

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

B. Tech. 1st Year, Semester I, GROUP-A (ME/IPE/CH/CE/TT)

S. No.	Course Code	Course Title	L	T	P	C
1	PHCI-101	Applied Physics-A	3	1	0	4
2	*see Page 4	<i>Basic Engineering Course-1</i>	3	1	0	4
3	CSCI-101	Computer Programming	3	0	0	3
4	MACI-101	Applied Mathematics-I	3	1	0	4
5	HMCI-101	Management, Principles & Practices	3	0	0	3
6	MECI-102	Engineering Graphics & CADD	1	0	4	3
7	PHCI-102	Applied Physics- A Lab	0	0	2	1
8	CSCI-102	Computer Programming Lab	0	0	2	1
Total Credits			16	3	8	23

B. Tech. 1st Year Semester I, GROUP-B (CSE/ECE/EE/ICE/BT)

S. No.	Course Code	Course Title	L	T	P	C
1	CYCI-102	Applied Chemistry-B	3	1	0	4
2	MACI-101	Applied Mathematics-I	3	1	0	4
3	*see Page 4	<i>Basic Engineering Course-1</i>	3	1	0	4
4	HMCI-102	English Communication & Report Writing	3	0	0	3
5	IPCI-101	Manufacturing Processes	2	0	0	2
6	IPCI-102	Product Realization through manufacturing Laboratory	0	0	4	2
7	HMCI-103	English Communication Lab	0	0	2	1
8	CYCI-103	Applied Chemistry-B Lab	0	0	2	1
9	CYCI-104	Environmental Studies	3	0	0	3
Total Credits			17	3	8	24

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B. Tech. 1st Year, Semester II, GROUP-A (ME/IPE/CH/CE/TT)

S. No.	Course Code	Course Title	L	T	P	C
1	CYCI-101	Applied Chemistry-A	3	1	0	4
2	MACI-102	Applied Mathematics-II	3	1	0	4
3	*see Page 4	Basic Engineering Course-2	3	1	0	4
4	HMCI-102	English Communication & Report Writing	3	0	0	3
5	IPCI-101	Manufacturing Processes	2	0	0	2
6	IPCI-102	Product Realization through manufacturing Laboratory	0	0	4	2
7	HMCI-103	English Communication Lab	0	0	2	1
8	CYCI-103	Applied Chemistry- A Lab	0	0	2	1
9	CYCI-104	Environmental Studies	3	0	0	3
Total Credits			17	3	8	24

B. Tech. 1st Year Semester II, GROUP-B (CSE/ECE/EE/ICE/BT)

S. No.	Course Code	Course Title	L	T	P	C
1	PHCI-103	Applied Physics-B	3	1	0	4
2	*see Page 4	Basic Engineering Course-2	3	1	0	4
3	CSCI-101	Computer Programming	3	0	0	3
4	MACI-102	Applied Mathematics-II	3	1	0	4
5	HMCI-101	Management, Principles & Practices	3	0	0	3
6	MECI-102	Engineering Graphics & CADD	1	0	4	3
7	PHCI-104	Applied Physics-B Lab	0	0	2	1
8	CSCI-102	Computer Programming Lab	0	0	2	1
Total Credits			16	3	8	23

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List of Basic Engineering Courses Selected by different Departments

S.No.	Department	Basic Engineering Courses Selected
1	Bio Technology	(1) Elements of Mechanical Engineering (2) Data Structures
2	Civil Engineering	(1) Elements of Civil Engineering (2) Elements of Mechanical Engineering
3	Chemical Engineering	(1) Elements of Mechanical Engineering (2) Basic Electrical Science
4	Computer Science & Engineering	(1) Basic Electronics (2) Basic Electrical Science
5	Electronics & Communication Engineering	(1) Data Structures (2) Basic Electrical Science
6	Electrical Engineering	(1) Basic Electronics (2) Elements of Mechanical Engineering
7	Information Technology	(1) Basic Electronics (2) Basic Electrical Science
8	Industrial & Production Engineering	(1) Elements of Mechanical Engineering (2) Data Structures
9	Instrumentation & Control Engineering	(1) Basic Electronics (2) Elements of Mechanical Engineering
10	Mechanical Engineering	(1) Elements of Mechanical Engineering (2) Basic Electrical Science
11	Textile Technology	(1) Basic Electronics (2) Elements of Mechanical Engineering

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List of Basic Engineering Courses

S. No.	Course Code	Course Description	Departments studying in First year
1	ECCI-101	Basic Electronics	<ol style="list-style-type: none">1. Computer Science & Engineering2. Electrical Engineering3. Information Technology4. Instrumentation & Control Engineering5. Textile Technology
2	CECI-101	Elements of Civil Engineering	<ol style="list-style-type: none">1. Civil Engineering
3	MECI-101	Elements of Mechanical Engineering	<ol style="list-style-type: none">1. Bio Technology2. Civil Engineering3. Chemical Engineering4. Electrical Engineering5. Industrial & Production Engineering6. Instrumentation & Control Engineering7. Mechanical Engineering8. Textile Technology
4	CSCI-103	Data Structures	<ol style="list-style-type: none">1. Bio Technology2. Electronics & Communication Engineering3. Industrial & Production Engineering
5	ICCI-101	Basic Electrical Science	<ol style="list-style-type: none">1. Chemical Engineering2. Computer Science & Engineering3. Electronics & Communication Engineering4. Information Technology5. Mechanical Engineering

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BASIC ENGINEERING COURSES for 1st Year

Group	Branch	Course offered in 1 st Semester	Course offered in 2 nd Semester
A1	Mechanical	EME	Basic Electrical Science
A2	Chemical	EME	Basic Electrical Science
A3	Industrial & Prod	EME	Data Structures
A4	Textile Technology	Basic Electronics	EME
A5	Civil Engineering	Elements of Civil Engg	EME

BASIC ENGINEERING COURSES for 1st Year

Group	Branch	Course offered in 1 st Semester	Course offered in 2 nd Semester
B1	Computer Science & Engg	Basic Electrical Science	Basic Electronics
B2	Electronics & Comm Engg	Basic Electrical Science	Data Structures
B3	Instrumentation & Control Engg	Basic Electronics	EME
B4A	Information Technology	Basic Electrical Science*	Basic Electronics*
B4B	Bio Technology	EME	Data Structures
B4C	Electrical Engg	Basic Electronics**	EME**

* Will attend class with CSE, ** Will attend classes with ICE

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Detailed Course Curriculum

Course Code	PHCI-101
Course Title	Applied Physics – A
Credits	4
Course Type	Common for Mechanical Engg., Civil Engg., Industrial Engg., Chemical Engg. & Textile Technology

CO 1	After completing the course students should know about the need of quantum mechanics. They should know about dual character of radiations as well as matter, about the Heisenberg uncertainty principle, the concept of wave function and about Schrodinger wave equation and its applications to simple one dimensional potential problem.
CO 2	Student should know basics of vector calculus and how to use that in electricity and magnetism. They should have knowledge of four Maxwell equations and their Physical significance.
CO 3	Students are expected to know about the special theory of relativity and how it is different from Newtonian theory. They should have knowledge about various interesting consequences of special theory of relativity and about Einstein mass energy relationship.
CO 4	Student should know different types of crystal system, about Miller indices and their use and about different types of defects in the crystals.
CO 5	Students will learn about the strength of materials, the processes leading to failure in materials and creep mechanism.
CO 6	Student will be familiar with the laws of thermodynamics, difference between classical and quantum statistical mechanics, application of statistical mechanics to calculate the specific heats of solids and for free electron gas.

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Course Code: PHCI-101	Course Title: Applied Physics-A	Core Course	L	T	P	Credit 4
			3	1	0	

UNIT-I

Quantum Theory: Need of Quantum theory, Photoelectric effect, The Compton effect; matter waves, group and phase velocities; Uncertainty principle and its application; time independent and time dependent Schrödinger wave equation; Eigen values and Eigen functions, Born's interpretation and normalization of wave function, orthogonal wave functions; applications of Schrödinger wave equation for particle in one dimensional infinite potential well. **(08 Lectures)**

UNIT-II

Electromagnetism: Gradient of a scalar, divergence and curl of a vector; electric potential due to arbitrary continuous charge distribution, multipole expansion; dielectrics: polarization, Gauss law in dielectrics, electric displacement, susceptibility & permittivity; continuity equation, derivation of integral and differential forms of Maxwell equations and their physical significance; EM waves in free space. **(10 Lectures)**

UNIT-III

Theory of Relativity: Galilean transformations, Galilean Invariance, concept of ether; Michelson-Morley experiment; Einstein's postulates and Lorentz transformation equations, Consequences of Special Theory of relativity: length contraction, Time dilation, and simultaneity of events, addition of velocity, variation of mass with velocity, mass-energy relation, energy-momentum relation. **(08 Lectures)**

UNIT-IV

Crystal Structure: Fundamental concepts, Crystal systems, Closed packed structures, Crystallographic planes and directions, Miller indices, Crystal defects. **(06 Lectures)**

UNIT-V

Mechanical Properties: The elastic properties, model of elastic behavior, plastic deformation tensile stress-strain curve, shear strength of perfect and real crystals, mechanical failure, fatigue and fracture, creeps: mechanism of creep, characterization of creep curves. **(06 Lectures)**

UNIT-VI

Thermal Physics: Seebeck effect, Peltier effect, Thomson effect, Kelvin relationships, Wiedemann-Franz law, Thermal equilibrium, Entropy, The laws of thermodynamics, thermal conductivity of bulk materials, Phonons: lattice vibration heat transfer, specific heat of solids, classical, Einstein and Debye Model, Ideal quantum gases: Maxwell-Boltzmann, Bose-Einstein, Fermi-Dirac statistics, Carnot efficiency. **(06 Lectures)**

Books Recommended:

1. A. Beiser, "Concepts of Modern Physics", McGraw Hill, New Delhi, 6th Ed. (2002).
2. K S Krane, "Modern Physics", John Wiley & Sons, Inc., 3rd Ed. (2011).
3. Raymond A Serway "Modern Physics", Thomson, 3rd Ed.

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4. D. J. Griffiths, "Introduction to Electrodynamics", Prentice Hall of India, New Delhi, 2nd Ed. (1998).
5. H K Malik & A K Malik, "Engineering Physics", McGraw Hill Education, 2nd Ed. (2017).
6. Callister W.D. "Material Science and Engineering", John Wiley & Sons, Inc. New York, (1997).
7. V. Raghavan "Introduction to Material Science and Engineering", Prentice Hall of India.
8. Daneil V Schroedar, "Introduction to Thermal Physics", Pearson, India (2014).
9. Stephen J. Blundell and Katherine M. Blundell, "Concepts in Thermal Physics", Oxford, Indian Ed. (2014).

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Course Code	PHCI-103
Course Title	Applied Physics – B
Credits	4
Course Type	Common for Computer Science, Electronics and Comm. Engg. & Instrumentation and Control & Engg.

CO 1	After completing the course students should know about the need of quantum mechanics. They should know about dual character of radiations as well as matter, about the Heisenberg uncertainty principle, the concept of wave function and about Schrodinger wave equation and its applications to simple one dimensional potential problem.
CO 2	Student should know basics of vector calculus and how to use that in electricity and magnetism. They should have knowledge of four Maxwell equations and their Physical significance.
CO 3	Students are expected to know about the special theory of relativity and how it is different from Newtonian theory. They should have knowledge about various interesting consequences of special theory of relativity and about Einstein mass energy relationship.
CO 4	Students should know the basic physics of semiconductors and how they are different from insulators and conductors. They should know the difference between intrinsic and extrinsic semiconductors and about the Fermi levels position in these semiconductors
CO 5	Students will learn fundamentals of the technologically important optoelectronic devices. They will learn about the fundamentals on which these devices are based. They will learn about solar cells, devices based on diodes, IR emitters, LCD and optocouplers.
CO 6	Students are expected to know about the basic of physical optics. They should know about basic properties of Laser beams and why they are important. They should know the physical principle behind the working of laser, different types of lasers and their applications. Students are also expected to know about physical principle behind the working of optical fibers and their applications.

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Course Code: PHCI-103	Course Title: Applied Physics-B	Core Course	L	T	P	Credit 4
			3	1	0	

UNIT-I

Quantum Theory: Need of Quantum theory, Photoelectric effect, The Compton effect; matter waves, group and phase velocities; Uncertainty principle and its application; time independent and time dependent Schrödinger wave equation; Eigen values and Eigen functions, Born's interpretation and normalization of wave function, orthogonal wave functions; applications of Schrödinger wave equation for particle in one dimensional infinite potential well. **(08 Lectures)**

UNIT-II

Electromagnetism: Gradient of a scalar, divergence and curl of a vector; electric potential due to arbitrary continuous charge distribution, multipole expansion; dielectrics: polarization, Gauss law in dielectrics, electric displacement, susceptibility & permittivity; continuity equation, derivation of integral and differential forms of Maxwell equations and their physical significance; EM waves in free space. **(10 Lectures)**

UNIT-III

Theory of Relativity: Galilean transformations, Galilean Invariance, concept of ether; Michelson-Morley experiment; Einstein's postulates and Lorentz transformation equations, Consequences of Special Theory of relativity: length contraction, Time dilation, and simultaneity of events, addition of velocity, variation of mass with velocity, mass-energy relation, energy-momentum relation. **(08 Lectures)**

UNIT-IV

Semiconductor Physics: Charged particles, Field intensity, potential energy barrier, Formation of energy bands in metals, semiconductors & insulators, Direct & Indirect Band Gap Materials, Fermi Dirac Function, Position of Fermi level in intrinsic and extrinsic semiconductors, Conductivity, Mobility, Current density (drift & diffusion) in semiconductors (n type and p type), Generation and recombination of charges, Continuity equation. **(11 Lectures)**

UNIT-V

Optoelectronic Device: Photoconductive cell, photovoltaic cell, Solar cell, Photodiode, Phototransistor, LED, IR emitters, LCD, Optocoupler. **(05 Lectures)**

UNIT-VI

Engineering Optics: Basic of Interference, Diffraction and Polarization, Lasers and characteristics, Einstein's coefficient, He-Ne laser, semiconductor lasers, Applications of Lasers, Optical fibres; Numerical aperture, Classification of optical fibres, fibre Losses, fibre manufacturing, Applications of optical fibre in industry and communication.

Books Recommended:

1. A. Beiser, "Concepts of Modern Physics", McGraw Hill, New Delhi, 6th Ed. (2002).
2. K S Krane, "Modern Physics", John Wiley & Sons, Inc., 3rd Ed. (2011).

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3. Raymond A Serway“Modern Physics”, Thomson, 3rd Ed.
4. D. J. Griffiths, “Introduction to Electrodynamics”, Prentice Hall of India, New Delhi, 2nd Ed. (1998).
5. H K Malik & A K Malik, “Engineering Physics”, McGraw Hill Education, 2nd Ed. (2017).
6. K. Thyagarajan and A. K. Ghatak, “Lasers, - Theory and Applications”, Macmilan India Ltd., New Delhi, (2000).
7. Ajoy Ghatak, “Optics”, McGraw Hill Companies, 3rd Ed. (2010).
8. Eugene Hecht, “Optics”, Addison Wesley (2002).
9. S.M.Sze and Kwok K. Ng, "Physics of Semiconductor Devices", John Wiley & Sons.
10. John Wilson and John Hawkes , "Optoelectronics" Prentice Hall.
11. Michael Bass, Eric W. Van Stryland, David R. Williams and William L. Wolfe, "Handbook of Optics: Fundamentals, Techniques, and Design", Mc-Graw Hill.

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Course Code	PHCI-102
Course Title	Applied Physics-A Lab
Credits	1
Course Type	Common for Mechanical Engg., Civil Engg., Industrial Engg., Chemical Engg. & Textile Technology

Pre-requisites: None

Course Assessment Method: Both continuous and semester end examination.

Topics to be covered: All

Course Outcomes: Following are outcomes of the course:

CO 1	Students will learn about the application and working of basic semiconductor devices.
CO 2	Students will learn about various aspects of waves.
CO 3	Students will learn about the thermal properties of materials.
CO 4	Students will learn how to experimentally calculate some of the quantities related to quantum physics.
CO 5	Students will learn about basics of experimental electromagnetism.
CO 6	Students will learn to use experimental set-up to calculate the elastic constants of materials and to study their mechanical properties.

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Course Code: PHCI-102	Course Title: Applied Physics-A Lab	Core Course	L	T	P	Credit 1
			0	0	2	

List of experiments

1. To verify the laws of vibrating strings by Melde's experiments that is to show that $\lambda^2/T =$ constant.
2. To determine the impedance of A.C. Circuits.
3. To study the characteristic of PN diode and Zener diode.
4. To find out the intensity response of a solar cell/Photo diode.
5. To analyze the suitability of a given Zener diode as a power regulator.
6. To determine the band gap of a semiconductor.
7. To study the effect of voltmeter resistance on voltage measurement.
8. To study the variation of magnetic field with distance along the axis of a circular coil carrying current and its estimate the radius of the coil.
9. To determine Planck's constant by LED method.
10. To determine the resistivity of a semiconductor by four probe method.
11. To confirm the de Broglie equation for electrons.
12. To find the coefficient of thermal conductivity of bad conductor by Lee's disc method.
13. To find Young's modulus, modulus of rigidity and Poisson's ratio for the material of a given wire by Searle's method.
14. To investigate creep of a copper wire at room temperature.
15. To determine the Hall coefficient of a semiconductor and hence to estimate the charge carrier concentration.

Books Recommended:

1. R S Sirohi "Practical Physics" Wiley Eastern, New Delhi.
2. C L Arora "B.Sc. Practical Physics", S Chand & Company.

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Course Code	PHCI-104
Course Title	Applied Physics-B Lab
Credits	1
Course Type	Common for Computer Science, Electronics and Comm. Engg. & Instrumentation and Control & Engg.

Pre-requisites: None

Course Assessment Method: Both continuous and semester end examination.

Topics to be covered: All.

Course Outcomes: Following are outcomes of the course:

CO 1	After completing the course PHX-102, students should be familiar with practical training of basic electrical circuits.
CO 2	Students will learn how to use electrical devices to calculate some of the quantities related to quantum physics.
CO 3	Students will learn about the application and working of basic semiconductor devices.
CO 4	Students will learn about basics of experimental electromagnetism.
CO 5	Students will gain practical knowledge about the basics phenomenon related to physical optics i.e. interference, diffraction and polarisation.
CO 6	Students will learn about various optoelectronic devices and study their characteristics.

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Course Code: PHCI-104	Course Title: Applied Physics-B Lab	Core Course	L	T	P	Credit 1
			0	0	2	

List of experiments

1. To study the characteristic of PN diode and Zener diode.
2. To find out the intensity response of a solar cell/Photo diode.
3. To analyze the suitability of a given Zener diode as a power regulator.
4. To determine the band gap of a semiconductor.
5. To determine the Refractive index of the Prism material using spectrometer.
6. To determine the wavelength using Fresnel's Biprism/Diffraction grating.
7. To determine the wavelength of sodium light using Newton's ring method.
8. To study the effect of voltmeter resistance on voltage measurement.
9. To study the variation of magnetic field with distance along the axis of a circular coil carrying current and its estimate the radius of the coil.
10. To verify Malus law.
11. To determine Planck's constant by LED method.
12. To determine the resolving power of a telescope.
13. To study the diffraction pattern by slits and gratings.
14. To determine the resistivity of a semiconductor by four probe method.
15. To confirm the de Broglie equation for electrons.

Books Recommended:

1. R S Sirohi "Practical Physics" Wiley Eastern, New Delhi.
2. C L Arora "B.Sc. Practical Physics", S Chand & Company.

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COURSE TITLE: COMPUTER PROGRAMMING

CONTACT HOURS/CREDIT SCHEME: (L-T-P-C: 3-0-0-3)

COURSE ASSESSMENT METHODS: Two sessional exams and one end-semester exam, along with assignments, presentations and class tests which may be conducted by the course coordinator in lieu of internal assessment.

COURSE OUTCOMES

Upon completion of the course, the students will be able to

CO1: Develop simple applications in c using basic constructs

CO2: Design and implement applications using arrays and strings

CO3: Develop applications in c using functions, pointers and structures.

Course Outcomes	Program outcomes											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
CSX-XXX												
CO 1.	M	L	H	L								
CO 2.		H	M	M	L		M	M				
CO 3.		M	M									

Course Code: CSCI-101	Course Title:	Core Course	L	T	P	Credit 3
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	Computer Programming	3	0	0	
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Basics of C Programming

Introduction to programming paradigms, Structure of C program, C programming: Data Types, Storage classes, Constants, Enumeration Constants, Keywords, Operators: Precedence and Associativity, Expressions, Input/Output statements, Assignment statements, Decision making statements, Switch statement, Looping statements, Pre-processor directives, Compilation process

Arrays and Strings

Introduction to Arrays: Declaration, Initialization, One dimensional array, Example Program: Computing Mean, Median and Mode, Two dimensional arrays, Example Program: Matrix Operations (Addition, Scaling, Determinant and Transpose), String operations: length, compare, concatenate, copy, Selection sort, linear and binary search.

Functions and Pointers

Introduction to functions: Function prototype, function definition, function call, Built-in functions (string functions, math functions), Recursion, Example Program: Computation of Sine series, Scientific calculator using built-in functions, Binary Search using recursive functions – Pointers, Pointer operators, Pointer arithmetic, Arrays and pointers, Array of pointers, Example Program: Sorting of names, Parameter passing: Pass by value, Pass by reference, Example Program: Swapping of two numbers and changing the value of a variable using pass by reference.

Structures

Structure, Nested structures, Pointer and Structures, Array of structures, Example Program using structures and pointers, Self referential structures, Dynamic memory allocation, Singly linked list typedef.

File Processing

Files, Types of file processing: Sequential access, Random access, Sequential access file, Example Program: Finding average of numbers stored in sequential access file, Random access file, Example Program: Transaction processing using random access files, Command line arguments

TEXT BOOKS, AND/OR REFERENCE MATERIAL:

1. Pradip Dey, Manas Ghosh, “Fundamentals of Computing and Programming in C”, first Edition, oxford university press, 2009
2. Ashok N. Kamthane, “Computer Programming”, pearson education, 2007.
3. Yashavant p. Kanetkar. “ Let us C”, bpb publications, 2011
4. Kernighan,B.W and Ritchie,D.M, “The C Programming Language”, second edition, Pearson education, 2006.
5. Byron S Gottfried, “ Programming With C”, schaum’s outlines, second edition, tata Mcgraw-hill, 2006.

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6. R.G. Dromey, “How to Solve it by Computer”, pearson education, fourth reprint, 2007

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Course Code: CSCI-102	Course Title: Computer Programming Laboratory	Core Course	L	T	P	Credit 1
			0	0	2	

COURSE TITLE: COMPUTER PROGRAMMING LABORATORY

CONTACT HOURS/CREDIT SCHEME: (L-T-P-C: 0-0-2-1)

OBJECTIVES:

- To introduce the concepts of structured Programming language.
- To introduce the concepts of pointers and files
- To introduce the concepts of primitive Data Structures.

LIST OF EXPERIMENTS:

1. C Programs using simple statements and expressions.
2. C Programs for scientific problem solving using decision making and looping.
3. C Programs for the implementation of simple one dimensional array and its various operations.
4. C Programs for the implementation of two dimensional arrays and its various operations.
5. C Programs for solving problems using String functions.
6. C Programs for the implementation of user defined functions and their operations.
7. C Programs using recursive function.
8. C Programs using structures.
9. C Programs using Pointers.
10. C Programs for file handling operations.

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Course Code: CYCI-101	Course Title: Applied Chemistry-A	Core Course	L	T	P	Credit 4
			3	1	0	

Applied Chemistry-A (For ME, CE, IPE, CH, TT, BT)

Part-A

- 1. Phase Equilibria & Distribution Law:** Phase diagram for single component system, carbon dioxide system, sulphur system, carbon system, helium system, Two component systems: Pb-Ag system, Bi-Cd system, KI-H₂O system, Iron Carbon Equilibrium diagram, Iron Allotropy, Micro Constituents of Iron and Steel
- 2. Structural elucidation of engineering Materials:** Lambert-Beer's Law, Principles and applications of U. V. Visible, Molecular Absorption Spectroscopy, Chromophore, Effect of conjugation on chromophore, Absorption by aromatic systems, Rotational and Vibrational spectroscopy: Principles and application to simple molecules, Magnetic Resonance Spectroscopy, MRI, XRD, SEM, TEM.
- 3. Biological Inorganic Chemistry:** Oxygen transport and storage-Myoglobin, Haemoglobin Bohr's effect, The chemistry of elements in medicine – chelation therapy, Cancer treatment, Antiarthritis drugs, contributions of individual elements to biological systems.
- 4. Nano-Science & Technology:** Introduction, Nanotechnology applications, Material self assembly, Molecular Vs material self assembly, Self assembling materials, Two dimensional assemblies, Mesoscale self assembly (MESA), Coercing colloids, Processes of nanotechnology, Processes of Nanotechnology, Processes used in bottom up approach, Nanomaterial, Nanocrystals,/Nanoparticles, Nanostructure, Supramolecular systems, Future perspective.

Part-B

- 5. Fuels & Lubricants:** Classification of fuels, Calorific values, Comparison between solid, liquid and gaseous fuels, Bomb calorimeter, Calorific value of gaseous fuel, Theoretical calculation of calorific value of a fuel, Wood, Coal, Classification of coal by rank, Selection of coal, analysis of coal, Natural Gas, Producer gas, water gas, Non-Conventional sources of energy.
Friction and wear, Lubricants, Mechanism of lubrication, classification of lubricants, lubricating oils, Greases or Semi-Solid lubricants, Solid lubricants, Synthetic lubricants, Lubricating emulsions, Properties of lubricating oils, Properties of greases, Cutting fluids, Selection of lubricants.
- 6. Water treatment:** Introduction, Hardness of water, Disadvantages of hard water, Scale and Sludge formation in boilers, Caustic Embrittlement, Boiler corrosion, Priming and foaming, softening methods, Drinking water or municipal water.

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7. Protective Coating: Introduction, Metallic coatings, Electroplating, Methods of cleaning articles before electrodeposition, Electroplating methods, Electroless plating, Some electroless platings, Some electroless platings, Some other metallic, coatings, Chemical conversion coatings, Organic Coatings, Paints, Varnishes, Enamels, Special paints.

8. Cement, Refractions, Glass & Ceramics, Optical Fibers: Inorganic cementing materials, Gypsum plaster, cement, Manufacture of Portland cement, Chemical composition of cement, chemical constitution of Portland cement, setting and hardening of Portland cement, heat of hydration of cement, special cements, concrete and RCC, Decay of concrete, Glasses and ceramics, Types of glasses, Optical fibers.

9. Composites and their Mechanical Properties: Classification of Composites, Constituents of composites.

REFERENCES:

1. *Advanced Inorganic Chemistry* (6th edition), F. A. Cotton and G. Wilkinson, John Wiley and Sons, **2003**.
2. *Inorganic Chemistry* (4th edition), D. F. Shriver and P. W. Atkins, Oxford University, Oxford, **2006**.
3. *Modern methods of organic synthesis* (3rd edition), W. Carruthers, Cambridge University Press (Cambridge Low Price editions) 1986, Reprinted **2004**.
4. *Reactions, Rearrangements and Reagents* (4th edition), S. N. Sanyal, Bharti Bhawan (P & D), **2003**.
5. *Polymer Science and technology* (2nd Edition), P. Ghosh, Tata McGRAW Hill, **2008**.
6. *Applications of Absorption Spectroscopy of Organic Compounds* (4th edition), John R. Dyer, Prentice Hall of India Pvt. Ltd., **1978**.
7. *Introduction to Nanotechnology*, C. P. Poole Jr., F. J. Owens, Wiley Interscience, **2003**.
8. *Nanotechnology Science, Innovation and Opportunity*, L. E. Foster, Pearson Education, **2007**.
9. *Spectroscopic methods in organic chemistry* (4th Edition), Williams & Fleming, Tata McGRAW Hill, **2003**.
10. *A Text Book of Engineering Chemistry*, Shashi Chawla, Dhanpat Rai & Co, **2004**.
11. *Polymers: Chemistry & Physics of Modern Materials* (2nd edition) J.M.G.Cowie, Blackie Academic & Professional, **1994**.
12. *Engineering Chemistry* (16th Edition) Jain, Jain, Dhanpat Rai Publishing Company, **2013**.

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Course Code: CYCI-102	Course Title: Applied Chemistry-B	Core Course	L	T	P	Credit 4
			3	1	0	

Applied Chemistry-B (For CSE, ECE & ICE)

Part-A

- 1. Phase Equilibria & Distribution Law:** Phase diagram for single component system, carbon dioxide system, sulphur system, carbon system, helium system, Two component systems: Pb-Ag system, Bi-Cd system, KI-H₂O system, Carbon, Metals.
- 2. Structural elucidation of engineering Materials:** Lambert-Beer's Law, Principles and applications of U. V. Visible, Molecular Absorption Spectroscopy, Chromophores, Effect of conjugation on chromophores, Absorption by aromatic systems, Rotational and Vibrational spectroscopy: Principles and application to simple molecules, Magnetic Resonance Spectroscopy, MRI, XRD, SEM, TEM.
- 3. Biological Inorganic Chemistry:** Oxygen transport and storage-Myoglobin, Hemoglobin Bohr's effect, The chemistry of elements in medicine – chelation therapy, Cancer treatment, Antiarthritis drugs, contributions of individual elements to biological systems.
- 4. Nano-Science & Technology:** Introduction, Nanotechnology applications, Material self assembly, Molecular Vs material self assembly, Self assembling materials, Two dimensional assemblies, Mesoscale self assembly (MESA), Coercing colloids, Processes of nanotechnology, Processes of Nanotechnology, Processes used in bottom up approach, Nanomaterial, Nanocrystals,/Nanoparticles, Nanostructure, Supramolecular systems, Future perspective.

Part-B

- 5. Polymer Liquid Crystals and their applications in LCDs:** Introduction, Liquid crystalline phases, Identification of the mesophases, Lyotropic main chain liquid crystalline polymers, Thermotropic main chain liquid crystal polymers, Applications of liquid Crystals in Displays (LCDs).
- 6. Polymers for the Electronics Industry:** Polymers, Conduction mechanism, Preparation of conductive polymers, Polyacetylene, Poly (*p*- phenylene), Polyheterocyclic systems, Polyaniline, Poly (Phenylene sulphide), Poly (1,6-heptadiyne), Applications, Photonic applications.
- 7. Semi conductors, insulators and Superconductors:** Semi conductivity in non elemental materials , Preparations of semiconductors, Chalcogen photoconductors , photocopying process Introduction to Superconductors, types of Superconductors, Properties of superconductors , Applications of Superconductors, Electrical insulators or Dielectrics.

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

- 8. Materials for energy sector**-Solar cell, Fuel cell, Examples of Fuel Cells, Advantages and limitations of Fuel Cells, Battery, Types of Batteries, Lead Acid Storage cell.
- 9. Sensors** - MEMS, NEMS, Actuators, Biosensors construction and working of Biosensors and classification of Biosensors, Advantages of Biosensors, Biochips or Biological computers.

REFERENCES:

- 1.** *Advanced Inorganic Chemistry* (6th edition), F. A. Cotton and G. Wilkinson, John Wiley and Sons, **2003**.
- 2.** *Inorganic Chemistry* (4th edition), D. F. Shriver and P. W. Atkins, Oxford University, Oxford, **2006**.
- 3.** *Modern methods of organic synthesis* (3rd edition), W. Carruthers, Cambridge University Press (Cambridge Low Price editions) 1986, Reprinted **2004**.
- 4.** *Reactions, Rearrangements and Reagents* (4th edition), S. N. Sanyal, Bharti Bhawan (P & D), **2003**.
- 5.** *Polymer Science and technology* (2nd Edition), P. Ghosh, Tata McGRAW Hill, **2008**. **6.** *Applications of Absorption Spectroscopy of Organic Compounds* (4th edition), John R. Dyer, Prentice Hall of India Pvt. Ltd., **1978**.
- 7.** *Introduction to Nanotechnology*, C. P. Poole Jr., F. J. Owens, Wiley Interscience, **2003**.
- 8.** *Nanotechnology Science, Innovation and Opportunity*, L. E. Foster, Pearson Education, **2007**.
- 9.** *Spectroscopic methods in organic chemistry* (4th Edition), Williams & Fleming, Tata McGRAW Hill, **2003**.
- 10.** *A Text Book of Engineering Chemistry*, Shashi Chawla, Dhanpat Rai & Co, **2004**.
- 11.** *Polymers: Chemistry & Physics of Modern Materials* (2nd edition) J.M.G.Cowie, Blackie Academic & Professional, **1994**.
- 12.** *Engineering Chemistry* (16th Edition) Jain, Jain, Dhanpat Rai Publishing Company, **2013**.

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

Course Code: CYCI-103	Course Title: Applied Chemistry Laboratory	Core Course	L	T	P	Credit 1
			0	0	2	

Applied Chemistry Laboratory

- 1) Preparation of Urea-formaldehyde resins.
- 2) Determine the viscosity of test liquids with the help of Ostwald viscometer.
- 3) Find out the R_f value of the given amino acid by thin layer chromatography (TLC) and identify the amino acid present in a given mixture by TLC
- 4) Isolation of caffeine from Tea leaves.
- 5) To determine the molecular weight of an organic compound by depression in freezing point (Rast Camphor method).
- 6) Find out the ion-exchange capacity of a cation exchanger (Dowex -50).
- 7) To prepare phenol formaldehyde resin (Bakelite).
- 8) To determine the ion-exchange capacity of a given anion exchange resin.
- 9) To synthesize Paracetamol and determine the percentage yield of the product.
- 10) Determine the equivalent weight of a given acid.
- 11) Determination of total (temporary and permanent) hardness in water sample using EDTA as standard solution (Complexometric Titration).
- 12) Separation of Metal ions by paper chromatography.
- 13) To estimate the nickel content in the given sample using dimethyl glyoxime.
- 14) To determine the strength of given acid using pH titrations.
- 15) To determine the strength of given acid using conductometric titrations.
- 16) To determine the average molecular weight of a polymer.
- 17) Determine the surface concentration of 1-butanol in aqueous solution.
- 18) Determine the amount of sodium carbonate and sodium hydroxide in a mixture by titration.
- 19) Determination of ferrous ions using potassium dichromate by internal indicator.
- 20) To Purify Common organic solvents by distillation.
- 21) To Determine the Acid Value of Fat.
- 22) To prepare the pure sample of phthalimide.
- 23) Isolation of Casein Protein from Milk.
- 24) Synthesis of cis- and trans- potassiumdioxalatodiaquochromate (III)
- 25) Preparation of a conducting polymer.
- 26) To determine concentration of trace metals by atomic absorption spectrophotometer.

Note: At least 10-12 experiments will be carried out.

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

Course Code: IPCI-101	Course Title: Manufacturing Process	Core Course	L	T	P	Credit 2
			2	0	0	

Pre-requisites: None

Course Assessment Method: Both continuous and semester end examination.

Topics to be covered: All.

Course Outcomes: At the end of the course the student will be able to:

CO 1	Ability to clear basic fundamental concepts of machining, welding, casting, forming and list of major metal, non metal, alloy and their physical characteristics.
CO 2	Selecting or suggesting suitable manufacturing processes to achieve the required products with the aim of avoiding material and time wastage.
CO 3	Recommend appropriate part manufacturing processes when provided a set of functional requirements and product development constraints.
CO 4	Developing manufacturing processes and tools for typical applications in the industries.

Detailed Syllabus

Manufacturing: Introduction to manufacturing processes, Basic terminology used Economical and technological considerations.

Materials properties and their application: Different engineering materials, Properties, Nomenclature, Basics of heat treatment.

Carpentry: Introduction, Classification of wood, Seasoning of wood, Classification of carpentry tools, Joints and joining processes, Wood working machines and processes, safety precaution.

Fitting: Introduction, Tools used in fitting, measuring and marking tools, the process of making sawing, Filing, Tapping and die, Introduction to drills.

Welding: Introduction, Various welding processes with brief introduction, Electric Arc welding, Arc welding procedure, List of equipment for electric arc welding, Gas welding process and equipment, Soldering and Brazing process.

Smithy: Introduction, Types of forging, Equipment used in the smithy shop, Smithy tools, Black smith's hearth, Hand forging operations.

Foundry: Introduction, Basic terminology, Pattern, Types of patterns, Patterns allowances, Tools for hand Moulding, Moulding sand and Moulding process, Crucible furnace, Operation of cupola, Foundry containers, Casting defects, Safety precautions.

Sheet metal working: Introduction, Types of sheets (ferrous/non-ferrous), Standard sheet sizes and their measurement, Tools used in sheet metal.

Metal cutting: Introduction, Classification of machine tools and cutting tools, Basic operations on lathe, Drilling, Shaper, Milling, Cutting tool material, Work-holding devices, Cutting parameters i.e. speed, feed and depth of cut.

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

Course Code: MECI-102	Course Title: Engineering Graphics and CADD	Core Course	L	T	P	Credit 3
			1	0	4	

Engineering Graphics and CADD

Introduction: Engineering Graphics/Technical Drawing, Introduction to drawing equipments and use of instruments, Conventions in drawing practice. Types of lines and their uses, BIS codes for lines, Technical lettering as per BIS codes, Introduction to dimensioning, Types, Concepts of scale drawing, Types of scales. **No. of Sheets: 2**

Theory of Projections: Theory of projections, Perspective, Orthographic, System of orthographic projection: in reference to quadrants, Projection of Points, Projection in different quadrants, Projection of point on auxiliary planes. Distance between two points, Illustration through simple problems. **No. of Sheets: 1**

Projection of Lines: Line Parallel to both H.P. and V.P., Parallel to one and inclined to other, Other typical cases: three view projection of straight lines, true length and angle orientation of straight line: rotation method, Trapezoidal method and auxiliary plane method, traces of line. **No. of Sheets: 2**

Projection of Planes: Projection of Planes Parallel to one and perpendicular to other, Perpendicular to one and inclined to other, Inclined to both reference planes, Plane oblique to reference planes, traces of planes. **No. of Sheets: 2**

Projection of Solids: Projection of solids in first or third quadrant, Axis parallel to one and perpendicular to other, Axis parallel to one inclined to other, Axis inclined to both the principle plane, Axis perpendicular to profile plane and parallel to both H.P. and V.P., Visible and invisible details in the projection, Use of rotation and auxiliary plane method. **No. of Sheets: 3**

Section of Solids: Definition of Sectioning and its purpose, Procedure of Sectioning, Illustration through examples, Types of sectional planes-application to few examples. **No. of Sheets: 1**

Development of Surface: Purpose of development, Parallel line, radial line and triangulation method, Development of prism, cylinder, cone and pyramid surface for both right angled and oblique solids, Development of surface. **No. of Sheets: 1**

Isometric Projection: Classification of pictorial views, Basic Principle of Isometric projection, Difference between isometric projection and drawing, Isometric projection of solids such as cube, prism, pyramid and cylinder. **No. of Sheets: 1**

Orthographic Projection: Review of principle of Orthographic Projection, Examples of simple machine parts, Drawing of Block and machine parts. **No. of Sheets: 1**

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Introduction to CADD: Interfacing and Introduction to CAD Software, Coordinate System, 2D drafting: lines, circles, arc, polygon, etc., Dimensioning, 2-D Modelling, Use of CAD Software for engineering drawing practices. **Total No. of Sheets: 14**

Books Recommended for Engineering Drawing

1. Bhatt N.D., “Engineering Drawing”, 53rd Ed., Charotar Publishing House Pvt. Ltd., Gujarat (2017).
2. Gill P.S., “Engineering Drawing”, 2013 Ed., S.K Kataria & Sons, New Delhi, 2013.
3. Frederick E. Giesecke, Shawna Lockhart, Marla Goodman, Cindy M. Johnson, “Technical Drawing with Engineering Graphics”, 15th Ed., Prentice Hall, USA, 2016.
4. M.B. Shah, B.C. Rana, “Engineering Drawing”, 3rd Ed., Pearson Education, New Delhi, 2009.
5. Kirstie Plantenberg, “Engineering Graphics Essentials-Text and Digital Learning”, 5th Ed., SDC Publications, USA (2016).

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

Course Code: MACI-101	Course Title: Applied Mathematics-I	Core Course	L	T	P	Credit 4
			3	1	0	

APPLIED MATHEMATICS – I

Formation of ordinary differential equations, solution of first order differential equations by separation of variables, homogeneous equations, exact differential equations, equations reducible to exact form by integrating factors, equations of the first order and higher degree, Clairaut's equation.

Linear differential equations with constant coefficients, Cauchy's homogenous linear equations, Legendre's linear equation, simultaneous linear equations with constant coefficients.

Fourier series of periodic functions, even and odd functions, half range expansions and Fourier series of different wave forms, complex form of Fourier series and practical harmonic analysis.

Laplace transforms of various standard functions, properties of Laplace transforms and inverse Laplace transforms, Convolution theorem, Laplace transforms of unit step function, impulse function and periodic functions, application to solution of ordinary differential equations with constant coefficient and simultaneous differential equations.

Z-transform and difference equations, elementary properties of Z-transform, Convolution theorem, formation of difference equations using Z-transform.

Fourier transforms, Fourier integral theorem, Fourier sine, cosine integral and transforms, Fourier transforms of derivatives of function, convolution theorem, Parseval's identity.

BOOKS RECOMMENDED:

1. E Kreyszig, "Advanced Engineering Mathematics", 8th Ed. John Wiley, Singapore (2001).
2. R K Jain and S R K Iyengar, "Advanced Engineering Mathematics," 2nd Ed. Narosa Publishing House, New Delhi (2003).
3. B S Grewal, "Higher Engineering Mathematics", Thirty-fifth edition, Khanna Publishers, Delhi.

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

Course Code: MACI-102	Course Title: Applied Mathematics-II	Core Course	L	T	P	Credit 4
			3	1	0	

APPLIED MATHEMATICS –II

Linear dependence of vectors and rank of matrices, linear transformations and inverse of matrices, reduction to normal form, bilinear form and quadratic form, consistency and solution of linear algebraic system of equations, eigen values, eigen vectors and their applications to system of ordinary differential equations, Cayley Hamilton Theorem, orthogonal, unitary, hermitian and similar matrices.

Differential calculus of functions of several variables, partial differentiation, homogeneous functions and Euler's theorem, Taylor's and Maclaurin's series, Taylor's theorem for functions of two variables, maxima and minima of functions of several variables, Lagrange's method of multipliers.

Double and triple integrals, change of order of integration, change of variables, applications to evaluation of area, surface area and volume.

Scalar and vector fields; differentiation of vectors, velocity and acceleration, vector differential operators Del, Gradient, Divergence and Curl and their physical interpretations, formulae involving these operators, line, surface and volume integrals, solenoidal and irrotational vectors, Green's theorem, Gauss divergence theorem, Stoke's theorem and their applications.

Formulation and classification of partial differential equations, solution of first order linear equations, standard forms of non-linear equations, Charpit's method, linear equations with constant coefficients, non-homogeneous linear equations, Monge's method for nonhomogeneous equations of second order; separation of variables method for solution of heat, wave and Laplace equation.

BOOKS RECOMMENDED:

1. E Kreyszig, "Advanced Engineering Mathematics". 8th Ed. John Willey, Singapore (2001)
2. R K Jain and S R K lyengar, "Advanced Engineering Mathematics", 2nd Ed. Narosa Publishing house, New Delhi (2003).
3. I A N Sneddon, "Elements of Partial Differential Equations" "Tata McGraw Hill, Delhi (1974).
4. B S Grewal, "Higher Engineering Mathematics", Thirty-fifth edition, Khanna Publishers, Delhi.

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

Course Code:CYCI-104	Course Title: Environmental Studies	Core Course	L	T	P	Credit 3
			3	0	0	

ENVIRONMENTAL STUDIES

Unit 1: Multidisciplinary nature of environmental studies

Definition, scope and importance, Need for public awareness. (2 lectures)

Unit 2: Natural Resources:

Renewable and non-renewable resources:

Natural resources and associated problems.

- a) Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
 - b) Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
 - c) Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
 - d) Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
 - e) Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
 - f) Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources.
 - Equitable use of resources for sustainable lifestyles. (8 lectures)

Unit 3 : Ecosystems

- Concept of an ecosystem.
 - Structure and function of an ecosystem.
 - Producers, consumers and decomposers.
 - Energy flow in the ecosystem.
 - Ecological succession.
 - Food chains, food webs and ecological pyramids.
 - Introduction, types, characteristic features, structure and function of the following ecosystem :-
 - a) Forest ecosystem
 - b) Grassland ecosystem
 - c) Desert ecosystem
 - d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)
- (6 lectures)

Unit 4: Biodiversity and its conservation

- Introduction – Definition: genetic, species and ecosystem diversity.
- Biogeographical classification of India

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- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels. • India as a mega-diversity nation
- Hot-spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

(8 lectures)

Unit 5 : Environmental Pollution

Definition

- Cause, effects and control measures of :-
 - a. Air pollution
 - b. Water pollution
 - c. Soil pollution
 - d. Marine pollution
 - e. Noise pollution
 - f. Thermal pollution
 - g. Nuclear hazards
- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster management: floods, earthquake, cyclone and landslides

(8 lectures)

Unit 6 : Social Issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case Studies
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation.
- Public awareness.

(7 lectures)

Unit 7 : Human Population and the Environment

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- Population growth, variation among nations.
- Population explosion – Family Welfare Programme.
- Environment and human health.
- Human Rights.
- Value Education.
- HIV/AIDS.
- Women and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies

(6 lectures)

Unit 8: Field work

- Visit to a local area to document environmental assets- river/forest/grassland/hill/mountain
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc.

(Field work Equal to 5 lecture hours)

Books Recommended:

1. Environmental Studies, Benny Joseph, 3rd Addition, McGraw Hill Education (India) Private Limited, 2018.
2. Environmental Studies, Deeksha Dave, S.S. Katewa, Cengage Learning India Pvt. Ltd., 2012.
3. Environmental Chemistry, 7th Addition, A.K. DE, New Age International (P) Limited, 2010.
4. Environmental Science, Anubha Kaushik, C.P. Kaushik, New Age International (P) Limited, 2011.
5. Environmental Studies, Reach Bharucha, 2004.

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

Course Code: HMCI-101	Course Title: Management, Principles & Practices	Core Course	L	T	P	Credit 3
			3	0	0	

**Department of Humanities and Management
Management, Principles and Practices**

L	T	P	C
3	0	0	3

Unit 1- Introduction of Management

[8 Lectures]

What is Management, Roles and skills of a manager, Universality of Management, Management- A Science or an Art, overview of Management functions, Management Styles- Japanese, American, and Indian, Management as a function

Unit 2- Historical Background of Management

[8 Lectures]

Scientific Management- Contribution of F W Taylor, General Administrative theory- 14 principles of Henry Fayol, Bureaucracy- Max Weber Contribution, Human Relationship Approach- Elton Mayo contribution through Hawthorne experiments, McGregor theory X and Y, Contribution of Peter Drucker

Unit 3 – Planning and Organising

[10 Lectures]

What is planning and its purpose, Planning process, types of plans, criticism of planning, Departmentalization- Purpose and Basis, Span of Control, Centralization v/s Decentralisation, traditional and contemporary Organisational Design

Unit 4- Staffing and Leading

[12 Lectures]

Importance of HRM, Human Resource planning, Recruitment- Methods, Selection process, Motivating employees- Maslow's need hierarchy theory, Herzberg two factor theory, three need theory, Vroom Expectancy theory, Leadership theories- Trait theory, Fiedler Model, Hersey and Blanchard Situational leadership, Path Goal theory, Managerial grid theory, Leadership Styles, Transformational v/s Transactional Leadership, Group v/s Team, Group Formation Stages

Unit 5- Co-ordination, Conflict and Controlling

[6 Lectures]

Authority v/s Responsibility, Co-ordination v/s Co-operation, Importance of Co-ordination, Conflict-types of Conflict, resolving conflicts, Controlling- importance, controlling process, controlling techniques

Recommended Books

1. Koontz, Hand Weilhrich H, "Essentials of Management", 10th Edition, Tata McGraw Hill
 2. Robbins, Stephen P, Coutler, Mary, "Management" 8th Edition, Pearson
 3. Prasad, L M, "Principles and Practices of Management", 6th Edition, Sultan Chand
 4. Stoner, J A F, Freeman R E, Gilbert, D R, "Management" 6th Edition, Pearson
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B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

Course Code: HMCI-102	Course Title: English Communication & Report Writing	Core Course	L	T	P	Credit 3
			3	0	0	

Department of Humanities and Management

English Communication and Report Writing

L	T	P	C
3	0	0	3

Communication:

[6 Lectures]

Meaning, Significance, Process, Verbal, Non-Verbal, Types, Formal, Informal Channels, Functions, Barriers to Communication, Miscommunication, Effective Communication Strategies, Ethical & Legal Communication, Role of Communication in Society, Technology-Enabled Communication: Tools, Positive and Negative Impact of Technology-Enabled Communication, Appropriate & Effective Technology- Based Communication.

Business Correspondence & Etiquettes:

[4 Lectures]

Elements of Business Writing, Business Letters, Memorandum, Purchase Order, Quotation and Tenders, Job Application Letters, Resume Writing, Press Release, Etiquettes, Foreign Language.

Phonetics:

[7 Lectures]

Organs of Speech , Mechanism of Sound Production, Different Kinds of Sounds, Consonant Sounds, Place of Articulation, Manner of Articulation, Vowels Sounds, Syllable Division and Word Stress – Rules of Stress, Intonation – Pitch, Tone Shapes, Rising Tone, Falling Tone.

Basic Applied Grammar and Usage:

[6 Lectures]

Transformation of Sentences, Word Used as Different Parts of Speech, One Word Substitution, Abbreviations, Technical Terms, Foreign Expressions, Sentence: Kinds of Sentences, Simple & Complex Sentences, Interrogative, Assertive, Affirmative & Negative, Phrases, Parts of Speech: Noun, Pronouns, Adjective, Determiners, Articles, Adverbs, Propositions, Verbs, Auxiliaries, Conjunctions, Interjections, Active & Passive Voice, Gender, Tenses, Synonyms & Antonyms, Spotting Error in Sentences, Passages, Homophones and Homonyms.

Reading & Writing Skills:

[6 Lectures]

Process of Reading, Reading Purposes, Characteristic of Efficient Reading, Models, Strategies, Methodologies, Reading Comprehension, Improving Comprehension Skills, Reading Activities, Elements of Effective Writing, Writing Styles, Scientific & Technical Writing, Clarity in Writing.

Listening & Speaking Skills:

[6 Lectures]

Meaning, Process & Types of Listening, Active and Passive Learning, Barriers to Listening, Effective Listening Skills, Feedback Skills, Role of Listening n an Organization. Skills of Effective Speaking and Components of Effective Talk. Discussion, Meeting and Telephone: Group Discussions, Conducting a Meeting, Telephonic Communication, Oral Presentation and Role of Audio/Visual Aids.

Report Writing:

[7 Lectures]

What is a report, Difference between a Report and other forms of Writing, Kinds and Purpose of Report, Objectives of Report, Steps in writing a Routine Business Report, Basic and Subsidiary Parts of Report,

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Elements of a long Formal Report, Abstract and Summary, Discussion of Findings and Analysis, Concept Development, Glossary, Appendix, Index, Process of Investigation, Research Defining and Narrowing Down the Problem, Statement of the Problem, Difference between Project Report and Technical Report.

Recommended Books

1. Rodrigues. M. V., "Effective Business Communication", Concept Publishing Company New Delhi, 1992 reprint (2000)
2. Sharma. R. C., Mohan. Krishna, "Business Correspondence and Report Writing- A practical approach to business and technical communication" Tata McGraw-Hill Publishing Company Limited, New Delhi.
3. Bhattacharya. Indrajit., "An Approach to Communication Skills", Dhanpat Rai & Co., (Pvt.) Ltd. New Delhi.
4. Wright. Chrissie, "Handbook of Practical Communication Skills", Jaico Publishing House. Mumbai.
5. Gartside. L., "Modern Business Correspondence", Pitman Publishing London.
6. Gimson. A.C., "An Introduction to the Pronunciation of English", ELBS. (YP)
7. Bansal. R. K. & Harrison. J.B., "Spoken English", Orient Longman Hyderabad.
8. Eckersley. C. E., "A Comprehensive English Grammar" Orient Longman Hyderabad.
9. Carter. Ronald and McCarthy. Michael., "Cambridge Grammar of English". Cambridge University Press, Cambridge.
10. Chaturvedi. P. D. & Chaturvedi. Mukesh., "Business Communication- Concepts, cases & applications, Pearson Publications.
11. Swan. Michael., Practical English Usage. Oxford University Press.

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

Course Code: HMCI-103	Course Title: English Communication Laboratory	Core Course	L	T	P	Credit 1
			0	0	2	

Department of Humanities and Management

English Communication Laboratory

Business Letters:

Structure of Business Letters, Language in Business Letters, Letters of Enquiry & Their Places, Sales Letters, Memorandum, Quotations, Tenders, Bank Correspondence, Applications and Appointment Letters,

Resume, Bio data, Curriculum Vitae.

[6 lectures]

Comprehension and Precis Writing:

Role of Listening, Ear Training, Reading and Comprehension: Reasons for Poor Comprehension. Improving Comprehension Skills, Developing Skills of Comprehension. Difference Between Precis Writing and Comprehension, Techniques of Precis Writing, Topic Sentences and its Arrangement.

[4 lectures]

Essay Writing:

Definition of Essay, Types of Essay, Essay writing for Engineers/Professionals, Use of Essay Writing, Dimensions of Essay Writing: Literary, Scientific, Sociological, Contemporary, Problem Solving Essays, Horizons of Essay Writing: Narrative Essays, Descriptive Essays, Reflective Essays, Expository Essays, Argumentative and Imaginative Essays.

[4 lectures]

Introduction to Phonetics:

Organs of Speech, Mechanism of Sound Production, Different Kinds of Sounds, Consonant Sounds, Place of Articulation, Manner of Articulation, Vowels Sounds, Syllable Division and Word Stress- Rules of Stress, Intonation- Pitch, Tone Shapes, Rising Tone, Falling Tone.

[6 lectures]

Role Play and Giving Direction:

Voice Characteristics, Pitch and Modulation, Pace and Non-Verbal Communication, Personality and Attitude. Ways of Giving Direction- Written and Oral, Listening Skills, Describing Objects, Situations and People- Important features, Describing a Process, Person, Object, Vocabulary.

[6 lectures]

Oral Presentations: Presentation Skills, Attention Gaining Devices, Barriers to Effective Presentation

[6 lectures]

Telephonic Skills: Rules for Calling and Receiving a Call, Skills for Telephone Interview, Basic Telephone Etiquette.

[2 lectures]

Group Discussion and Debate: Features of a Debate, Analytical Skills, Types of Debates, Non-verbal Communication.

[8 lectures]

Project work/ Term Paper: Students will be required to Produce and Submit a Project Work/Term Paper on a Topic by the End of the Semester. The Topic should Involve Data Collection, Analysis, and Reporting.

Suggested Readings:

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

1. Rodriques. M. V., "Effective Business Communication", Concept Publishing Company New Delhi, 1992 reprint (2000)
2. Sharma. R. C., Mohan. Krishna, "Business Correspondence and Report Writing- A practical approach to business and technical communication" Tata McGraw-Hill Publishing Company Limited, New Delhi.
3. Bhattacharya. Indrajit., "An Approach to Communication Skills", Dhanpat Rai & Co., (Pvt.) Ltd. New Delhi.
4. Wright. Chrissie, "Handbook of Practical Communication Skills", Jaico Publishing House. Mumbai.
5. Gartside. L., "Modern Business Correspondence", Pitman Publishing London.
6. Gimson. A.C., "An Introduction to the Pronunciation of English", ELBS. (YP)
7. Bansal. R. K. & Harrison. J.B., "Spoken English", Orient Longman Hyderabad.
8. Eckersley. C. E., "A Comprehensive English Grammar" Orient Longman Hyderabad.
9. Carter. Ronald and McCarthy. Michael., "Cambridge Grammar of English". Cambridge University Press, Cambridge.
10. Chaturvedi. P. D. & Chaturvedi. Mukesh., "Business Communication- Concepts, cases & applications, Pearson Publications.
11. Swan. Michael., Practical English Usage. Oxford University Press.

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

List of Basic Engineering Courses

- Basic Electronics
- Basic Electrical Science
- Elements of Mechanical Engineering
- Elements of Civil Engineering
- Data Structures

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

Course Code: CSCI-103	Course Title: Data Structures	Basic Engineering Course	L	T	P	Credit 4
			3	1	0	

COURSE TITLE: DATA STRUCTURES

CONTACT HOURS/CREDIT SCHEME: (L-T-P-C: 3-1-0-4)

COURSE ASSESSMENT METHODS: Two sessional exams and one end-semester exam, along with assignments, presentations and class tests, which may be conducted by the course coordinator in lieu of internal assessment.

COURSE OUTCOMES:

Upon completion of the course, the students will be able to

CO1: Understand the concepts of data structure, data type and array data structure.

CO2: Implement linked list data structure to solve various problems.

CO3: Understand and apply various data structure such as stacks, queues, tree, and graph.

CO4: Implementation of data structure namely stacks, queues, tree, and graph using C programming language.

Course Outcomes	Program outcomes											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
CSX-XXX												
CO 1.	M	L	H	L								
CO 2.		H	M	M	L		M	M				
CO 3.		M	M									
CO 4.		M	H	L	L							

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

TOPICS COVERED:

Introduction

Basic Terminology, Elementary Data Organization, Structure operations, Algorithm Complexity and Time-Space trade-off

Arrays

Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C++, Character string operation, Array as Parameters, Ordered List, Sparse Matrices and Vectors.

Stacks

Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Applications of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack.

Recursion

Recursive definition and processes, recursion in C, example of recursion, Tower of Hanoi Problem, simulating recursion, Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.

Queues

Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, D-queues and Priority Queues.

Linked list

Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

Trees

Binary Trees, Binary tree representation and traversals, Binary Search tree, Application of tree, AVL tree

Graph

Graph and its representations, Graph Traversals, Connected components in graph, Applications of graph.

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TEXT BOOKS, AND/OR REFERENCE MATERIAL:

1. Horowitz and Sahani, “Fundamentals of data Structures”, 2nd Edition, Galgotia Publication Pvt. Ltd., New Delhi.
2. R. Kruse et al, “Data Structures and Program Design in C”, 2nd Edition, Pearson Education Asia, Delhi-2002
3. A. M. Tenenbaum, “Data Structures using C & C++”, 1st Edition, Prentice-Hall of India Pvt. Ltd., 209, New Delhi.
4. Bruno R Preiss, “Data Structures and Algorithms with Object Oriented Design Pattern in C++”, 1st Edition, Jhon Wiley & Sons, Inc, 2005.

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Course Code: ECCI-101	Course Title: Basic Electronics	Basic Engineering Course	L	T	P	Credit 4
			3	1	0	

The Department of Electronics & Communication Engineering is offering Basic Electronics Course with 3 hrs lecture and 1 hr tutorial/practical sessions per week for the first year students. The detailed contents to be covered in theory and the list of lab experiments follows.

Basic Electronics

[3 1 0 4]

Course Contents

Electronic Instruments: Role and importance of general-purpose test instruments, Cathode Ray Oscilloscope (CRO): Block diagram and working of CRO, Cathode Ray Tube (CRT), Amplitude, frequency and phase measurements using CRO. (2)

Semiconductor Diodes and Applications: Review of PN Junction Diode, Diode Equivalent Circuits, V-I Characteristics, Ideal diode, Zener Diode, Light-Emitting Diode (LED), Varactor Diode, Power Diode, Tunnel Diode, Photodiode. Regulated Power Supply: Block diagram of power supply, Halfwave, Fullwave and Bridge rectifiers, Passive filters, Regulators, Line regulator and load regulators, Zener Diode as voltage regulator, concept of switched mode power supply (SMPS). (10)

Bipolar Junction Transistor: Physical structure and modes of operation, transistor configurations, Load line analysis, Transistor as a switch and as an amplifier, frequency response and bandwidth. Transistor Biasing, Introduction to MOSFET. (10)

Feedback and Oscillators: Concept of feedback, positive and negative feedback, advantages of negative feedback, Basic principles of sinusoidal oscillators, Oscillation criteria, LC and RC oscillators. (5)

Operational Amplifiers: Ideal Op-amp, Equivalent model, Open and close Inverting, non-inverting and differential configurations, Applications of op-amp as summing amplifier, differentiator and integrator. (4)

Digital Electronics: Number system and logic gates, NAND and NOR as universal gates, combinational Circuits: Half adder, Full adder, MUX, DEMUX, Encoder, Decoder, Sequential circuits: SR and JK flip-flops, idea about ROM, RAM, and EPROM, Introduction of Microprocessor and Microcontroller and their Evolution. Open Source Hardware Platforms (Arduino, Raspberry Pi), Introduction to IoT. (9)

List of Laboratory Experiments

- To get familiar with the working of the following instruments:
 - Cathode ray oscilloscope (CRO)
 - Multimeter (Analog and Digital)
 - Function generator
 - Power supply

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2.
 - a) Plot the forward and reverse V-I characteristics of P-N junction diode
 - c) Study of Zener diode in breakdown region
3. To assemble and test 5V/9V DC regulated power supply
4. To assemble RC Phase shift oscillator circuit and calculation of oscillation-frequency and its verification from the observed output
5. To get familiar with pin-configuration of typical Op-amp (741) and its use as:
 - a) Summing amplifier
 - b) Difference amplifier
 - c) Integrator
 - d) Differentiator
6. Verification of truth tables of logic gates -OR, AND, NOT, NAND, NOR and Ex-OR
7. Verification of truth tables of flip-flops (S-R, J-K, D and T)

Course Outcomes

After studying this course, the students will have:

- CO1: Familiarization with different measuring instruments for study of various electrical parameters
- CO2: Understanding of basic fundamental concepts as well as practical behaviour of basic semiconductor diode and its applications
- CO3: Knowledge of transistors and its applications for amplifiers and oscillators
- CO4: Understanding of basics of digital logic circuits and Microprocessors

Books Recommended

1. Bhargava, N. N., and NN Bhargava SC Gupta DC Kulshreshtha, “*Basic Electronics and Linear Circuits*” Tata McGraw-Hill Education, (1984).
2. Boylestad and Nashelsky, “*Electronic Devices and Circuit Theory*”, 11th edition, Pearson Education India, New Delhi, 2013.
3. Mottershed A, “*Electronic devices and circuits: An introduction,*” 1st edition, PHI Learning, (1973).
4. Mano M Morris, “*Digital Design*”, 4th edition, Pearson Education, 2011.
5. Ramesh S Gaonkar, “*Microprocessor Architecture- Programming & Applications with 8085/8080A*”, 5th edition, Penram International Publishing (India) Pvt. Ltd, (2000).
6. [Ramakant A. Gayakwad](#), “*Op-Amps and Linear Integrated Circuits*” 3rd edition, Prentice-Hall, (1993).

B Tech FIRST YEAR Revised Teaching Scheme and Curriculum from 2018 onwards

Course Code: CECI-101	Course Title: Elements of Civil Engineering	Basic Engineering Course	L	T	P	Credit 4
			3	1	0	

Elements of Civil Engineering

Course Objectives

- To inculcate the essentials of Civil Engineering field to the students of all branches of Engineering.
- To provide the students an illustration of the significance of the Civil Engineering Profession in satisfying societal needs.

Section – I

Introduction to Civil Engineering: Basic Areas in Civil Engineering – Surveying, Construction Engineering, Fluid Mechanics, Transportation Engineering, Irrigation Engineering, Project Management, Structural Engineering, Geotechnical and Foundation Engineering, Environmental Engineering, Quantity Surveying, Town Planning, Earthquake Engineering, Infrastructure Development,

Role of Civil Engineer in the construction of buildings, dams, expressways, and infrastructure projects for 21st century. Importance of an interdisciplinary approach in engineering.

Materials and Construction: Basic materials for construction – cement, bricks, stone, natural and artificial sand, Reinforcing Steel – Mild, Tor, and High Tensile Steel. Concrete Types - PCC, RCC (pre-stressed and pre-cast). Recycling of materials.

Substructure – Definition and functions of foundations (only concepts of settlement and bearing capacity of soils). Types of shallow foundations. Deep foundation (only concept of friction and end bearing pile).

Superstructure – Types of loads: - Dead Load, Live Load, Wind Loads, Earthquake considerations. Types of Construction – Load bearing, Framed, Composite, Fundamental requirements of masonry.

Introduction to automation in construction:- Concept, Need, examples related to different civil engineering projects.

Use of maps and field surveys: Principles of survey, Introduction to scale, types of maps and their uses. Modern survey methods using levels, Theodolite, EDM, Lasers, Total Station and GPS. Measuring areas from maps using digital planimeter.

Simple and differential levelling for setting out various benchmarks, determining the elevations of different points and preparation of contour maps. Introduction to GIS software and its application areas.

Section – II

Ecology and Ecosystem: Concept of Environment – biotic and abiotic factors, Impact of the human behavior and the technological advancements on the environment. Need for conserving natural resources and preserving the environment. Engineer's role in achieving sustainable development, Environment Impact Assessment (only concept).

Introduction to solid waste management, electronic wastes and its disposal.

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Planning for the Built Environment: Concept of an integrated built environment-natural and manmade. Principles of planning. viz. Aspect, Prospect, Roominess, Grouping, Privacy, Circulation, Sanitation, Orientation, Economy.

Use of various eco-friendly materials in construction. Concept of green buildings.

Role of by-laws in regulating the environment, Concept of built up area, carpet area, plinth area. Plot area, FSI.

Energy and Environmental Pollution: Types of energy – conventional and non-conventional. Need for harnessing alternative energies to meet the increased demand. Methods of harnessing energies.

Sources, causes, effects and remedial measures associated with Air Pollution, Water pollution, Noise Pollution, Land Pollution.

Term Work: Any 8 Practical Exercises from those given below should be carried out, record to be submitted in the field book and file ,which will form a part of term work.

1. Study of any 4 types of maps and writing their uses.
2. Exercise on use of dumpy level and laser level.
3. Measurement of area of irregular figures by digital planimeter.
4. Drawing of plan elevation & section for a residential building, single storied framed/load bearing structure.
5. Determination of coordinates of a traverse using Global Positioning system
6. Measurement of distance by EDM and comparing it with the distance measured using tape
7. Visit to a construction site for studying the various construction materials used, type of structure, type of foundation and components of superstructure - submission of visit report
8. Demonstration of use of any 4 Civil Engineering software
9. Making a poster (A1 size) in a group of 4 students. related to Energy/Environment
10. Presentation in a group of 4 students, any case study related to Energy/Environment

Expected outcome

- The students will be able to illustrate the fundamental aspects of Civil Engineering.
- They will able to illustrate the uses of various building materials and explain the method of construction of different components of a building.
- Students will have knowledge regarding the significance of civil engineering in important infrastructure projects and sustainability of the society.

Text and Reference Books:

- 1) Surveying and Levelling by Kanitkar, Kulkarni - Vidyarthi Prakashan
- 2) Build Planning and Built Environment by Shah ,Kale, Patki- Tata McGraw Hill
- 3) Civil Engg. Materials by Dr . S. V. Deodhar - Khanna Publications
- 4) Environmental Engineering by Donald R. Rowe, George Tchobanoglous, and Howard S. Peavy - McGraw Hill India
- 5) Basic Civil Engineering by M.S. Palanichamy - Tata McGraw Hill
- 6) Basic Civil Engineering by Shatheesh Gopi - Pearson
- 7) Elements of Civil Engineering and Engineering Mechanics by R. V. Raikar – PHI Learning Pvt. Ltd.

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Course Code: ICCI-101	Course Title: Basic Electrical Science	Basic Engineering Course	L	T	P	Credit 4
			3	1	0	

B Tech (1ST and 2ND SEMESTER)

Basic Electrical Science

[3 1 0 4]

Network Laws and Theorems: Network Laws for D.C. networks- Kirchhoff's laws, Node voltage and mesh current methods, Delta-Star and Star-Delta conversion, Classification of network elements, Principle of Superposition, Thevenin's and Norton's Theorems, Maximum Power Transfer Theorem.

Single Phase A.C. Circuits: Single-phase EMF generation, Effective and Average values of sinusoids and determination of form factor, Phasor diagram, Symbolic notation, phasor in polar, rectangular and exponential form. Resistive, Inductive and Capacitive circuits, A.C. series and parallel circuits. Analysis of simple RLC-series circuits, Solution of parallel circuits - resonance, Q factor.

Three Phase A.C. Circuits: Three -phase EMF generation, Delta and star connection, Line and phase quantities and relations, Solution of 3-phase circuits – balanced voltage and balanced load, Phasor diagrams, Measurement of power in three-phase circuits.

Magnetic Circuits and Transformers: Analogy between electric and magnetic circuits, Magnetic Circuits, B-H Curve, Hysteresis Loop, Solutions of simple problems, Inductances in series and parallel, Hysteresis and Eddy current losses, Transformers- constructional details, EMF equation, rating and phasor diagrams on no-load and full-load, Equivalent circuits, Regulation and efficiency, Open-circuit and short-circuit tests.

Electrical Machines: Basic principles of EMF generation, three phase Induction motors and their applications.

Electrical Instruments: Basic principles of Moving iron, PMMC, dynamometer and Induction type instruments, torque equation, Dynamometer type Wattmeter, Induction type energy meter.

Recommended Books:

1. Hughes E, Smith IM, Hiley J and Brown K, "Hughes Electrical & Electronic Technology", 8/e, Pearson Education India
2. Del Toro, "Electrical Engineering Fundamentals", 2/e, Prentice Hall of India Pvt. Ltd.

Reference Books:

3. Kothari DP and Nagrath IJ, "Basic Electrical Engineering", Tata McGraw Hill
4. Nagsarkar TK and Suhija MS, "Basic Electrical Engineering", Oxford Univ. Press
5. Bell DA, "Electrical Circuit" 6th Edition, Prentice Hall of India Pvt. Ltd.

Course Outcome:

After completion of this course, the students will learn:

- simple electrical networks (both ac and dc) using network laws and theorems and is expected to solve and analyze various simple electrical networks using them.
- basic concepts of ac circuits and is expected to solve simple single phase and three phase ac circuits.
- basic concepts of magnetic circuits and transformers and is expected to solve simple numerical problems based on them.
- the principle and working of basic electrical measuring instruments and machines.

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Course Code: MECI-101	Course Title: Elements of Mechanical Engineering	Basic Engineering Course	L	T	P	Credit 4
			3	1	0	

Pre-requisites: None

Course Assessment Method: Both continuous and semester end examination.

Topics to be covered: All.

Course Outcomes: At the end of the course the student will be able to:

CO 1	Emphasis laid upon the principles and fundamentals involved in the interconversion of thermal energy into mechanical energy and vice versa.
CO 2	The subject also offers a birds eye-view to all students about the common engineering materials finding wide application in Mech. Engg. Industry and about their strength and other related vital aspects.
CO 3	Understand the basic concepts of fundamental of fluid mechanics and thermodynamics.
CO 4	To understand basic principle of engineering mechanics to design and analyze various types of structural elements.

Detailed Syllabus

Part-I: Solid Mechanics

Introduction: System of forces, coplanar concurrent force system, composition and resolution of force, equilibrium of rigid bodies, free body diagram, Lami's theorem.

Analysis of framed structure: Reaction in beam with different end conditions, determination of reactions in members of trusses: a) Analytical methods b) Graphical method

Centre of gravity and moment of inertia: Concept of C.G and centroid, position of centroid, theorem of parallel and perpendicular axes, moment of inertia of simple geometrical figures.

Stress and strain: Concept of stress and strain, simple stresses, tensile, compressive, shear, bending and torsion, stress- strain curves, elongation of bars, composite bars, thermal stresses, elastic constants.

Part- II Basis of Thermal and Fluid Science

Thermal Science: Introduction and scope of thermodynamics, thermodynamics properties, forms of energy, thermodynamic systems and control volume, steady flow systems, types of work, thermodynamic processes, laws of thermodynamics, Carnot theorem, concept of entropy.

Fluid and their properties: Ideal and real fluids, capillarity, Vapour pressure, compressibility and bulk modulus, Newtonian and non Newtonian fluids.

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Fluid Statics: Concept of pressure, Pascal's law and its engineering applications, action of fluid pressure on a plane (horizontal, vertical and inclined) submerged surface, resultant force and centre of pressure, Buoyancy and flotation, stability of floating and submerged bodies, Metacentric height.

Fluid Kinematics: Classification of fluid flows, velocity and acceleration of fluid particle, normal and tangential acceleration, streamline, path line and streak line, flow rate and discharge mean velocity, continuity equation, Euler's equation, Bernoulli's equation and its applications and steady flow energy equation.

Books Recommended

1. Engg. Thermodynamics by P.K Nag, Tata McGraw- Hill education, 01- April- 2005.
2. Thermodynamics: An Engg. Approach by Yunus A. Cengel, Michael Boles, Tata McGraw- Hill Education, 2006.
3. Fluid Mechanics: Fundamentals and Applications- by Yunus A. Cengel, John M Cimbala, Tata McGraw- Hill Series in Mechanical Engg.