



JECRCTM
UNIVERSITY

BUILD YOUR WORLD

FACULTY OF ENGINEERING

BOARD OF STUDY : B. TECH. FIRST YEAR (SEMESTER I & II)
(COMMON TO ALL COURSES)

School of Engineering
B. Tech. (common to all disciplines) I Year
Course Structure for 2019-2020 Batch

Semester I/II

Subject Code	Subject	Contact Hours L-T-P	Credits	
BMC120D	English	2-0-0	4	F
BMC121B	Communication Technique Lab	0-0-2		
BAS001C	Engineering Mathematics-I *	3-1-0	4	F
BAS010C	Applied Physics	3-1-0	4	F
BES001B	Basic Electronics Engineering	3-0-0	3	F
BES020A	Computer Programming-I*	3-0-0	3	F
BAS012A	Applied Physics Lab	0-0-2	2	F
BES002A	Engineering Graphics	0-0-2	2	F
BES012A	Computer Programming-1 Lab*	0-0-2	2	F
BES004A	Basic Electronics Engineering Lab	0-0-2	2	F
	BMC061A -Environmental Sciences/ BMC161A -Indian Constitution		NC	
	TOTAL	14-2-10	26	

* In semester I common to all sections

NC- Non Credit Course, It is mandatory to clear for completion of degree.

Semester I/II

Subject Code	Subject	Contact Hours L-T-P	Credits	
BAS002C	Engineering Mathematics-II **	3-1-0	4	F
BAS011C	Engineering Chemistry	3-1-0	4	F
BES005C	Basic Electrical Engineering	3-0-0	3	F
BES013B	Computer Programming II**	3-0-0	3	F
BES007A	Engineering Mechanics	2-1-0	3	F
BES003A	Engineering Workshop	0-0-2	2	F
BES008C	Basic Electrical Engineering Lab	0-0-2	2	F
BAS015A	Chemistry Lab	0-0-2	2	F
BES014A	Computer Programming II Lab**	0-0-2	2	F
BES010A	Engineering Mechanics Lab	0-0-2	2	F
	BMC061A -Environmental Sciences BMC161A -Indian Constitution		NC	
	TOTAL	14-3-10	27	

** In semester II common to all sections

NC- Non Credit Course, It is mandatory to clear for completion of degree.

B. Tech. (common to all disciplines)-I/II Semester**Contact Hours (L-T-P): 2-0-2**

BMC120D	English	2-0-0 2
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Objectives

1. To enhance Professional competence in reading, writing, listening and speaking.
2. Switch the approach from providing information about the language to use the language.
3. Minimize the Grammar Translation Method of ELT while trying to replace it with Direct Method.
4. Introduce Communicative Method of ELT and focusing the teaching pedagogy on the student-centred learning rather than on the teacher-centred learning.
5. Ability to master three major forms of communications which are vital in academic and professional settings namely professional presentations, interviews and group communications respectively.
6. Providing a deep insight into the techniques for delivering effective presentations, winning job interviews, and actively participating in various forms of group communication.

UNIT 1	Basic Writing Skills: Tenses, Voice, Narration,
UNIT 2	Vocabulary Building: Word Formation, Affixes, Synonyms, Antonyms, One Word Substitution
UNIT 3	Composition: Composing a CV/Resume, Letter Writing, Email Writing, Précis Writing
UNIT 4	Communication Skills: What is Communication, Process, features of communication, Types, Flows of Communication and Barriers to communication.
UNIT 5	Prose and Poetry: The Gift of Magi (O' Henry), How Much Land Does a Man Need (Leo Tolstoy), Where the Mind is Without Fear (Rabindra Nath Tagore), If (Rudyard Kipling)

Course Outcomes (CO):**At the end of this course students will have:**

CO1: Ability to design a language component or process to meet desired need within realistic, Constraints such as economic, environmental, social, political, ethical, scenario

CO2: Ability to analyze the usage of English words in different contexts.

CO3: An understanding of technical and academic articles' comprehension.

CO4: The ability to present oneself at multinational levels knowing the type of different standards of English

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome							Program Specific Outcome		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1			H		L				L	
CO2			L		M				H	
CO3		M								M
CO4					H			H		

H = Highly Related; M = Medium L = Low

Suggested Readings:

- A. Practical English Usage. Michael Swan. OUP. 1995
- B. Remedial English Grammar. F.T. Wood. Macmillan. 2007
- C. On Writing Well. William Zinsser. Harper Resource Book. 2001
- D. Study Writing. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
- E. Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
- F. Exercises in Spoken English. Parts. I-III, Hyderabad. Oxford University Press.

Communication Techniques Lab

BMC121B	Communication Technique Lab	0-0-2 2
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- Listening Comprehension
- Phonetic Symbols and Transcription
- Stress Patterns, Intonation and Pronunciation
- Job Interviews
- Group Discussion
- Formal Presentation

B. Tech. (common to all disciplines)-I/II Semester
Contact Hours (L-T-P): 3-1-4

BAS001C	Engineering Mathematics-I	3: 1: 0	4
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OBJECTIVE:

The objectives of this course are to make the students:

- To increase the student's appreciation of the basic role played by mathematics in modern technology.
- Incorporate the knowledge of advanced mathematics to support their concurrent and subsequent engineering studies.
- To develop the concepts and tools that will serve as building blocks towards tackling more advanced level of mathematics that they are likely to find useful in their profession when employed in the firm/industry/corporation in public or private sector

UNIT 1	Asymptotes (Cartesian coordinates only), curvature, convexity, concavity, point of inflexion and curve tracing.
UNIT 2	Limit, continuity and partial derivatives, Euler's theorem on homogenous functions, total derivative, approximate calculations; Maxima and minima of two and more independent variables; Method of Lagrange multipliers.
UNIT 3	Beta and Gamma functions and their properties. Surface and volumes of solids of revolutions. Double integrals, change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes.
UNIT 4	Vectors covering, laws of vector algebra, operations- dot, cross, triple products; Vector function- limits, continuity and derivatives, geometric interpretation; Gradient, divergence and cur- formulae.
UNIT 5	Line integrals, simple connected regions, Line integrals, surface integrals, volume integral, Green's theorem, Stokes theorem and Gauss theorem.

Text Books:

1. B.V.Ramana, Higher Engineering Mathematics, Tata McGraw Hill, 2011.

Reference Books:

1. Erwin Kreyszig , Advanced Engineering Mathematics, Wiley 9th Edition, 2008
2. Maurice D. Weir and Joel Hass, Thomas Calculus, Pearson, 11th Edition, 2005.
3. Higher Engineering Mathematics- B. S. Grewal, Khanna Publications.

Course Outcomes

Upon successful completion of this course, the student will be able to:

- CO1 Understand the concepts of Asymptotes, curvature and curve tracing.
- CO2 Understand the functions of more than one independent variable and calculate partial derivatives along with their applications .Also obtain an idea for finding the extreme values of functions of more the one variable.
- CO3 Will able to integrate a continuous function of two or three variables over a bounded region and able to trace the curves.
- CO4 Understand the representation of vector and its properties.
- CO5 Understand line integral, surface integrals, volume integral, Green's theorem, Stokes theorem and Gauss theorem

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome												Program Specific Outcome		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	H	H			M		M					M	H	L	
CO2		M		L	M		H				L	M	M		
CO3	H	H		M	M		H			L		M	M	M	
CO4	H	M		M	L		M					M		M	
CO5	H	H			M		H					M	H	M	

H = Highly Related; M = Medium L = Low

B. Tech. (common to all disciplines)-I/II Semester**Contact Hours (L-T-P): 3-1-2**

BAS 010C	Applied Physics	3:1:0	4
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OBJECTIVE:

The Objectives of Applied Physics are:

1. An ability to apply profound understanding of Quantum Mechanics and its applications.
2. An understanding of free electron gas model
3. An ability to design a Laser system and its component, or process to meet desired needs within realistic constraints such as health and safety, manufacturability
4. The broad education necessary to understand special theory of relativity.
5. A knowledge of upcoming technologies like photonics

UNIT 1	Quantum Mechanics: Compton Effect and quantum nature of light. Compton Profile: Applications in material Science. Schrödinger's Equation: Time dependent and time independent cases. Physical interpretation of wave function and its properties, boundary conditions. Particle in one-dimensional box. Applications of Quantum Mechanics: Schrödinger's Equation and its Solution for Particle in three-dimensional boxes. Degeneracy. Barrier penetration and tunnel effect. Tunnelling probability. Overview of Alpha Decay, Scanning and Tunnelling Microscopes.
UNIT 2	Sommerfeld's Free Electron Gas Model and its Applications: Density of energy states, Fermi energy levels. Determination of Specific Heats of solids. Band Theory of solids: Understanding Semiconductors. Band Gap in solids. Conductivity and Mobility due to electrons and Holes. Solar Cells.
UNIT 3	Quantum Optics: Coherence: Spatial and temporal coherence, Coherence length, Coherence time. Q- factor for LASER. Visibility as a Measure of Coherence. Spatial Coherence and Size of the Source. Temporal Coherence and Spectral Purity. LASER: Theory of LASER action: Einstein's coefficients, Threshold conditions for LASER Action. Method and Mechanism of production of He-Ne LASER. Semiconductor LASER. Elementary ideas of Q-switching and Mode Locking.
UNIT 4	Special Theory of Relativity (STR): Idea of Relativity and Frames of References. Postulates of STR. Lorentz transformations. Relativity of length and time. Relativity and GPS. Velocity transformations. Variation in mass with speed. Mass-Energy equivalence principle. Relativistic Energy and momentum. Sagnac's formula and Optical gyroscope.
UNIT 5	Applications of Optical Technologies: Determination of thickness of thin films using interference technique. Elementary idea of anti-reflection coating. Optical filters. Applications of Diffraction: Bragg's law of X-Ray Diffraction. Polaroids and their industrial applications. Holography: Holography versus photography. Basic theory of Holography. Applications of Holography in Microscopy and Interferometry.

	<p>Optical Communication: Optical fiber as optical wave-guide. Numerical Aperture and Maximum Angle of Acceptance.</p> <p>Overview of Upcoming Technologies * Photonics * Spintronics * Quantum Computers * Nanotechnology and Nano-materials. Carbon Nano-tubes (CNTs).</p>
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Course Outcomes

Upon successful completion of this course, the student will be able to:

CO-1 Students would be able to describe the Quantum Mechanics and its applications.

CO-2 Students would be able to write down the band theory of Solids.

CO-3 to enable student to learn and to apply concepts learnt in Quantum optics in Industry and in real life.

CO-4 to enable students to learn the idea of **Global Positioning System (GPS)** and to explore its further applications and importance in advancement of technologies

CO-5 To identify the applications of electrodynamics using Maxwell equations

Suggested Books

1. Arthur Beiser, **Perspectives in Modern Physics**, McGraw Hill International.
2. H. S. Mani and G. K. Mehta, **Modern Physics**, East-West Press.
3. A. K. Ghatak, **Optics**, TATA McGraw Hill.
- 4 D. K. Bhattacharya and A. Bhaskaran: **Engineering Physics**, Oxford University Press.
5. A. K. Ghatak and Thyagrajan, **Fiber Optics**, Oxford University Press.
6. S. O. Pillai, **Solid State Physics**, Wiley Eastern

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome												Program Specific Outcome		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1			H		L		H		L					L	
CO2			L		M		L		M	H		L		H	
CO3		M								L		M			M
CO4					H								H		
CO5			H				M						H		

H = Highly Related; M = Medium L = Low

B. Tech. (common to all disciplines)-I/II Semester**Contact Hours (L-T-P): 3-0-2**

BES001B	Basic Electronics Engineering	3-0-0	3
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Objective

- To understand basic concepts required in understanding electronic circuits
- To understand the concept of Semiconductor Diode and their applications.
- To understand the concept of Opto-Electronic Devices.
- To understand the concept of BJT and their configurations. As well as the concept of Field Effect Transistor with their various configuration.
- The student will be able to understand fundamental circuit analysis techniques and basic electronics backgrounds, including PN Diode, BJT and MOSFET.
- The student will be able to understand the concept of Various Binary Number Systems and conversions.
- To understand Logic Gates and Logic Circuit focussing on basic and universal gates.

UNIT 1	Comparison of Insulator, conductor and semiconductor with energy band diagrams. Semiconductor materials-Intrinsic and Extrinsic semiconductor (P-type and N-type SC), Crystal structures of p-type and Ntype materials, resistivity, conductivity, mobility.
UNIT 2	Semiconductor Diode, PN diode-construction, working and V-I plot, Diode as a Rectifier, Half Wave and Full Wave Rectifiers with and without Filters with calculation of ripple factor and efficiency, Breakdown Mechanisms, Zener Diode – construction, Operation, characteristics; Opto-Electronic Devices – LEDs, Photo Diode, SCR.
UNIT 3	Bipolar Junction Transistor (BJT) – Construction, Operation, Amplifying Action, Common Base, Common Emitter and Common Collector Configurations-(construction, Properties, Input and output graphs), Operating Point, Biasing configurations: Fixed Bias, Emitter bias and Voltage Divider Bias Configuration;
UNIT 4	Field Effect Transistor (FET) – Construction, Characteristics of Junction FET, Depletion and Enhancement type Metal Oxide Semiconductor (MOS) FETs (Construction, Input characteristics and transfer characteristics).
UNIT 5	Number Systems: Binary system, Hexadecimal System, Octal system, Decimal system, Code conversions, Basic Logic Gates(AND, OR , NOT), Universal Gates(NAND and NOR) and other gates(EX-OR,EX-NOR),Truth Tables, Boolean Algebra, De Morgan’s Theorems, Realization of other gates using NAND and NOR.

Course Outcome (CO):

At the end of this course students will have:

CO1-Ability to understand the physical properties of different types of semiconductors used in fabricating devices.

CO2- Ability to understand the functioning of PN junction diode and explains its main application as rectifiers and opto-electronic devices.

CO3-Ability to understand the surprising action of BJT and explains its working and biasing in three configurations

CO4-Ability to understand the working of JFET and MOSFET.

CO5-Ability to understand the concept of Various Binary Number Systems and Codes, Logic Gates and Logic Circuit.

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome												Program Specific Outcome		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	M	H								M				L	
CO2	M	H						H					L	H	L
CO3			H	M	L				L						M
CO4				H	H						L		H		
CO5						H	H					H			M

H = Highly Related; M = Medium L = Low

Text Books:

R. L. Boylestad & Louis Nashlesky (2007), Electronic Devices & Circuit Theory, Pearson Education

Reference Books

Santiram Kal (2002), Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India

David A. Bell (2008), Electronic Devices and Circuits, Oxford University Press

Thomas L. Floyd and R. P. Jain (2009), Digital Fundamentals, Pearson Education

R. S. Sedha (2010), A Text Book of Electronic Devices and Circuits, S.Chand & Co.

R. T. Paynter (2009), Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education

B. Tech. (common to all disciplines)-I/II Semester

Contact Hours (L-T-P): 3-0-0

BES020A	Computer Programming-I	3: 0: 0	3
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Objectives

1. To introduce the parts of the computer system and number system.
2. To describe the concepts of Boolean function and languages.
3. To explain the approach of problem solving and design an algorithmic solution for a given problem with introduction of C language.
4. To prepare the students for write a maintainable C program for a given algorithm using control statements.
5. To prepare C program for simple applications of real life using functions.

UNIT 1	Computer Fundamentals: Flow chart, pseudo code. Binary, octal and hexadecimal number system.
UNIT 2	ASCII, EBCDIC and UNICODE. Boolean operations, primary and secondary memory. Difference among low-level & high-level languages.
UNIT 3	C Programming: Structure of a 'C' program, Data types, enumerated, assignment statements, input output statements,
UNIT 4	If statement, for loops, while loops, do-while loops, switch statement, break statement, continue statement. Data type conversion.
UNIT 5	Functions & program structure (function call and return), scope of variables, parameter passing methods, recursion v/s iteration.

Outcomes:

Upon completion of the subject, students will be able to:

- CO1. Identify the parts of the computer system and functioning of various computer components.
- CO2. Adequately describe the concepts of Boolean function and languages.
- CO3. Explain approach of problem solving and design an algorithmic solution for a given problem with introduction of C language.
- CO4. Write a maintainable C program for a given algorithm using control statements.
- CO5. Write a C program for simple applications of real life using function.

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome												Program Specific Outcome		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	H												H		
CO2		H													
CO3					H										
CO4				H										H	
CO5						M								M	

Reference Books:

1. Fundamental of Computers By R. Thareja, Oxford University Press.
2. Programming in ANSI C by E Balagurusamy, Tata McGraw-Hill Education.
3. The C Programming Language by Brian W. Kernighan and Dennis M. Ritchie, PHI.
4. C:The Complete Reference by Herbert Schildt, McGraw-Hill Education.
5. Let us C by Yashavant P. Kanetkar, bpb publications.

B. Tech. (common to all disciplines)-I/II Semester
Contact Hours (L-T-P): 3-0-2

BAS012A	APPLIED PHYSICS LAB	0: 0: 2	2
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List of Experiments

Students are required to perform any ten experiments out of the following list of experiments.

1. To convert a Galvanometer into an Ammeter of given range and calibrate it.
2. To convert a Galvanometer into a Voltmeter of given range and calibrate it.
3. To study the variation in resistance of a Semiconductor with temperature and to determine its **energy Band-Gap**.
4. To determine specific Resistance of a wire by Carrey-Foster's Bridge.
5. To determine the height of an unknown object using Sextant.
6. To determine Resolving power of Telescope.
7. To determine Dispersive Power of a Prism using Mercury light source and Spectrometer.
8. To determine the wavelength of prominent lines of Mercury by using plane Diffraction Grating and Spectrometer.
9. To measure Numerical Aperture of an Optical Fiber.
10. To determine the profile of He-Ne LASER beam.

By graduation, students in the Engineering Physics Lab program must fulfill the following student outcomes:

CO-1 Engineering Physics graduates must have demonstrated a working knowledge of fundamental physics and basic electrical and/or mechanical engineering principles to include advanced knowledge in one or more engineering disciplines;

CO-2 the ability to formulate, conduct, analyze and interpret experiments in engineering physics; and
CO-3 the ability to use modern engineering physics techniques and tools, including laboratory instrumentation.

CO-4 communicate their ideas effectively, both orally and in writing; and function effectively in multidisciplinary teams.

. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome												Program Specific Outcome		
	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3
CO1			H		L		H		L					L	
CO2			L		M		L		M	H		L		H	
CO3		M								L		M			M
CO4					H								H		

H = Highly Related; M = Medium L = Low

B. Tech. (common to all disciplines)-I/II Semester
Contact Hours (L-T-P): 0-0-2

BES002A	Engineering Graphics	0: 0: 2	2
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Course Objective:

- Increase ability to communicate with people
- Learn to sketch and take field dimensions.

Exercise 1: Draw sheet of Lettering, Scale: Plain Scale, Diagonal Scale,

Exercise 2: Draw sheet of Conic Curves: parabola, hyperbola & ellipse.

Exercise 3: Draw sheet of Engineering Curves: Cycloid, Epicycloid, Hypocycloid and Involute.

Exercise 4: Draw sheet of Projection of points & projection of lines.

Exercise 5: Draw sheet of Projection of planes

Exercise 6: Draw sheet of projection of solid-I

Exercise 7: Draw sheet of projection of solid-II

Exercise 8: Draw sheet of sections and section views.

Exercise 9: Draw sheet of Orthographic projections: first angle of projection.

Exercise 10: Draw sheet of Orthographic projections: Third angle of projection.

Exercise 11: Draw sheet of Isometric projections and view.

Exercise 12: Draw sheet of development of surfaces.

Course Outcomes: After learning the course the students should be able to:-

- CO1. Students will be able to draw orthographic projections and sections.
- CO2. Student's ability to use architectural and engineering scales will increase.
- CO3. Student will be able to read drawing of given object
- CO4. Student will differentiate first angle and third angle projection

**MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM
OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:**

Course Outcome	Program Outcome												Program Specific Outcome	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1				H	L									L
CO2			L		M									H
CO3		M												
CO4					H								H	

H = Highly Related; M = Medium L = Low

Text Books:

1. Bhat, N.D.& M. Panchal (2008), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & B.C. Rana (2008), Engineering Drawing and Computer Graphics, Pearson Education

Reference Books:

- 1 Dhawan, R.K. (2007), A Text Book of Engineering Drawing, S. Chand Publications
- 2 Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers

B. Tech. (common to all disciplines)-I/II Semester
Contact Hours (L-T-P): 0-0-2

BES012A	COMPUTER PROGRAMMING -I LAB	0-0-2	2
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List of Experiments

1. Eight programs using input output statements, if statement, for loops, while loops, do-while loops, switch statement, break statement, continue statement, data type conversion etc.
2. Check a number- palindrome, prime, etc.
3. Eight programs using functions.
4. Two programs using recursion and Iteration.

B. Tech. (common to all disciplines)-I/II Semester**Contact Hours (L-T-P): 0-0-2**

BES004A	BASIC ELECTRONICS ENGINEERING LAB	0-0-2
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Objective

- Understand the nature and scope of modern electronics.
- Describe physical models of basic components.
- To provide students engineering skills by way of breadboard circuit design with electronic devices and components.
- To design and analyze various Electronic circuits such as PN diode, clipping ,applications of PN Diode, digital circuits etc. so that students are able to understand the practical aspects of basic electronics theory.
- Design and construct simple electronic circuits to accomplish a specific function, e.g., designing filters, clippers, clamper.
- Understand student's capabilities and limitations and make decisions regarding their best utilization in a specific situation.
- To make students understand how these small circuits are used in their day to day life.

Experiment 01	Familiarization of electronics component and equipments like C.R.O, Function generator and power supplies etc. Generate a sine wave using a function generator and measure its amplitude and frequency using C.R.O.
Experiment 02	Study of Digital Multimeter
Experiment 03	Study the following passive components (a) Study of resister (b) Study of capacitor (c) study of Inductors(d) Study of Bread Board
Experiment 04	Study of Analog & Digital ICs
Experiment 05	Determine static resistance and dynamic resistance of p-n junction diode and plot the V-I characteristics.
Experiment 06	Design and test, diode clipping circuits for peak clipping and peak detection.
Experiment 07	Design and test, positive and negative clamping circuit for a given reference voltage.
Experiment 08	Observe output waveform of half wave rectifier with and without filter capacitor and measure DC voltage, DC current, ripple factor with and without filter capacitor.
Experiment 09	Observe output waveform of full wave rectifier with and without filter capacitor and measure DC voltage, DC current, ripple factor with and without filter capacitor.

Experiment 10	Observe waveform at the output of Bridge rectifier with and without filter capacitor and measure DC voltage, DC current, ripple factor with and without filter capacitor.
Experiment 11	Design a half wave rectifier using discrete components on a breadboard and measure DC voltage, DC current, ripple factor, with and without filter capacitor
Experiment 12	Design a full wave rectifier using discrete components on a breadboard and measure DC voltage, DC current, ripple factor with and without filter capacitor.
Experiment 13	Verification of Truth table of basic & universal Gates using ICs.

Course Outcome (CO):

CO1- Ability to understand the working of diodes

CO2-Ability to understand the use of CRO and Function Generator

CO3- Ability to understand the operation of PN diode and rectifiers.

CO4- Ability to understand the circuitry which converts an AC to digital DC.

CO5- Ability to understand the designing of different types of filters and logic gates.

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome							Program Specific Outcome		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1		L	L	H	H				L	
CO2		H	M	M				L	H	L
CO3			H	H			H			M
CO4			L	H	M			H		
CO5						H	H			M

H = Highly Related; M = Medium L = Low

Text Books:

R. L. Boylestad & Louis Nashlesky (2007), Electronic Devices & Circuit Theory, Pearson Education

Reference Books

Santiram Kal (2002), Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India

David A. Bell (2008), Electronic Devices and Circuits, Oxford University Press

Thomas L. Floyd and R. P. Jain (2009), Digital Fundamentals, Pearson Education

R. S. Sedha (2010), A Text Book of Electronic Devices and Circuits, S.Chand & Co.

R. T. Paynter (2009), Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education

B. Tech. (common to all disciplines)-I/II Semester**Contact Hours (L-T-P): 0-0-2**

BAS 002C	Engineering Mathematics-II	3:1:0 [4]
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Objective: At the end of the course, the student should be able to:

- To provide a brief, hands-on overview of ordinary differential equations and Higher order linear differential equation with constant coefficients.
- To understand the second order linear differential equations with variable coefficients.
- To make utilization of Linear Partial differential equations – some important equations Heat, wave and Laplace equation.
- To understand the Laplace transform, Inverse Laplace transform and their applications
- To familiarize and Analyze numerical solution of a differential equation by Euler's, Modified Euler's, Predictor Corrector and Runge Kutta fourth order Methods.

UNIT1	Rank of a Matrix, Inverse of a matrix, System of linear equations (Homogenous and Non-homogeneous); Eigen values and eigen vectors, Cayley's Hamilton theorem.
UNIT2	Convergence of sequence and series, tests for convergence, power series, Taylor's series. Series for exponential, trigonometric and logarithmic functions.
UNIT3	Ordinary differential equation (first order first degree), Homogenous differential Equation, Linear differential equation, Exact differential equation, Higher order linear differential equation with constant coefficients.
UNIT4	Linear equations with variable coefficients: Homogenous form, Exact form, Change of dependent variable, Normal form, Change of independent variable and method of variation of parameters.
UNIT 5	Series solutions of second order linear differential equations with variable coefficients (Complementary functions only). First order partial differential equations, solutions of first order linear and non-linear PDEs.

Text Books: 1. B.V.Ramana, Higher Engineering Mathematics, Tata McGraw Hill, 2011.**Reference Books:**

- Recommended Books:**
1. Erwin Kreyszig , Advanced Engineering Mathematics, Wiley 9th Edition, 2008
 2. Thomas and Finney, Calculus and Analytical Geometry, Narosa Publishing House. New Delhi, 2002.
 3. M.Ray and Chaturvedi, A Text Book of Differential Equations, Students Friends & Co. Publisher, Agra, 1998.
 4. Maurice D. Weir and Joel Hass, Thomas Calculus, Pearson, 11th Edition, 2005.

Outcomes:**At the end of this course, students will be able to:**

CO1: Use matrices, determinants and techniques for solving systems of linear equations in the different areas of Linear Algebra. Understand the definitions of Vector Space and its linear Independence. Solve Eigen value problems and apply Cayley Hamilton Theorem.

CO2: Understanding convergence of sequence and series.

CO3: Identify, analyze and subsequently solve physical situations whose behavior can be described by First order and first degree ordinary differential equations and Higher order linear differential equation with constant coefficients.

CO4: Determine solutions to second order linear differential equations with variable coefficients.

CO5: Understanding the series solutions of second order linear differential equations with variable coefficients

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome												Program Specific Outcome		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	H	M	L	L	M				L			L	M		
CO2	H	M	M	M	M				L			L	H		
CO3	H	M	M	M	M		M		L			L		H	M
CO4	H	H	M	M	M			L	L			L			M
CO5	H	H	M	M	M	L			L			L	H		

H = Highly Related; M = Medium L=Low

B. Tech. (common to all disciplines)-I/II Semester**Contact Hours (L-T-P): 3-1-0**

BAS011C	Engineering Chemistry	3:1:0	4
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Objectives of Chemistry

1. The purpose of this course is to emphasize the relevance of fundamentals and applications of chemical sciences in the field of engineering.
2. The courses have been conceived in such a way that they take into account appropriate combinations of old and new emerging concepts in the chemical sciences area and their current and potential uses in engineering.
3. The Course attempt to address the principles of general chemistry and specific topics relevant to various engineering disciplines, wherein the students can apply this learning in their respective areas of expertise.

UNIT 1	<p>WATER AND ITS TREATMENT Types of impurities in Water, Hardness of Water, Disadvantages of Hard Water, Temporary and Permanent hardness. Units and inter conversions of Units. Estimation of hardness by EDTA Methods.. Methods of Treatment of Water for Domestic Purposes - Sedimentation, Coagulation, Filtration, Disinfection, Sterilization, Chlorination, Break point chlorination, Ozonization. Water for Industrial purpose, Water for Steam Making-Boiler Troubles, Carry Over, Priming and Foaming, Boiler Corrosion, Scales and Sludge, Caustic Embrittlement.</p> <p>Water Treatment: Internal Treatment methods, Colloidal, Phosphate, Calgon, Carbonate, Sodium aluminates, Conditioning of Water. External Treatment methods, Lime-Soda Process, Zeolite Process, Ion- Exchange Process, Numerical Problems on EDTA Methods and Lime-Soda process.</p>
UNIT 2	<p>FUELS AND ENERGY Fossil Fuels: Classification of Fuels, Calorific value, Gross and Net calorific values (SI units). Determination of calorific value of a solid and liquid fuel, Bomb calorimeter, Boy's Gas Calorimeter, Carbonization, Beehives Oven Method, Ottohaffman's Byproduct Method, Petroleum, Cracking- fluidized catalytic cracking. Reformation of petrol, Knocking, Octane number, Cetane number, prevention of knocking, anti-knocking agents, Synthetic petrol, Bergius process and Fischer-Tropsch process.</p>
UNIT 3	<p>Phase Rule: Phase rule: Definition and explanation of the terms involved- phase, component and degree of freedom. One component system (water system only). Brief Idea of Condensed phase rule with reference to two component system (Pb-Ag system).</p> <p>Corrosion</p>

	Chemical (Dry) and Electrochemical (Wet) corrosion. Protection from corrosion, Protective coatings, cathodic protection, sacrificial Anodic protection and modification in designs.
UNIT 4	Polymer Science Classification of polymers. Types of Polymerization; Addition and Condensation Polymerizations, Coordination polymerization. Preparation, Properties and Engineering Uses of the Following: Polyethylene, PVC, Teflon, Bakelite, Nylon, Polyester. Rubber - Processing of Natural Rubber, Vulcanization of rubber. Elastomers - Buna S, Buna N. Brief Introduction of organic conducting polymers.
UNIT 5	Lubricants: Principles and function of lubricants - Types of Lubrication and Mechanism -Thick Film or Hydrodynamic Lubrication, Thin Film or Boundary Lubrication, Extreme Pressure Lubrication. Classification and properties of lubricants-Viscosity, flash and fire point, cloud and pour point, aniline point and Neutralization Number, Precipitation No.

Suggested Books

1. Engineering Chemistry by J C Kuriacose and J. Rajaram, Tata McGraw-Hill Co, New Delhi (2004)
2. B.K. Sharma, "Engineering Chemistry", Krishna Prakasam Media (P) Ltd., Meerut, 2001.
3. A text book of Engineering Chemistry by Jain & Jain, Dhanpat Rai Publishing Company, New Delhi(15 Ediction) (2006).
4. Chemistry of Engineering Materials by C.P. Murthy, C.V. Agarwal and A. Naidu BS Publication Hyd. 2007.
5. Text book of Engineering Chemistry by Shashi Chawala, Dhanpat Rai Publishing Company, 15th edition New Delhi (2004).

Course outcome

CO-1 Students will be able to explain the impurities of water (mainly hardness) and boiler troubles and also different methods to remove hardness of water.

CO-2 Students will be able to analyze the basic knowledge of various types of Fuels, their properties and Industrial Applications.

CO-3 Students will be able to understand phase rule for one component and two component systems. Students will also be able to understand mechanism of corrosion and its protection.

CO-4 Students will be able to understand about different polymers.

CO-5 Students will be able to understand the basic concept of lubricants and their applications in various fields of Engineering.

Mapping of PO/CO

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	L	M	L	M	M		L	L	L	M
CO2	M	L	L			L	L		L	M	L	M
CO3	H	M	M	L	M	M	M		L	M	L	H
CO4	M	L	L			L			L	M	L	M
CO5	H	H	M	M	H	M			L	L	M	H

L – LOW M- MEDIUM H-HIGH

B. Tech. (common to all disciplines)-I/II Semester**Contact Hours (L-T-P): 3-0-0**

BES013B	Computer Programming-II	3: 0: 0	3
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UNIT 1	Computer System Fundamentals: System software, firmware, freeware/open-source, loader, compiler, peripherals.
UNIT 2	Computer Programming: one-dimensional arrays, multi-dimensional arrays, character arrays and strings
UNIT 3	Pointers, Pointers arithmetic, Pointers and Logical Operators, Increment and Decrement on Pointers, Generic Pointer, Null Pointer, Dynamic memory allocation: functions like malloc, calloc, free
UNIT 4	Preprocessor, User Define Data types, command line arguments, Structure & Union, Nested Structure, Structure with Pointer
UNIT 5	File operations and multi-file handling, sscanf()/sprintf(). Graphics using C.

Suggested Readings:

1. Programming in ANSI C by E Baluguamsamy, Tata McGraw-Hill Education
2. Programming in C by Thareja, Oxford University Press.
3. The C Programming Language by Brian W. Kernighan and Dennis M. Ritchie, PHI.
4. C: The Complete Reference by Herbert Schildt, McGraw-Hill Education.
5. Graphics Under C by Yashavant P. Kanetkar, bpb publications.

B. Tech. (Common to all) – Semester I/II

Contact Hrs per week (L-T-P): 3-0-0

<u>BES005C</u>	Basic Electrical Engineering	3: 0: 0	3
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OBJECTIVE:

The objective of this course is to provide the students with an introductory treatment of the field of Electrical Engineering.

Unit 1	DC Circuit & Theorems – Ohm’s law, KCL & KVL, Voltage & Current Sources, Star-Delta and Delta-Star transformations, Nodal & Mesh Analysis, Superposition Theorem, Thevenin’s Theorem, Norton’s Theorem, Maximum Power Transfer Theorem
Unit 2	Single Phase Circuits - Definition of average value, root mean square value, form factor and peak factor of sinusoidal voltage and current and phasor representation of alternating quantities; Analysis with phasor diagrams of R, L, C, RL, RC and RLC circuits; Real power, reactive power, apparent power and power factor.
Unit 3	Three Phase AC 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.
Unit 4	Transformers - Principle of operation and construction of single phase transformers (core and shell types). EMF equation, losses, efficiency and voltage regulation
Unit 5	Rotating Electrical Machines – Construction & Working principle of DC machine as a generator and a motor; EMF equation of DC generator; torque equation of DC motor. Back EMF of DC Motor. Applications of dc machines and single phase motors.

COURSE OUTCOMES:

- To understand, analyze and solve DC electrical circuits.
- To understand, analyze and solve single phase electrical circuits for different loads and configurations.
- To understand, analyze and solve three phase electrical circuits for different loads and configurations.
- To understand working and applications of transformers.
- To understand working and applications of different AC and DC rotating machines.

Text Books:

1. Nagsarkar and Sukhija, Basic Electrical Engineering, Oxford Uni. Press.

Reference Book:

1. Nagrath I.J. and D. P. Kothari, Basic Electrical Engineering, TMH
2. Kulshreshtha DC, Basic Electrical Engineering, Tata McGraw Hill
3. Rajendra Prasad, Fundamentals of Electrical Engineering, Prentice Hall, India
4. Hughes, E., Electrical Technology. Pearson
5. BL Theraja, A textbook of electrical technology, Vol- II, S.Chand & Co. LTD.

BES 007A	<u>Engineering Mechanics</u>	3-0-0	3
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Course Objective: The student will be able to

- Ability to identify, formulate, and solve engineering problems.
- an ability to apply knowledge of basic mathematics, science and engineering

Unit I	Statics –Basics Concepts, Fundamental principles & concepts: Vector algebra, Newton’s laws, gravitation, force (external and internal, transmissibility), couple, moment (about point and about axis), Varignon’s theorem, resultant of concurrent and non-concurrent coplanar forces, static equilibrium, free body diagram, reactions. Problem formulation concept; 2-D statics, two and three force members, alternate equilibrium equations, constraints and static determinacy; 3-D statics.
Unit II	Analysis of Structures- Trusses: Types of support reactions, Assumptions, rigid and non-rigid trusses; Simple truss (plane and space), analysis by method of joints. Analysis of simple truss by method of sections; Compound truss (statically determinate, rigid, and completely constrained). Analysis of frames and machines.
Unit III	Friction: Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, screw jack. , Principle of Lifting Machines, Mechanical Advantage.
Unit IV	Moment of Inertia- First moment of mass and center of mass, centroids of lines, areas, volumes, composite bodies. Area moments- and products- of inertia, radius of gyration, transfer of axes, composite areas. Rotation of axes, principal area-moments-of-inertia,
Unit V	Simple stress and strain, Factor of Safety, Types of Beam and loading, Shear force and Bending Moment diagram for simple supported and cantilever Beam.

Text Books:

1. Nelson A., “Engineering Mechanics”, McGraw -Hill Publication

Reference Books:

1. Timoshenko P. S. and Young D. H., “Engineering Mechanics”, McGraw-Hill Publication.
2. Bhattacharyya Basudeb, “Engineering Mechanics”, Oxford University Press.
3. Engineering Mechanics by RS Khurmi.

Course Outcomes: After learning the course the students should be able to:-

- CO1. Identify, formulate, and solve engineering problems

- CO2. apply knowledge of basic mathematics, science and engineering.
- CO3. Visualize the concept of moment of inertia for different shapes
- CO4. Recognition of type of motion and forces.

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome												Program Specific Outcome	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M	H		M					L					M
CO2	H	M		H			M						M	
CO3	H	H		M									H	
CO4	H	M		H								M		H

H = Highly Related; M = Medium L = Low

BES 003A	<u>Engineering Workshop</u>	0-0-2	2
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Course Objective: The student will be able to

- Read and interpret job drawing.
- Identify, select and use various marking, measuring, holding, striking and cutting tools & equipments.

Unit I	<p>Machine Shop - Study of lathe machine, drilling machine and shaper, their parts and demonstration of operations performed on them.</p> <p>1. Prepare a job on lathe machine by performing turning, facing and chamfering as per given drawing.</p>
Unit II	<p>Fitting Shop - Study of fitting tools, their uses and demonstration of operations by using different tools.</p> <p>3. Prepare a job including finishing of all four sides by filing and make a square notch.</p> <p>4. Prepare a job by finishing its two sides and perform drilling and tapping on it.</p>
Unit III	<p>Carpentry Shop - Study of wood and wood working, tools used in carpentry shop and their applications.</p> <p>5. Prepare a T-lap/Cross lap joint.</p> <p>6. Prepare a bridle joint.</p>
Unit IV	<p>Welding Shop - Definition of welding and brazing process and their applications. Study of tools used in arc and gas welding shop.</p> <p>7. Prepare a /butt joint in arc welding shop.</p> <p>8. Demonstration of different types of flames in gas welding shop.</p> <p>9. Study of common welding defects</p>
Unit V	<p>Foundry Shop - Study of moulding and casting process, moulding sand, foundry tools and patterns used for moulding.</p> <p>10 Prepare a mould by using a given pattern.</p> <p>11 Making and baking of dry sand cores for placing in horizontal, vertical and hanging positions in the mould cavity.</p>

Text Book:

1. Hajra Choudhury Workshop Technology Vol. 1 & 2, Media Promoters & Publishers P. Ltd, Bombay.

Reference Book:

1. Chapman W. A. J., Workshop Technology Parts 1 & 2, Viva Books P. Ltd., New Delhi.

Course Outcomes: After learning the course the students should be able to:-

- CO1. Understand applications of hand tools and power tools.
 CO2. Understand the operations of machine tools.
 CO3. Student will be able to working at shop floor.
 CO4. Student will visualize casting process.

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome												Program Specific Outcome	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1			M		H				M	M		L		L
CO2					H				H	M			H	L
CO3			L		H	M		M						
CO4					M		H				H			L

H = Highly Related; M = Medium L = Low

B. Tech. (Common to all) – Semester I/II
Contact Hrs per week (L-T-P): 0-0-2

BES008C	Basic Electrical Engineering Lab	0:0:2
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OBJECTIVE: To provide exposure to the students with hands on experience on various basic engineering practices in Electrical Engineering.

List of experiments (Perform any 10).

1. Familiarization with (a) Electrical Symbols (b) Electrical Abbreviations (c) Electrical Tools
2. Familiarization with (a) Various Electrical Components (b) Electrical Measuring Instruments
3. To study the various Electrical Lamps Viz. Halogen Lamps, Fluorescent Tube & CFL, Sodium Vapour lamp, Neon Lamps, Incandescent Lamps and LED bulbs & Tubes
4. To make house wiring for a lamp operated from two different positions (or two way switching).
5. To make house wiring including Earthing for 1- Phase Energy meter, MCB, Ceiling Fan, Tube light, 3 Pin Plug & Socket.
6. To verify transformation ratio by measuring primary and secondary side voltages of single phase transformer
7. To measure the voltages on primary and secondary sides of three phase transformer for different configurations.
8. To study the construction & working of Ceiling fan
9. To run the single phase induction motor at varying speeds by using autotransformer.
10. To run the 3-phase induction motor at varying speeds by using 3-phase auto transformer.
11. To measure Power in 3-phase load by one-wattmeter method.
12. To measure Power in 3-phase load by three-wattmeter method.
13. To measure Power and Power factor in 3-phase load by two-wattmeter method.

OUTCOMES:

- CO1. Students can now become familiar with various electrical symbols, abbreviations, tools and measuring instruments and practically connect the electrical circuits.
- CO2. The ability to conduct testing and experimental procedures on different types of electrical machines.
- CO3. The ability to select a suitable measuring instrument for measuring electrical and non electrical quantities for a given application. They will now be in position to learn different testing procedure of transformers and induction motors.

B. Tech. (Common to all) – Semester I/II
Contact Hrs per week (L-T-P): 0-0-2

BAS 015B	Engineering Chemistry Lab -I	0:0:2
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Course Objectives:

- To provide students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technical competence
- To Provide the students with a solid foundation in Chemistry laboratory required to solve engineering problems.
- To provide students with the knowledge of practical implementation of fundamental concepts.

List of experiments

Module 1: (A) Choice of ten experiments from, (10 Sessions)-

1. Total Hardness of Water by EDTA Method.
2. Determination of Alkalinity of water sample.
3. Determination of Chloride Content in Water.
4. Determination of Residual Chlorine in Tap water.
5. Determination of Cloud and Pour Points of a given lubricant.
6. To determine the strength of unknown solution of FAS by titrating it with Potassium dichromate by using potassium ferricyanide as an external indicator.
7. To determine the strength of unknown solution of FAS by titrating it with Potassium dichromate by using N-phenyl anthranilic acid as an internal indicator.
8. To determine the strength of a given copper sulphate solution by using sodium thiosulphate (hypo) solution using starch as an indicator.
9. Determination of Dissolved oxygen present in given water sample (Winkler's Method).
10. Proximate analysis of Fuel Sample.
11. Determination of Viscosity of a given lubricant by Redwood Viscometer No.1.
12. Determination of Flash Point and Fire point by Abel's Apparatus or by Pensky-Marten's Apparatus
13. Conductometric titrations using strong base/strong acid or strong base/weak base
14. Determination of pH of various water samples by pH meter.
15. Determination of Conductance of various water samples by Conductivity meter..

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Course Outcomes:

On completion of this course, students will be able to-

CO1 Analyze water sample for hardness and to estimate other impurities present in water.

CO2 Carry out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results

CO3 Select lubricants for various purposes.

CO4 Select good fuel for various industrial purposes

CO5 Use different types of instruments for quick and accurate analysis.

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:**Mapping of PO/CO**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	H	H	H	H	M	L	L	L	H
CO2	H	H	H	H	H	H	H	M	L	L	L	H
CO3	H	H	H	H	H	H	H	M	L	L	L	H
CO4	H	H	H	H	H	H	H	M	L	L	L	H
CO5	H	H	H	H	H	H	H	M	L	L	L	H

H = Highly Related; M = Medium L = Low

Reference Books:

1. J. Bassett, R.C. Denny, G.H. Jeffery, A. I. Vogel, Text book of quantitative inorganic analysis, 4th Edition.
2. O. P. Vermani & Narula, "Theory and Practice in Applied Chemistry" New Age International Publisher.
3. Gary D. Christian, "Analytical chemistry" 6th edition, Wiley India.
4. Laboratory Manual on Engineering Chemistry by S.K. Bhasin and Sudha Rani, Dhanpat Rai Publishing Company, New Delhi (2004).

The programs shall be developed in C language related with the following concepts:

1. Input roll numbers of your friends in an array & print in reverse order.
2. Input names of your friends in an array & print in reverse order.
3. Input two matrices and output third matrix after performing add/subtract the corresponding elements.
4. Four programs using malloc, calloc, free & scanf()/sprintf() functions.
5. Two programs using macro and online functions.
6. Two programs using structure & union.
7. Two programs using pointers.
8. Three programs belonging to file operations and multi-file handling.
9. Three programs belonging to graphics using C.

BES 010A	<u>Engineering Mechanics lab</u>	0 0 2	2
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Course Objective : The student will be able to:

- the ability to identify and formulate elementary level engineering problems related to particle mechanics, in conceptual form as well as in terms of mathematical and physical models;
- the ability to apply the basic principles of classical particles mechanics to the analysis of particles subjected to forces;

(Minimum 12 experiments from following)

- To verify Law of Parallelogram of Forces.
- To verify Polygon law of forces.
- To determine Support Reactions of a Simply Supported Beam.
- To measure coefficient of Static Friction.
- To determine Efficiency of a Compound Lever.
- To determine Efficiency of Bell Crank Lever.
- To determine Efficiency of Worm and Worm Wheel.
- To determine efficiency of a Screw Jack.
- To determine efficiency of Double Purchase Crab Winch.
- To determine efficiency of Differential Wheel & Axle.
- To study pulley systems.
- To Verify Lami's Theorem.
- To determine moment of inertia of a flywheel about its own axis of rotation.
- To determine the force in the member of simple roof truss.
- To determine the coefficient of friction between ladder and floor and between ladder and wall.

Course Outcomes: After learning the course the students should be able to:-

CO1. Visualize the concept of component of forces and force balancing.

CO2. Understanding of how machine is creating mechanical advantages and concept of efficiency.

CO3. Visualize the concept of Bending moment and shear force.

CO4. Demonstration of law of friction.

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome												Program Specific Outcome	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M	H		M					L					M
CO2	H	M		H			M						M	
CO3	H	H		M									H	
CO4	H	M		H								M		H

H = Highly Related; M = Medium L = Low

Non Credit Course

BMC 061A	Environmental Sciences	0-0-0	0
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The objectives of Environment science are to-

1. Create an awareness about environmental problems among students
2. Impart basic knowledge about the environment and its allied problems.
3. *Develop an attitude of concern for the environment.*
4. *Motivate public through students to participate in environment protection and environment improvement.*
5. *Acquiring skills to help the concerned individuals in identifying and solving environmental problems.*

UNIT 1	The Multidisciplinary Nature of Environmental Studies: The Multidisciplinary Nature of Environmental Studies Definition, scope and importance need for public awareness.
UNIT 2	<p>Natural Resources Renewable and Non-renewable Resources: •Natural resources and associated problems.</p> <p>(a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.</p> <p>(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.</p> <p>(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.</p> <p>(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.</p> <p>(f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.</p> <p>• Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.</p>
UNIT 3	Ecosystems, Biodiversity and Its Conservation: •Concept of an ecosystem.

	<ul style="list-style-type: none"> •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) <p>Biodiversity and Its Conservation</p> <ul style="list-style-type: none"> •Introduction, definition: genetic, species and ecosystem diversity. •Biogeographical classification of India. • 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.
UNIT 4	<p>Environmental Pollution: •Definition</p> <ul style="list-style-type: none"> • Causes, effects and control measures of <p>(a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution</p> <p>(e) Noise pollution (f) Thermal pollution (g) Nuclear hazards</p> <ul style="list-style-type: none"> • 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.
UNIT 5	<p>Social Issues and the Environment, Human Population and the Environment, Field Work: • From unsustainable to sustainable</p>

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.

Human Population and the Environment

- 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.

Field Work

- Visit to a local area to document environmental assets—river/forest/grassland/hill/ mountain.

	<ul style="list-style-type: none"> • 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. <p>(Field work equal to 5 lecture hours) • Case Studies.</p>
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Course Outcome (CO)

After the completion of the course, student will be able to:

CO-1: Recognize the history, structure, function, interactions and trends of key socio-environmental systems on personal, organizational and intellectual level regarding our surroundings through different media.

CO-2: Examine the generation of scientific knowledge and how that knowledge is presented, evaluated, framed and applied for environmental protection by conservation of Natural resources.

CO-3: Articulate a coherent philosophy of the environment and consider ethical bases for responding to environmental questions.

CO-4: Understand the role of conservation of resources and public awareness in prevention of pollution and ultimately for the sustainable development of society.

CO-5: Understand the social responsibility towards protection of environment and society

CO/PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO-1	H	M	H	H	H	H	M
CO-2	M	H	H	M	M	H	M
CO-3	M	H	H	L	H	H	H
CO-4	M	M	H	M	H	H	H
CO-5	H	H	H	H	H	H	H

DEPARTMENT OF LAW ; JECRC UNIVERSITY

RECOMMENDED SYLLABUS FOR B TECH FIRST YEAR

BMC161A- Indian Constitution

Ser No	Recommended Subject	Number of Proposed Lecture
1.	Salient Features of the Indian Constitution	01
2.	Preamble of the Constitution	01
3.	Nature of the Constitution	01
4.	<u>Fundamental Rights</u>	
	(a) Articles 12 & 13	01
	(b) Articles 14 to 18	01
	(c) Articles 19	02
	(d) Articles 21	02
	(e) Articles 32 and Writs	01
5.	Directive Principles and Fundamental Duties	02

