UNIVERSITY OF JAMMU

NOTIFICATION
(22/Nov/Adp/74)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Competent Bodies, has been pleased to authorize the adoption of the revised Syllabi and Courses of Studies in **Bachelor of Engineering (Electrical Engineering)** for Semester I & II under the **Credit Based System** as per the model curriculum of the **AICTE (as given in the Annexure)** for the candidates of **(Govt./Pvt.) Engineering Colleges affiliated with the University of Jammu** for the Examinations to be held in the years indicated against each Semester as under:-

Branch	Semester	For the Examination to be held in the years
Electrical	**Semester-I**	**December 2022, 2023, 2024 and 2025**
	Semester-II	**May 2023, 2024, 2025 and 2026**

The Syllabi of the course is available on the University Website: www.jammuuniversity.in.

Sd/-
DEAN ACADEMIC AFFAIRS

No. F.Acd/III/22/9985-9993
Dated: 22 /11/2022
Copy for information & necessary action to:-

1. Dean Faculty of Engineering
2. Principal, GCET/MBSCET/BCET/YCET
3. C.A to the Controller of Examinations
4. Deputy/Assistant Registrar (Exams/Confidential)
5. Incharge University Website

Deputy Registrar (Academic)

UNIVERSITY OF JAMMU

COURSE SCHEME

B.E. 1st Semester Electrical Engineering

Examination to be held in the year Dec-2022, 2023, 2024, 2025

Contact Hours: 27

Course Code	CourseType	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	% change
			L	T	P	Internal	External			
BST1101	Basic Science Theory	Engineering Mathematics -I	2	1	0	50	100	150	3	100%
BST1103	Basic Science Theory	Applied Engineering Physics	2	1	0	50	100	150	3	100%
EET2101	Engineering Science Theory	Principles of Electrical Engineering	2	1	0	50	100	150	3	100%
MET5102	Engineering Science Theory	Engineering Graphics	3	0	0	50	100	150	3	100%
ECT1101	Engineering Science Theory	Basic Electronics Engineering	2	1	0	50	100	150	3	100%
HMT1102	Basic Science Theory	Universal Human Values	2	1	0	50	100	150	3	100%
MEP5112	Engineering Science Practical	Workshop Technology	0	0	3	50		50	1.5	100%
BSP1113	Basic Science Practical	Applied Engineering Physics Lab.	0	0	2	50		50	1	100%
EEP2111	Engineering Science Practical	Principles of Electrical Engineering Lab	0	0	2	50		50	1	100%
ECP1111	Engineering Science Practical	Basic Electronics Engineering Lab	0	0	2	50		50	1	100%
Total			13	5	9	500	600	1100	22.5	

Examination to be held in the year Dec-2022, 2023, 2024, 2025

BRANCH: COMPUTER/CSE/IT/CIVIL/ECE/ELECTRICAL/MECHANICAL ENGINEERING

CLASS: B.E. 1ˢᵗ SEMESTER   **CREDITS: 3**

COURSE TITLE: ENGINEERING MATHEMATICS –I
COURSE NO: BST1101
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks	
L	T	P	Internal	External
2	1	0	50	100

Course Outcomes: At the end of the course the students will be able to	
CO 1	Learn general theorems of calculus, find maximum and minimum value of functions of two variables.
CO2	Understand the concept of definite integrals.
CO 3	Learn basic concepts of complex trigonometry.
CO 4	Find the rank, eigen values/ vectors of matrices.

SECTION-A

UNIT-I: DIFFERENTIAL CALCULUS

Partial differentiation, Euler's theorem on homogeneous functions, Rolle's theorem, Mean value theorem, Taylor's and Maclaurin's series with remainder, Taylor's series in two variables, Maxima and Minima of functions of two variables, Method of Lagrange's multipliers.   **(12 hours)**

UNIT-II: INTEGRAL CALCULUS

Definite integrals with important properties, differentiation under the integral sign, Gamma, Beta and error functions with simple problems, double and triple integrals with simple problems.

(8 hours)

SECTION-B

UNIT-III: COMPLEX TRIGONOMETRY

Hyperbolic functions of a complex variable, Inverse Hyperbolic functions, Logarithmic function of a complex variable; Summation of series by C+iS method.   **(8 hours)**

UNIT-IV: MATRICES

Introduction, Rank of a matrix, Elementary transformations, Elementary matrices, Inverse using elementary transformation, Normal form of a matrix, Eigen values and Eigen vector, Properties of Eigen value, Cayley Hamilton Theorem, Diagonalization of matrix.

(14 hours)

BOOKS RECOMMENDED:

1	Calculus and Analytic Geometry	Thomas and Finney, 9ᵗʰ Edition, Pearson, 2002.
2.	Differential Calculus	S. Narayan and P.K. Mittal, S.Chand, New Delhi.
3.	Higher Engineering Mathematics	B.S Grewal, Khanna Publishers, New Delhi
4.	Engineering Mathematics-I	Dr. Bhopinder Singh
5.	Engineering Mathematics-II	Dr. Bhopinder Singh

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of calculator is allowed.

Examination to be held in the year Dec-2022, 2023, 2024, 2025

CLASS: B.E 1ST SEMESTER

BRANCH: COMPUTER/CSE/IT/ECE/ELECTRICAL ENGINEERING

COURSE TITLE: APPLIED ENGINEERING PHYSICS
COURSE No: BST1103

CREDITS: 3

DURATION OF EXAM: 3 HRS

Hours/ Week			Marks	
L	T	P	Internal	External
2	1	0	50	100

Course Outcomes (CO): At the end of the course the Student will be able to -

CO1	Understand the significance of vector calculus and Maxwell's equations as the basis of Electromagnetic theory.
CO2	Acquire the basic principles of laser physics, quantum mechanics and their applications.
CO3	Acquire knowledge of semiconductor physics along with different aspects of applied optics & their applications
CO4	Understand the working principle of optical fibres with their applications in various fields.

Section-A

UNIT1: ELECTROMAGNETIC FIELDS AND WAVES

Concepts of Del Operator- gradient, divergence, curl and their physical significances, Displacement Current. Maxwell's equations in integral and differential form, Poynting vector and Poynting theorem, Electromagnetic wave propagation in free space (e m wave equations for electric & magnetic fields for free space) & their solutions (plane wave solution), velocity of E M waves, Relation between E_o & B_o.

(08 hours)

UNIT-II: LASER PHYSICS

Concept and principle of Laser action, Spontaneous and Stimulated emission, Einstein's Co-efficient and relations, three and four level laser system, coherence and characteristics of laser light, Ruby, He –Ne and CO_2 Lasers, Applications of lasers

(05 hours)

UNIT -III: QUANTUM MECHANICS

Need of quantum mechanics, Compton effect, concept of wave function, Eigen function and Eigen values, operators in quantum mechanics, Expectation values, Schrodinger's wave equation (Steady-state and Time-dependent) for one- dimensional case, Applications of Schrodinger's equation (Time independent) to Particle in a one-dimensional box of infinite height and concept of zero point energy

(08 hours)

UNIT-IV: SEMICONDUCTOR PHYSICS

Structure of Atoms, Energy band diagram, Metal, Insulator and Semiconductor, Intrinsic and Extrinsic semiconductors, Direct & Indirect semiconductors (E-k diagrams), Electron and hole concentration in intrinsic semiconductors, Charge densities in semiconductor, Generation & Recombination of charge carrier, Law of mobility & conductivity, Current densities in semiconductors, Fermi levels, Mass action law, Drift & Diffusion current and Einstein relation for p-n junction, Hall effect, Hall co-efficient & its applications.

(09 hours)

UNIT –V: APPLIED OPTICS

Thin films, Interference in thin films (by reflection and transmission of light), Theory of Newton's rings by reflected & transmitted light, Determination of wavelength and refractive index of monochromatic light by Newton's rings theory., Plane diffraction grating & its theory for secondary maxima & minima, polarized and unpolarized light, Nicol Prism as a Polarizer and Analyzer

(07 hours)

UNIT VI: FIBRE OPTICS

Optical Fibre, Physical structure and basic theory, Propagation of Light in Optical fibres, critical angle, Acceptance angle & acceptance cone, Numerical Aperture, Single mode & Multimode Fibres, Characteristics and General applications of Optical fibres.

(05 hours)

Books Recommended

1. Fundamentals of Electricity & Magnetism — Duggal & Chabbra
2. Lasers Fundamentals and applications — A. K. Ghatak
3. Semiconductor Physics and Devices — Donald A. Neamen
4. Optics — Brijlal & Subramaniam
5. Fibre Optics — Ghatak, Tyagrajan
6. Quantum Mechanics — N. Zettili

NOTE: There shall be total eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of calculator is allowed.

Examination to be held in the year Dec-2022, 2023, 2024, 2025

CLASS: B.E. 1st SEMESTER   **Credit-3**
BRANCH: ELECTRICAL/ CIVIL ENGINEERING
COURSE CODE: EET 2101

TITLE: PRINCIPLES OF ELECTRICAL ENGINEERING
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks	
L	T	P	Internal	External
2	1	0	50	100

COURSE OUTCOMES: students will be able to understand and analyse	
CO.1	The basic concepts of electric circuit terminology, Kirchhoff's and Ohm's laws.
CO.2	The circuits using electrical theorems
CO.3	The basic terminologies in AC and star-delta circuits
CO.4	The working principle of single phase transformer.

SECTION-A

Unit-1
Electric Circuit Laws & Energy Sources: Basic electric circuit terminology, Ohm's law, Kirchhoff's laws, Circuit parameters (Resistance, inductance & capacitance), series & parallel combination of resistance, inductance & capacitance. ideal & practical voltage and current sources and their transformation, dependent voltage sources and dependent current sources.

(08 hours)

Unit-2
D.C. Circuit Analysis: Power and energy relations, analysis of series parallel D.C. circuits, Mesh & Nodal methods, Star- Delta transformation, Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Reciprocity Theorem.

(10 hours)

SECTION-B

Unit-3
A.C. Circuit: Introduction, Average and effective values of periodic functions, instantaneous and average power, Phasor and complex number representation. Solution of sinusoidally excited R, L, C circuits, Resonance in series and parallel circuits, quality factor. Concept of 3-phase voltage and current in Wye (y), Delta circuits and their relationship.

(10 hours)

Unit-4
Transformers
Construction, principle operation of single phase transformer, ideal and practical transformer (no-load & on-load phasor diagrams), equivalent circuit, losses in transformers, transformer test (open circuit & short circuit), regulation and efficiency, auto transformer.

(08 hours)

RECOMMENDED BOOKS:
1. Electrical Engineering Fundamentals   V. Del toro
2. Electrical Technology   H.Cotton
3. Electrical Technology   E.Hughes
4. Basic Electrical Engineering   A.K.Chakrabarti
5. Basic Electrical Engineering   J.B Gupta

NOTE : There shall be total eight questions, each question will be of 20 marks four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

Examination to be held in the year Dec-2022, 2023, 2024, 2025

CLASS: B.E. 1ˢᵗ SEMESTER
BRANCH: COMPUTER/CSE/IT/E&C/ELECTRICAL ENGINEERING
COURSE TITLE: ENGINEERING GRAPHICS

Credit: 3

COURSE NO: MET5102
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks	
L	T	P	Internal	External
3	0	0	50	100

COURSE OUTCOMES: Students will be able to:

CO1	Understand and use engineering scales with accuracy and interpret missing views.
CO2	Work with zeal of Industrial practices and standards.
CO3	Convert sketches to engineering drawings.
CO4	Fundamentally understand and perform Two and Three dimensional drawings.
CO5	Draw and understand orthographic projections of sections.

SECTION -A

Engineering Curves: Conventional lines and signs used in Engineering Drawing, Printing and Lettering, Curves used in Engineering Practice: Cycloidals, Involutes, Spirals and Hellices, Locus of a point on simple mechanisms.

Projection of Planes: Projections of a plane w.r.t. the principle planes in simple and inclined positions. Rotation method and the Auxiliary plane method.

Projection of Solids: Classification and main features-Prisms and Pyramids. Projection of solids inclined to both the reference planes by (1) Rotation Method, and (II) Auxiliary plane method. Projection of solids in combination (Co-axial) in simple and inclined positions.

Sectioning of Solids: Object of sectioning, Types of cutting planes, True shape of section, Auxiliary views of sections of multiple co-axial solids in simple and titled conditions. **(20 hrs.)**

SECTION -B

Interpenetration of Solids and Intersection of Surface: Intersection of geometrical solids/hollow sections, Tracing of lines of intersection by line method and by section method.

Development of Surfaces: Classification of surfaces, Methods of development-Straight line method and Radial line method, Development of solids and hollow sections in full or part development of transition pieces.

Orthographic Projections: Orthographic projection of simple blocks (First & Third angles), to draw the third view from given two views. Missing lines in projection.Introduction to Auto CAD.Basic Commands and Basic Drawing Practices. **(21 hrs.)**

RECOMMENDED BOOKS:

1.	Engineering Drawing	P.S Gill
2.	Practical Geometry	V. Laxminarayan& GEV
3.	Engineering Graphics	K.L. Narayanan & P. Kamaish
4.	Principles of Engineering Graphics	P.E Giesecks
5.	Engineering Graphics	Frederic & Michelle.

NOTE: There shall be total eight questions, four from each section. Five questions will have to be attempted selecting at least two from each section. Use of calculator is allowed.

Examination to be held in the year Dec-2022, 2023, 2024, 2025

CLASS: B.E. 1ST SEMESTER
BRANCH: COMPUTER /CSE/IT/ELECTRICAL ENGINEERING   **Credits: 3**
COURSE NO: ECT1101
TITLE: BASIC ELECTRONICS ENGG
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks	
L	T	P	Internal	External
2	1	0	50	100

COURSE OUTCOMES: After learning this course students will be able to:	
CO1	To understand the fundamentals of semiconductor Physics.
CO2	To introduce the concepts of semiconductor devices with applications.
CO3	To enable the students to understand the working and applications of transistor
CO4	To understand the basics of communication systems.

SECTION-A

Unit-I: Semi-Conductors and Diodes: Introduction, Insulators, Semiconductors and Metals, Mobility and Conductivity, Intrinsic and Extrinsic Semiconductors, Charge Density, Current Components in Semiconductors, Continuity Equation, Introduction, Insulators, Semiconductors and Metals, Mobility and Conductivity. PN Junction Diode- Volt ampere characteristics, Diode capacitances, Static & dynamic resistances; Types of Diodes- Zener Diode, its breakdown phenomenon and its applications, Photodiodes, LED, Varactor Diode, Tunnel Diodes, Schottky diode.

(10 Hrs)

Unit-II: Diode Applications: Rectifiers and Filter Circuit: Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier and their Analysis, LC and Pi Filters; Series and Shunt Diode Clippers, Clipping at Two Independent Levels, Clamping Operation, Clamping Circuit, Practical Clamping Circuits.   **(10 Hrs)**
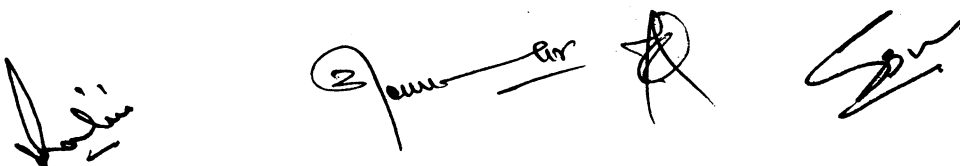
SECTION-B

Unit-III: Bipolar Junction Transistors: Symbol, Construction, and Characteristics of BJT, reach through phenomenon and Base width modulation, Transistor Configuration: CB, CE, CC Configuration with necessary current equations. Transistor as an amplifier and switch, Derivation related to Transistor Biasing and Bias Compensation Techniques.   **(10 Hrs)**

Unit-IV: Basics of Communication System: Introduction to Analog and Digital Communication Systems, Block Diagram Representation of Communication System, the Basic idea of Transmitter and Receiver used for radio communication, Various Frequency bands used for Communication, Need of Modulation and Introduction to Cellular Communication.   **(8 Hrs)**

BOOKS RECOMMENDED:
1. Integrated Electronics by J. Millman and C.C. Halkias, McGraw Hill Education, India.
2. Electronics Devices and Circuit Theory by R. Boylestad and L. Nashelsky, Pearson India.
3. Electronics Devices and Circuits-I by U. A. Bakshi and A. P. Godse, Technical Publications.
4. Electronic principles by L. Malvino, Tata McGraw Hill Education.
5. Electronic Communication Systems by G. Kennedy, McGraw Hill Education, India.

NOTE: There shall be total of eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

CLASS : B.E. 1ˢᵗSEMESTER
BRANCH: COMPUTER/CSE/IT/ECE/ELECTRICAL ENGINEERING
COURSE TITLE : UNIVERSAL HUMAN VALUES   Credits: 3
COURSE NO: HMT1102
DURATION OF EXAM : 3 HOURS

Hours/ Week			Marks	
L	T	P	Internal	External
2	1	0	50	100

COURSE OUTCOMES : On completion of the course the students will be able to:	
CO1	Understand the meaning of happiness and prosperity for a human being.
CO2	Comprehend the holistic approach about the family and society.
CO3	Understand the harmony in the nature and self-regulation in nature with ethical human conduct
CO4	Apply the understanding of harmony in existence in their profession.

SECTION A
UNIT 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

1. Understanding the need, basic guidelines, content and process for Value Education
2. Self Exploration–what is it?-its content and process; 'Natural Acceptance' and Experiential Validation-as the mechanism for self exploration
3. Continuous Happiness and Prosperity-A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facilities-the basic requirements for fulfilment of aspirations of every human being with their correct priority.

(11 hours)

UNIT 2: Understanding Harmony in the Human Being-Harmony in Myself!

1. Understanding human being as a co-existence of the sentient 'I' and the material' Body'
2. Understanding the needs of Self('I')and 'Body'– Happiness and physical facility.
3. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
4. Understanding the characteristics and activities of 'I' and harmony in 'I'   (9 hours)

SECTION B
UNIT 3: Understanding Harmony in the Family and Society-Harmony in Human-Human Relationship

1. Understanding Harmony in the family–the basic unit of human interaction
2. Understanding values in human-Human relationship: meaning of justice(*Nyaya*) and program for its fulfilment to ensure mutual happiness(*Ubhay-tript*) Trust(*Vishwas*) and Respect (*Samman*) as the foundational values of relationship
3. Understanding the meaning of trust(*Vishwas*):Difference between intention and competence
4. Understanding the meaning of respect(*Samman*),Difference between respect and differentiation; the other salient values in relationship

(10 hours)

UNIT4: Understanding Harmony in the Nature and Existence-Whole existence as Co-existence

1. Understanding the harmony in the Nature
2. Interconnectedness and mutual fulfilment among the four orders of nature-recyclability and self-regulation in nature.
3. Understanding existence as co-existence of mutually interacting units in all pervasive space
4. Holistic perception of harmony at all levels of existence.

(10 hours)

Book Recommended:

1. R.RGaur,RSangal,GPBagaria,AfoundationcourseinHumanValuesandprofessional Ethics, Excel books, New Delhi,

Reference Books:

1. P L Dhar, RR Gaur, Science and Humanism, Common wealth Purblishers.
2. Subhas Palekar,2000,How to practice Natural Farming, Pracheen(Vaidik)KrishiTantraShodh,
3. A Nagraj, 1998,Jeevan Vidya ek Parichay,Divya Path Sansthan, Amar kantak.
4. B. Mahadevan, Vinayak Rajat Bhat, Nagendra Pavana R.N, Indian Knowledge System, PHI Publisher.

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section.

Examination to be held in the year Dec-2022, 2023, 2024, 2025

CLASS: B.E. 1ˢᵗ SEMESTER
BRANCH: MECHANICAL / ELECTRICAL ENGINEERING

COURSE TITLE: WORKSHOP TECHNOLOGY
COURSE NO: MEP5112

Credits 1.5

Hours/ Week			Marks	
L	T	P	Internal	External
0	0	3	50	00

COURSE OUTCOMES: At the end of the course, the student will demonstrate the ability to: -	
CO1	Introduction to different manufacturing methods in different fields of engineering.
CO2	Understanding different manufacturing techniques and their relative advantages/disadvantages with respect to different applications.
CO3	Acquire a minimum practical skill with respect to the different materials.
CO4	Creation of simple components using different materials.

SHOP PRACTICE: -

Unit -1: - Carpentry
1. Middle/Cross lap joint
2. Mortise and Tenon Joint T -Joint
3. Pattern making of open bearing

Unit II: -Foundry
1. Moulding of open bearing (simple pattern)
2. Moulding of Sliding Job of Bench Vice (Split piece pattern)

Unit -III: - Smithy
1. Upsetting, drawing and bending operation

Unit -IV: - Welding
1. Preparation of single V- Butt joint by arc/gas welding.
2. Preparation of Double V-Butt joint by gas /arc welding.
3. Corner Joint by arc/gas welding
4. Lap Joint by arc/gas welding

Unit – V: - Fitting
1. Assembly of snap fitting of MS-Flat pieces (Male and Female)
2. Assembly and fitting of two L-shaped rectangular MS-flat pieces.

Books Recommended: -
1. Workshop Technology by Hajra and Chowdhary
2. Manufacturing Technology Vol I and II by Rao. P.N
3. Manufacturing Technology by Gowri. P. Hariharan and A. Suresh Babu.

Note:- Minimum of eight experiments to be performed.

Examination to be held in the year Dec-2022, 2023, 2024, 2025

CLASS: B.E 1ST SEMESTER
BRANCH: COMPUTER/CSE/IT/ECE/ELECTRICAL ENGINEERING   **CREDITS: 1**
COURSE TITLE: APPLIED ENGINEERING PHYSICS LAB.
COURSE NO: BSP1113

Hours/ Week			Marks	
L.	T	P	Internal	External
0	0	2	50	00

Course Outcomes (CO): At the end of the course the Student will be able to -

CO1	Gain knowledge about the scientific methods of measuring different physical parameters based on the concepts of Physics.
CO2	Develop experimentation skills by displaying minimized measurement errors.
CO3	Acquire the practical skills to obtain the solutions pertaining to different physics' experiments.
CO4	Acquire the essence of scientific temper infused with innovation and creativity.

Experiment No.	Title of Experiment
EXP-I	To find the co-efficient of self-induction of a coil by Anderson's Bridge using headphones.
EXP-II	To measure the number of lines on the diffraction grating using He-Ne laser.
EXP-III	To study the V-I characteristics of a PN- Junction diode.
EXP-IV	To find the wavelength of monochromatic light using Newton's rings apparatus.
EXP-V	To evaluate the value of Planck's constant using a photocell.
EXP-VI	To study the voice transmission through the optical fibre and measure the numerical aperture.
EXP-VII	To find the dispersive power of a given prism using a spectrometer.
EXP-VIII	To study the variation of Magnetic field by using Stewart and Gee's Tangent galvanometer.
EXP-IX	To find the resistivity of a semiconductor by four probe method at different temperatures.
EXP-X	To find the impedance of the LCR circuit.
EXP-XI	To study the Common base/ common emitter characteristics of PNP/NPN junction transistor.

NOTE: A minimum of ~~six~~ *eight* experiments is to be performed covering the diverse aspects of engineering physics

CLASS: B.E. 1ˢᵗ SEMESTER   CREDIT-1

BRANCH: ELECTRICAL/ CIVIL ENGINEERING
COURSE CODE: EEP2111
TITLE: PRINCIPLES OF ELECTRICAL ENGINEERING LAB.

Hours/Week			Marks	
L	T	P	Internal	External
0	0	2	50	00

<u>Course Outcome:</u>

After completion of laboratory course the students would able to:

CO.1	Experimentally verify the basic circuit theorems
CO.2	Measure current in series-parallel RLC circuits.
CO.3	Measure load of 3 phase ac circuits connected in star and delta
CO.4	Understand the basic characteristics of single phase transformer.

LIST OF EXPERIMENTS:
1. Verification of Kirchoff's Laws.
2. Verification of Superposition Theorem.
3. Verification of Thevinin's Theorem.
4. Verification of Norton Theorem.
5. Verification of Reciprocity Theorem.
6. Verification of Maximum Power Transfer Theorem.
7. Measurement of current in various branches of RLC series-parallel circuit.
8. Study of three-phase A.C Circuits with Star and Delta connected Load.
9. Study of single phase transformer. Determination of polarity test of given single phase transformer.
10. To perform open and short circuit test on single phase transformer.

Note- Minimum of seven experiments is to be performed by each student

CLASS: B.E 1ST SEMESTER
BRANCH:COMPUTER/CSE/IT/ELECTRICAL
ENGINEERING
COURSE CODE: ECP1111
TITLE: BASIC ELECTRONICS ENGG LAB

CREDIT:1

Hours/ Week			Marks	
L	T	P	Internal	External
0	0	2	50	00

COURSE OUTCOMES	
After learning this course students will be able to:	
CO.1	Plot forward and reverse characteristics of silicon and Zener diodes.
CO.2	To evaluate the performance parameters of Half and full wave rectifiers.
CO.3	Plot V-I characteristics of a transistor for various configurations using a trainer kit.
CO.4	Design of basic electronic circuits using soldering techniques.
CO.5	Understand the significance of modulation index in a communication system

LIST OF PRACTICALS

1. To study the active and passive electronic components & solder various electronic circuits on PCB.

2. To assemble various electronic circuits on Breadboard

3. To determine and plot the operating characteristics of the PN junction diode.

4. To study the characteristics of Zener diode, photodiode, Tunnel diode and LED.

5. To study Half wave and Full wave / Bridge Rectifier.

6. To study the operation characteristics (Input/Output) of the PNP/ NPN Transistor

   (Common Emitter/Common Base).

7. To study clipper and clamper circuits using diodes.

8. Design of self-bias circuits using BJT.

9. To find the modulation index of AM.

10. To find the demodulation of an AM and also find the modulating frequency.

11. To study the frequency response of Intermediate frequency Transformer (IFT)

Note: Each student has to perform at least nine experiments.

COURSE SCHEME

B.E. 2nd Semester Electrical Engineering

Examination to be held in the year May-2023, 2024, 2025, 2026

Contact Hours: 23

Course Code	Course Type	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits	% change
			L	T	P	Internal	External			
BST1201	Basic Science Theory	Engineering Mathematics -II	2	1	0	50	100	150	3	100%
BST1202	Basic Science Theory	Advanced Engineering Chemistry	2	1	0	50	100	150	3	100%
CET6201	Engineering Science Theory	Environmental Science	2	1	0	50	100	150	3	100%
CST3201	Engineering Science Theory	Fundamentals of programming using C	2	1	0	50	100	150	3	100%
MET5201	Engineering Science Theory	Basic Mechanical Engineering	2	1	0	50	100	150	3	100%
HMT1202	Engineering Science Theory	Professional Communication Skills	2	0	0	25	75	100	2	100%
CSP3211	Engineering Science Practical	Fundamentals of programming using C -Lab	0	0	2	50		50	1	100%
HMP1212	Engineering Science Practical	Professional Communication Skills Lab	0	0	2	50		50	1	100%
BSP1212	Basic Science Practical	Advanced Engineering Chemistry Lab.	0	0	2	50		50	1	100%
			12	5	6	425	575	1000	20	

BRANCH: COMPUTER/CSE/IT/CIVIL/E&C/ELECTRICAL/MECHANICAL ENGINEERING

CLASS: B.E. 2nd SEMESTER

COURSE TITLE: ENGINEERING MATHEMATICS-II

CREDITS: 3

COURSE NO: BST1201

DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks	
L	T	P	Internal	External
2	1	0	50	100

Course Outcomes: At the end of the course the students will be able to	
CO 1	Learn different tests to check the convergence or divergence of a series.
CO 2	Find the Fourier series of a function.
CO 3	Solve the differential equations of first order and higher order.
CO 4	Learn the concept of linear and non- linear partial differential equations.

SECTION A

UNIT-I: INTRODUCTION TO INFINITE SERIES

Convergence and divergence of a Series: p-test, Comparison Test, Cauchy Root Test, D'Alembert Ratio Test, Raabe's Test, Gauss Test, Logarithmic Test, Leibnitz Test for alternating series   (10 hours)

UNIT-II: FOURIER SERIES

Euler's formula, sufficient conditions for a Fourier expansion, functions having points of discontinuity, change of intervals. Odd and even functions, Fourier expansion of Odd and even periodic functions, half range series, typical wave forms, Parseval's formula, complex form of Fourier –series.   (10 hours)

SECTION B

UNIT-III: ORDINARY DIFFERENTIAL EQUATIONS

Differential equations of first order and first degree: Linear and Bernoulli's differential equations, Exact and non-exact differential equations. Higher order linear differential equations: Complementary solution, particular integral and general solution of these equations, variation of parameters technique to find particular integral of second order differential equations   (10 hours)

UNIT-IV: PARTIAL DIFFERENTIAL EQUATIONS

First order linear p.d.e, Non-Linear p.d.e. of 1st order, solution by Charpit's method, Four Standard forms of non-linear p.d.e with reference to Charpit's technique: $f(p, q) = 0$, $f(z, p, q) = 0$, $f(x, p) = g(y, q)$ and Clairaut's form. Homogeneous and Non-homogeneous higher order linear partial differential equations with constant coefficients, Rules for finding P.I and C.F, Non-Linear equations of 2nd order   (12 hours)

BOOKS RECOMMENDED:

1	Advanced Engineering Mathematics	R.K. Jain, S.R.K Iyenger, 2nd edition Narosa New Delhi.
2	Differential Equations	G. F. Simmons
3	Partial differential equations	M. D. Raisinghania
4	Engineering Mathematics-I	Dr. Bhopinder Singh
5	Engineering Mathematics-II	Dr. Bhopinder Singh

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of calculator is allowed.

Examination to be held in the year May-2023, 2024, 2025, 2026

CLASS: B.E. 2ND SEMESTER
BRANCH:COMPUTER/CSE/IT/E&C/ELECTRICAL
        ENGINEERING
COURSE TITLE: ADVANCED ENGINEERING CHEMISTRY
COURSE NO: BST1202
DURATION OF EXAM: 3 HRS

CREDIT: 3

Hours/ Week			Marks	
L	T	P	Internal	External
2	1	0	50	100

Course Outcomes: At the end of the course the students will be able to	
CO 1	Know the importance of green chemistry and apply the knowledge of Drugs in day to day life.
CO 2	Summarize the different types, preparation and uses of plastics, paints and varnishes.
CO 3	Acquire Knowledge about the identification of newly synthesized products through Spectroscopy
CO 4	Know the importance of Nano particles and get acquainted with the basic knowledge of various Electrochemical Cells.
CO 5	Know about the importance of colloids and the various chemical processes encountered in the water softening.

SECTION – A

Unit – I   **GREEN CHEMISTRY AND DRUGS**

Green Chemistry: Definition and need of Green Chemistry, Principles and applications of Green Chemistry.

Drugs: Definition, structure and applications of following drugs: -
  (a) Tranquilizers
  (b) Antibiotics

(06 hrs)

Unit – II   **PLASTICS, PAINTS AND VARNISHES**

Plastics: Introduction and importance of plastics, classification of plastics, moulding constituents of plastics, moulding of plastics into articles (compression, injection, transfer and extraction mouldings).

Paints: Introduction and requisites of a good paint, properties and uses of white pigments such as white lead and lithopone.

Varnishes: Definition, Preparation of Oil Varnish, Differences between Paints and Varnishes.   (08 hrs)
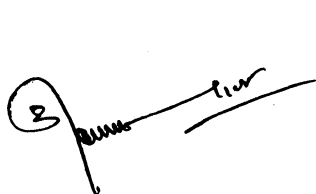
Unit – III   **SPECTROSCOPIC TECHNIQUES AND APPLICATIONS**

UV Spectroscopy: Principle, Band nature of UV Spectrum, types of electronic transitions and Applications.

I R Spectroscopy: Principle, molecular vibrations and Applications.

NMR Spectroscopy: Principle, shielding and de-shielding, equivalent and non-equivalent protons, chemical shift and Applications.   (08 hrs)

Unit – IV NANO CHEMISTRY AND MATERIAL SCIENCE

Nano Chemistry: Introduction and properties of nano particles, Nano materials- Graphene and fullerenes.
Material Science: Types, Properties and importance of materials: Metals, Semiconductors and Insulators.
Electrochemistry: Introduction to Electrolysis and Faraday's laws, Electrochemical cells; Galvanic cell and its application. Mass transfer by electroplating and diffusion.   (10 hrs)

Unit – V WATER TREATMENT AND COLLOIDS

Water Treatment: Introduction, softening of water by Zeolite and ion-exchange processes, priming and foaming, sludge and scale formation, determination of hardness of water by EDTA method, Numerical on hardness and softening of water.

Colloids: Definition, classification and properties of colloids-Brownian motion, electrophoresis and Tyndall effect. Paul C Hiemenz

      (10 hrs)

Books Recommended:

S.No.	BOOKS RECOMMENDED	AUTHOR
1.	Engineering Chemistry	Sharma, B.K.
2.	Material Science and Engineering	William Callister
3.	An introduction to Nanomaterials and Nano Science	A.K Das & Mahua Das
4.	Spectroscopy of Organic Compounds	Kalsi, P.S.
5.	Principles of Colloids and Surface Chemistry	Paul C Hiemenz

REFERENCE BOOKS

1.	Engineering Chemistry	Shashi, Chawla
2.	Spectroscopy of Organic Compounds	Silverstein
3.	Electrochemistry	Samuel Glasstone

NOTE: There will be total eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of calculator is allowed.

Examination to be held in the year May-2023, 2024, 2025, 2026

CLASS: B.E. 2ND SEMESTER
BRANCH: COMPUTER/CSE/IT/ELECRTICAL/MECHANICAL ENGINEERING
COURSE TITLE: ENVIRONMENTAL SCIENCE
COURSE NO: CET6201 **CREDITS:3**
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks	
L	T	P	Internal	External
2	1	0	50	100

COURSE OUTCOMES :On completion of the course the students will be able to:	
CO1	Understand the eco-systems, biodiversity and its conservation.
CO2	Understand the basic concepts of environmental studies and natural resources.
CO3	Gain knowledge about different types of environmental pollutions and their control measures.
CO4	Understand the fundamentals of social issues, population and the environment.

SECTION- A

Ecosystems: Ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Carbon and Nitrogen Cycles, Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types, Characteristic features, structures and functions of the following ecosystems: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (river and ocean).
(10 hrs)

Natural Resources: Renewable and Non-renewable resources.
Forest resources: Use and over Exploitation, deforestation, effects on forest and tribal people.
Water resources: Use and over utilization of surface and ground water and its conservation. (10 hrs)

SECTION-B

Environmental Pollution: Definition, Cause, effects and control measures of different types of pollution.
Air pollution- Sources, effects, control, air quality standards, air pollution act, air pollution measurement. Effect of air pollution on human beings, animals and materials.
Water Pollution-Sources and impacts, Soil Pollution-Sources and impacts, disposal of solid waste. Greenhouse gases – effect, acid rain, Ozone layer depletion.
(10 hrs)

Social Issues and the Environment: Sustainable development and Sustainable use of Resources, Urban problems related to energy, Energy resources: Growing energy needs, renewable and non renewable energy sources use of alternate energy sources, Land resources: Land as a resource, land degradation, soil erosion and desertification, Role of an individual in conservation of natural resources.
Environment Protection Acts: Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act and Forest Conservation Act.
(10 hrs)

REFERENCE BOOKS:
1. Environmental Engineering by Peavy, Rowe and Tchobanoglous, Mc Graw – Hill International Edition.
2. Elements of Environmental Science and Engineering, P. Meenakshi, 2nd edition, PHI Publishers.
3. Environmental Studies by Kaushik and Kaushik, New Age Publisher.
4. A Basic Course in Environmental Studies by Deswal and Deswal, Dhanpat Rai & Co.

NOTE: There shall be total eight questions of 20 marks each, four from each Section. Five questions have to be attempted, selecting at least two questions from each section. Use of calculator is allowed.

CLASS: B.E. 2ND SEMESTER
BRANCH: ELECTRICAL/CIVIL ENGINEERING

CREDITS:3

COURSE TITLE: FUNDAMENTALS OF
PROGRAMMING USING C
COURSE NO: CST3201
DURATION OF EXAM: 3
HOURS

Hours/ Week			Marks	
L	T	P	Internal	External
2	1	0	50	100

COURSE OUTCOMES: At the end of the course students will be able to:	
CO1	Understand various software development tools like algorithm, pseudo codes and flow charts for solving problems.
CO2	Understand the use of loops and decision making statements to solve the problems.
CO3	Apply different operations on arrays and user-defined functions to solve real-time problems.
CO4	Analyze the operation of pointers, structures and unions.
CO5	Implement file operations in C programming for a given application.

SECTION A

UNIT 1. Introduction to Programming (Flow chart/pseudocode, compilation etc.)

Evolution of programming languages, the compilation process, objects code, source code, executable code, fundamentals of algorithms, flow charts.

(4 Hours)

UNIT-2. Introduction to C, Data Types, Constants, Variables, Expressions, Statements, Operators, Data Input and Output.

Character set, Identifiers, Keywords, Data Types, Constant and Variables, Statements, Expressions, Operators, Precedence of operators, Input-output Assignments.

(6 Hours)

UNIT- 3. Control Statements, Storage Classes, Library Functions.

Control structures, Decision making and Branching, Decision making & looping. Storage Classes: Types of storage classes, Scoping rules. Standard Library Functions, advantages and use of various library functions (I/O functions, String, Character, Mathematics, Time and Date, functions)

(10 Hours)

SECTION B

UNIT-4. Functions, Arrays, User Defined Data Types, Structures
User defined and standard functions, Formal and Actual arguments, Functions category, function prototypes, parameter passing: Call-by-value, Call-by-reference, Nested functions. One dimensional Array, One dimensional Array, 2- dimensional arrays: declaration and their applications, searching in an array, Sorting in an array, String Manipulation, Passing array to a function. Declaration of structures.

(10 Hours)

UNIT- 5. Pointers in C

Pointer variable and its importance, Pointer Arithmetic, pointers to functions, dynamic memory allocation.

(8 Hours)

BOOKS RECOMMENDED:

1. C How to Program, 7/e - Paul J. Deitel
2. Programming With C - Byron Gottfried.
3. Programming With C - E. Balaguruswamy.
4. C The Complete Reference -Herbert Schildt.
5. Let us C - YashwantKanitkar.

NOTE: There will be eight questions of 20 marks each uniformly covering the entire syllabus. Students are required to attempt any five questions selecting at least two from each section. Use of Calculator is allowed

CLASS: 2nd SEMESTER

BRANCH: ELECTRICAL ENGINEERING   **CREDITS:3**

COURSE TITLE: BASIC MECHANICAL ENGINEERING

COURSE NO: MET5201

DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks	
L	T	P	Internal	External
2	1	0	50	100

COURSE OUTCOMES:	At the end of the course students will be able to:
CO1	To describe and use the basic concepts of Mechanical Engineering.
CO2	Principles and components of Mechanical Engineering.
CO3	Measuring and testing Methods of physical quantities.
CO4	Understanding properties of fluids and their uses.
CO5	Analyzing the performance of Hydraulic Machines.

Section A

Mechanics and Materials: Basic principles, Equivalent force system, Equations of equilibrium, free body diagram, Equilibrium of rigid bodies. Friction: Dry friction, description and applications of friction.
Classification of engineering materials, Composition of Cast iron and Carbon steels, Alloy steels their applications. Mechanical properties like strength, hardness, toughness, ductility, brittleness, malleability etc. of materials, tensile test stress- strain diagram of ductile and brittle materials.
Measurement: Concept of measurements, errors in measurements, Temperature, pressure, velocity, flow strain, force and torque measurement, vernier calliper, Micrometer, Dial gauge, Slip gauge, Sine-bar and Combination set.
     Production Engineering: Elementary and theoretical aspects of production processes like casting, carpentry, welding etc.   **(19 hrs.)**

Section B

Fluids: Fluid properties, density and viscosity etc. Types of fluids, Newton's law of viscosity, Pascal's law, Bernoulli's equation for incompressible fluids. Archimedes principles, buoyant force, working Principle of Hydraulic machines, pumps, turbines, Reciprocating pumps.
Thermodynamics: Introduction to Thermodynamics, Thermodynamics system (closed, open and isotropic systems), properties, state, process, Zeroth, First and second law of thermodynamics, thermodynamics processes at constant pressure, volume, enthalpy and entropy, thermodynamic Equilibrium and types of equilibrium, Classification and working of boilers, efficiency and performance analysis, Steam properties and use of steam tables.
Internal Combustion (I.C.) Engines: Working principle of steam Engine, Carnot, Otto, Diesel and Dual cycles P-V and T-S diagrams and its efficiency, working of Two- stroke and Four- stroke Petrol and Diesel Engines. Friction: Dry friction; Description and applications of friction. Working Principle of Compressors. **(20 hrs.)**

     Reference Books:
1. Agrawal CM, Basic Mechanical Engineering, Wiley Publication.
2. Achuthan M, Engineering Thermodynamics, PHI.
3. Ganesan, Internal combustion engines, TMH.
4. Nakra& Chaudhary, Instrumentation and Measurements

NOTE: There shall be total eight questions of 20 marks each, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

CLASS: B.E. 2ND SEMESTER
BRANCH: COMPUTER ENGINEERING/CSE/IT/E&C /ELECTRICAL ENGINEERING CREDITS:2
COURSE TITLE: PROFESSIONAL COMMUNICATION SKILLS
COURSE NO.: HMT1202
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks	
L	T	P	Internal	External
2	0	0	25	75

	Course Outcomes: At the end of the course the students will be able to
CO 1	Acquire proficiency in reading, writing, speaking & listening skills.
CO 2	Equip themselves with professional development skills.
CO 3	Learn interpersonal communication and self confidence.
CO 4	Learn the basics and essentials of Life skills education for successful life.

SECTION -A

Communication skills & writing practice: Introduction, Elements of Business Communication, Media of verbal communication (oral & written), Barriers to Communication, Technology-Enabled Business Communication, types of letter- inquiry letter, reply to an inquiry, claims letter, adjustment and sales letter, Job letter.
(08hrs)

Listening & Speaking skills: Process of listening, types of listening, techniques to improve listening ability, **Group Discussion**-Advantages, Purpose, Group Dynamics, and Guidelines for Effective Group discussion. **Speaking Skills**- Skills of Effective speaking, Tips for writing scripts and speeches.   (07hrs)

SECTION-B

Professional development:–Introduction, Objectives of professional development, tips for professional development, Activities that contribute to professional development. **Interviews**-Meaning, Types of interview, tips for giving an interview and handling questions.
(08hrs)

Life Skills:- Definition and Importance of Life Skills, Life Skills Activities for personality development, Essential Life Skills for personal and professional growth, Concept of Soft skills and Hard skills: Difference between soft skills & hard skills.
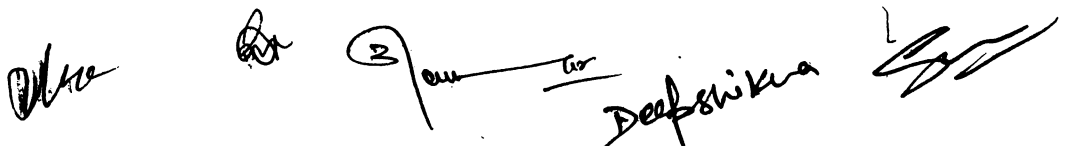(07 hrs)

Recommended Books:
- Communication Skills (Second Edition) by Sanjay Kumar & Pushap Lata, Oxford University Press.
- Functional Aspects of Communication Skills by Dr. Prajapati Prasad, Published by S.K Kataria& Sons.

Reference Books:
- An Approach to Communication Skills by Indrajit Bhattacharya, Published by Dhanpat Rai & Co Ltd
- Communication Skills by Varinder Kumar and Bodh Raj, Published by Kalyani Publishers.
- Integrated Life Skills by PayelBasu, published by Notion Press.
- Manuals of Life Skills Key to Excel by Alka Seth, Prof. Novrattan Sharma, Published by Global Vision Publishing House.
- Professional Development by Sally J. Zepeda, published by Taylor & Francis Ltd.

NOTE : There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed

CLASS: B.E. 2ND SEMESTER
BRANCH: ELECTRICAL/CIVIL
COURSE TITLE: FUNDAMENTALS OF PROGRAMMING
USING C LAB
COURSE NO: CSP3211

CREDITS:1

Hours/ Week			Marks	
L	T	P	Internal	External
0	0	2	50	00

COURSE OUTCOMES: At the end of the course students will be able to:	
CO1	Understand the working of different compilers and editors for writing programs in C.
CO2	Exercise conditional and iterative statements to write C programs
CO3	Implement Programs using operators, arrays and pointers to access functions.
CO4	Write programs that perform operations using derived data types and files.

Lab Experiments

Experiment 1: Problem solving using computers: Familiarization with programming Environment.
Experiment 2: Variable types and type conversions: Simple computational problems using arithmetic expressions.
Experiment 3: Branching and logical expressions: Problems involving if-then-else Structures.
Experiment 4: Loops, while and for loops: Iterative problems e.g., sum of series
Experiment 5: 1D Arrays: searching, sorting: 1D Array manipulation
Experiment 6: 2D arrays and Strings, memory structure: Matrix problems, String Operations
Experiment 7: Functions, call by value: Simple functions
Experiment 8: Structures and Structure Operations
Experiment 9: Implementation of Pointers
Experiment 10: Dynamic memory allocation

Note: Minimum of eight experiments to be performed

Examination to be held in the year May-2023, 2024, 2025, 2026

CLASS: B.E. 2nd SEMESTER
BRANCH: COMPUTER ENGINEERING/CSE/IT/E&C /ELECTRICAL ELECTRICAL
COURSE TITLE: PROFESSIONAL COMMUNICATION SKILLS LAB

COURSE NO.: HMP1212   **CREDITS:1**

Hours/ Week			Marks	
L	T	P	Internal	External
0	0	2	50	00

Course Outcomes: At the end of the course the students will be able to	
CO 1	Acquire proficiency in reading, writing and speaking skills.
CO 2	Develop presentation, interview and interpersonal skills

List of Practicals:

Listening Skills
1. Listen to text read aloud in normal speed with focus on intonation,
2. After listening the student can fill in blanks, choose a suitable title, make a summery, and be able to answer comprehension questions from the passage read aloud.

Speaking skills
3. Formal & Informal Conversations
4. Presentation Skills

Interpersonal Skills
5. Group Discussion
6. Interviews, Mock Interviews

Career Building & Resume writing
7. SWOT Analysis
8. Resume Writing

Life Skills Activities
9. Self Management
10. Role play

Note: 1. Eligibility to appear in Practical Test: 8 practicals
2.Simulation/ virtual labs are used to enhance the practical ability of students.

Examination to be held in the year May-2023, 2024, 2025, 2026

CLASS: B.E. 2ND SEMESTER
BRANCH:COMPUTER/CSE/IT/E&C/ELECTRICAL
ENGINEERING
COURSE TITLE: ADVANCED ENGINEERING CHEMISTRY LAB
COURSE No: BSP1212

CREDITS: 1

Hours/ Week			Marks	
L	T	P	Internal	External
0	0	2	50	00

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

	Course Outcomes: At the end of the course the students will be able to
CO1	Visualize and understand chemical engineering unit, operations related to fluid and practical mechanics and mass transfer.
CO2	Analyse an overview of preparation and identification of organic compound
CO3	Understand the quantitative analysis and makes use of simple equation to illustrate the concept involved.
CO4	Estimation of total hardness of water by EDTA complexometric method.

TITLE OF EXPERIMENTS

1. Determine Volumetrically the number of molecules of water of crystallization present in the given sample of Mohr's salt, x gms. of which have been dissolved per litre provided N/10 $K_2Cr_2O_7$ (using an external indicator).
2. Determine Volumetrically the percentage of Cu in a sample of $CuSO_4$ crystals, Z gms of which have been dissolved per litre, provided 0.IN $Na_2S_2 O_3$.
3. Determine the percentage of $CaCO_3$ in precipitated chalk. You are provided with IN HCI and 0.IN NaOH.
4. To analyse the given antacid tablets.
5. To determine the coefficient of viscosity of an unknown liquid using Ostwald Viscometer.
6. Determine the surface tension of a unknown liquid Stalagmometer.
7. To prepare a pure and dry sample of Glucosazone.
8. To analyse the absorbance of solutions at different concentrations by UV Spectrophotometer.
9. Determine the method of purification of organic compounds by paper chromatography.
10. Organic Analysis: Identify the following organic compound (preparation of at least one derivative) .
11. Determine the total hardness of a sample of water by complexometric method (using EDTA).
12. Determine the percentage of calcium oxide in cement.

Note:- A minimum of ten experiments to be performed.