create a structure of 5 student's roll_no and name and display the records. Use array of structure.	Knowledge of structure and union
5.3	Write a program to create union of student's roll_no and name and display the records.	Knowledge of structure and union
6.	Pointers & Functions	
6.1	Write a program that demonstrates the use of address of (&) and pointer (*) operator.	Use of pointers & Functions
6.2	Write a program to display the content of 1-D array using pointer.	Use of pointers & Functions

6.3	Write a program using function to count the area of circle, triangle, rectangle and square.	Use of pointers & Functions
6.4	Write a program using function with array, takes input of five subject's marks and count the percentage and display result.	Use of pointers & Functions
6.5	Write a function which accepts a character array as argument from the user. The function should convert all the lowercase characters into uppercase case	Use of pointers & Functions
6.6	Write a function using pointer parameter that calculate maximum element from given array of integer number.	Use of pointers & Functions
6.7	Write a program that demonstrates call by value and call by reference concept in function argument.	Use of pointers & Functions
7.	Introduction to Object Oriented Programming	
7.1	Write a program in C++ to create the class shape, and overload the function to return the perimeters of the different shapes.	Introduction of C++ Program
7.2	Write a program in C++ demonstrating the public, protected and private parameters.	Introduction of C++ Program
7.3	Write a program in C++ to demonstrate constructor with default argument.	Introduction of C++ Program
7.4	Create a class student which stores the detail about roll no, name, marks of 5 subjects, i.e. science, Mathematics, English, C++. The class must have the following: <ul style="list-style-type: none"> • Get function to accept value of the data members. • Display function to display values of data members. 	Introduction of C++ Program
7.5	Write a program in C++ to demonstrate destructor in inheritance.	Introduction of C++ Program

Subject: Engineering Mechanics								
Program : B.Tech. All				Subject Code: CV0002			Semester : I/II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
3	2	0	4	24/60	-	16/40	-	100

Course Objectives

1. To describe the fundamental knowledge of Engineering Mechanics.
2. To describe the importance of applications of Engineering Mechanics in their day-to-day life.
3. To describe and analyze the applicability aspect of the subject in their respective branch.

CONTENTS

UNIT-I

[14 hours]

Introduction

Beginning and Development of Engineering Mechanics, Fundamental Principles of Mechanics, Idealizations in Mechanics, Branches of Mechanics, Units

Coplanar Forces

Effect of Force, Characteristics of Force, Principle of Transmissibility of Forces, System of Forces, Resultant Force, Composition of Forces, Methods for Resultant Force, All major Laws of Forces, Principle of Equilibrium, Analytical Method for the Equilibrium of Coplanar Forces, Lami's Theorem.

Non-Coplanar Forces

Moment of a Force, Graphical Representation of Moments, Types of Moments, Varignon's Principle of Moments, Application of Moments, Levers, Types of Levers.

UNIT-II

[12 hours]

Beams

Types of Loads, Types of Supports, Types of Beams, Analytical Method for determination of Support Reactions of a Beam (Simply Supported Beam, Cantilever Beam)

Friction

Static Friction, Limiting Friction, Normal Reaction, Angle of Friction, Coefficient of Friction, Laws of Friction, Equilibrium of a Body on a Rough Horizontal Plane, Equilibrium of a Body on a Rough Inclined Plane, Equilibrium of a Body on a Rough Inclined Plane Subjected to a Force Acting Along the Inclined Plane, Equilibrium of a Body on a Rough Inclined Plane Subjected to a Force Acting Horizontally. Ladder & Wedge Friction

UNIT-III

[11 hours]

Centre of Gravity

Centroid, Methods for Centre of Gravity, Centre of Gravity by Geometrical Considerations, Axis of Reference, Centre of Gravity of Plane Figures, Centre of Gravity of Symmetrical Sections, Centre of Gravity of Unsymmetrical Sections, Centre of Gravity of Solid Bodies, Pappus Guldinus Theorem

Moment of Inertia

Moment of Inertia of Plane area, Methods for Moment of Inertia, Moment of Inertia by Integration Method, Moment of Inertia of simple lamina, Parallel and Perpendicular Axis Theorem, Moment of Inertia of Built-up Section

UNIT-IV

[12 hours]

Graphical Method

Method for the Resultant of two Co- Planar forces, Equilibrium of Coplanar Forces (Force Polygon), Funicular Polygon Method to find Support Reactions, Graphical Method for determination of CG, MI

Kinematics and Kinetics

Linear Motion, Relative Motion, Rectilinear Motion of Particle, Curvilinear Motion of Particle Newton's Second Law of Motion, Work, Work Done by Force, Energy, Law of Conservation of Energy, Work- Energy Principle, Power, Efficiency

Mechanical Vibrations

Simple Harmonic Motion, Vibrations, D'alembert's Principle, Classification of Vibration, Damping and Vibration, Derivation of Free Vibration without Damping and Examples

Course Outcomes

1. To apply the fundamentals of mechanics.
2. To apply the knowledge of Engineering Mechanics to solve complex Problems by making them comprehensible and simple.
3. To apply the data to calculate the reactions necessary to ensure static equilibrium.
4. To apply the data to calculate centre of gravity and moment of inertia.

5. To apply the parameters of motion for the bodies in motion.

Text Books

1. R. C. Hibbeler, "Engineering Mechanics: Statics and Dynamics", Pearson Publication, 13th Edition, 2013, ISBN: 9780132915540.

Reference Books

1. F. P. Beer and E. R. Johnston, "Vector Mechanics for Engineers: Statics and Dynamics", McGraw Hill Publication, 11th edition, 2016, ISBN: 9781259639265.
2. S. Ramamrutham, "Engineering Mechanics", Dhanpat Rai Publishing Company (P) Limited, 1st Edition, 2008, ISBN: 9788187433514.
3. B. Bhattacharyya, "Engineering Mechanics", Oxford University Press, 2nd Edition, 2008, ISBN: 9780195696554.
4. R. S. Khurmi, "A Textbook of Engineering Mechanics", S. Chand Publication, 1st Edition, 2007, ISBN: 9788121926164.
5. H. J. Shah and S. B. Junnarkar, "Applied Mechanics", Charotar Publishing House Pvt. Ltd., 19th Edition, 2015, ISBN: 9789385039065.

Web Resources

1. Applied Mechanics (<http://nptel.ac.in/courses/122102004/>)
2. Core Applied Mechanics (<https://www.youtube.com/watch?v=7moNzhLQ6OA&list=PLC3A601B6060658D3>)
3. Civil-Mechanics of Solids (<https://www.youtube.com/watch?v=whB7IX3NQpg&list=PL4C9BB8DDD5D888A6>)
4. NOC: Engineering Mechanics Statics and Dynamics (https://www.youtube.com/watch?v=o_f1nQDtOOK&list=PLa4KQhDIGd7Rj8uW4uFjqBmtzZe2rwDv)
5. Introduction to Engineering Mechanics (<https://www.mooc-list.com/course/introduction-engineering-mechanics-coursera>)
6. Applications in Engineering Mechanics (<https://www.mooc-list.com/tags/engineering-mechanics>)

Subject: Environmental Science								
Program : B.Tech. All				Subject Code: CV0001			Semester : I/II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
1	0	2	2	24/60	24/60	16/40	24/60	200

Course Objectives

1. To analyze the importance of Environment in our day to day life.
2. To describe environmental Bio-diversity and related concepts.
3. To analyze the environmental legislations.

CONTENTS

UNIT-I

[03 hours]

Concepts of Environmental Sciences:

Environment, Levels of organizations in environment, Structure and functions in an ecosystem; Biosphere, its Origin and distribution on land, in water and in air, Broad nature of chemical composition of plants and animals, Natural Resources: Renewable and Non-renewable Resources, Forests, water, minerals, Food and land (with example of one case study); Energy, Growing energy needs, energy sources (conventional and alternatives)

UNIT-II

[04 hours]

Biodiversity and its conservation:

Biodiversity at global, national and local levels; India as a mega-diversity nation; Threats to biodiversity (biotic, abiotic stresses), and strategies for conservation. Environmental Pollution: Types of pollution- Air, water (including urban, rural, marine), soil, noise, thermal, nuclear; Pollution prevention; Management of pollution- Rural/Urban/Industrial waste management [with case study of any one type, e.g., power (thermal/nuclear), fertilizer, tannin, leather, chemical, sugar], Solid/Liquid waste management, disaster management.

UNIT-III

[04 hours]

Environmental Biotechnology:

Biotechnology for environmental protection- Biological indicators, bio-sensors; Remedial measures- Bio-remediation, phytoremediation, bio-pesticides, bio-fertilizers; Bio-reactors- Design and application. Social Issues and Environment: Problems relating to urban environment- Population pressure, water scarcity, industrialization;

remedial measures; Climate change- Reasons, effects (global warming, ozone layer depletion, acid rain) with case studies.

UNIT-IV

[04 hours]

Legal issues

Environmental legislation (Acts and issues involved), Environmental ethics. Environmental Monitoring: Monitoring- Identification of environmental problem, tools for monitoring (remote sensing, GIS); sampling strategies- Air, water, soil Sampling techniques.

Course Outcomes

1. To apply concepts of environmental science to the environmental problems
2. To apply knowledge for the conservation of bio-diversity.
3. To apply the legal procedures pertaining to environmental legislations.

Text Books

1. Anubha Kaushik and C.P Kaushik, "Perspectives in Environmental Studies", New Age International (P) Ltd, 6th Edition, 2017, ISBN: 9789386418630.

Reference Books

1. H. S. Peavey, D. R. Rowe and G. Tchobanoglous, "Environmental engineering", McGraw Hill International Edition, 1st Edition, 1985, ISBN: 9780070491342.
2. C. S. Rao, "Environmental Pollution Control Engineering", New Age International (P) Ltd, 2nd Edition, 2015, ISBN: 9788122418354.
3. "Pollution Control Acts, Rules and Notifications issued thereunder", Central Pollution Control Board, 2010.

Web Resources

1. Introduction to Environmental Science (<https://www.mooc-list.com/course/introduction-environmental-science-edx>)
2. Introduction to Environmental Science (https://www.youtube.com/watch?v=7G3eXI_DPn8)
3. Environmental Science (https://en.wikipedia.org/wiki/Environmental_science)

LIST OF EXPERIMENTS

Experiment No.	Title	Learning Outcomes
1	Plotting of bio geographical zones and expanse of territorial waters on the map of India.	To identify the geo-graphical conditions of India with reference of water characteristics.
2	Identification of biological	To identify different types of bio-

	resources (minimum 20) (plants, animals, birds) at a specific locations	diversity of any particular area in a way to conservation.
3	Determination of : (i) pH value (ii) Water holding capacity (iii) Electrical conductivity of different types of soils	To determine whether sample is acidic or alkaline.
4	Determination of energy content of plants by bomb calorimeter	To determine energy content of plants.
5	Measurement and classification of noise pollution.	To determine the noise affected area.
6	Determination of particulate matter from an industrial area by high volume sampler.	To Determine the particulate matter in atmosphere. (Gravimetric Method)
7	Determination of iso-chemical parameters (Alkalinity, Acidity) of tap water well water, rural water supply industrial effluent and sea water & potability issues.	To determine the characteristics of water and waste water.
8	Determination of iso-chemical parameters (Salinity, COD, BOD) of tap water well water, rural water supply industrial effluent and sea water & potability issues.	To determine the oxygen content present in the particular sample.
9	Demonstration of Remote Sensing and GIS methods.	To Integrate GIS and RS data for Disaster management with the help of a case study.
10	Understanding Environmental Biotechnology Processes.	To apply the principles of microbiology to the solution of environmental problems.
11	To determine the amount of dissolved solids present in the given sample	To determine the amount of dissolved solids present in the given Sample.
12	To determine the concentration of residual chlorine in the given water sample.	To determine the concentration of residual chlorine in the given water Sample.
13	To determine the turbidity of the given water and wastewater samples.	To determine the turbidity of the given water and wastewater samples.

Subject: Business Communication & Presentation Skills								
Program : B.Tech. All				Subject Code: SH0202			Semester : II	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
1	2	0	2	24/60	-	16/40	-	100

Course Objectives:

1. To describe the varied uses of business communication.
2. To analyze the importance of personality and its reflection in communication.
3. Train students to develop business correspondence in writing and presentation skills.

CONTENTS

UNIT I

[05 hours]

Business Communication

Role of Communication in Information Age
 Concept and meaning of communication
 Skills necessary for technical communication
 Communications in a technical organization
 Barriers to the process of communication
 Style and organization in technical communication covering
 Language skills- Objectivity, clarity, precision, and organizational etiquettes as defining features of technical communication

UNIT II

[15 hours]

Effective Presentation Skills

Sub-Verb-Agreement, Tenses
 Numerical Adjectives, Conjunction
 Preposition clauses
 Noun and adjective clauses, Relative clauses
 Imperative and infinitive structures, Question pattern
 Auxiliary verbs (Yes or No questions)
 Contrasted time structures
 Adverbial clauses of time,
 Intensifiers, Simple, Complex & Compound Constructions

UNIT III

[05 hours]

Reading

Intensive reading, Predicting content

Interpretation, Inference from text, Skimming & Scanning techniques of reading
Critical Interpretation, Editorial of newspapers

UNIT IV

[10 hours]

Writing

Basic Writing skill development

Paragraph development (Unity, coherence, cohesive devices),

Letters: Inquiry- reply to inquiry, Complaint, Request

Business Letters, Using e-mail for business communication

Language in e-mail.

Course Outcomes

1. To apply the main ideas of complex text on both concrete and abstract topics, including technical discussions in their field of specialization.
2. To apply a clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.
3. Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party.

Text Books

1. B.V.RAMANA: "HIGHER ENGINEERING MATHAMATICS", TATA McGraw Hill.
2. R K Jain, S R K Iyengar: " Advanced Engineering Mathematics. Third Edition", Narosa Publishing House

Reference Books

1. Fred Luthans, Organizational Behaviour, McGraw Hill. ISBN: 9781282385252
2. Lesikar and petit, Report writing for Business. ISBN: 9780256236910
3. M. Ashraf Rizvi, Effective Technical Communication, McGraw Hill. ISBN: 9780097057997
4. Wallace and masters, Personal Development for Life and Work, Thomson Learning. ISBN: 9780538450232.
5. Hartman Lemay, Presentation Success, Thomson Learning. ISBN: 9780324100921
6. Michael Muckian, John Woods, The Business letters Handbook. ISBN: 9780831740078
7. Herta A. Murphy, Effective Business Communication. ISBN: 9780070440616.
8. Lehman, Dufrene, Sinha BCOM, Cengage Learning ISBN: 9788131516980.

Web Resources

1. Calculus by IIT Kanpur (<https://www.youtube.com/watch?v=0lzOAW8yMTc>)
2. Linear Algebra by Prof. K. C. Shivakumar (<http://nptel.ac.in/courses/111106051/>)