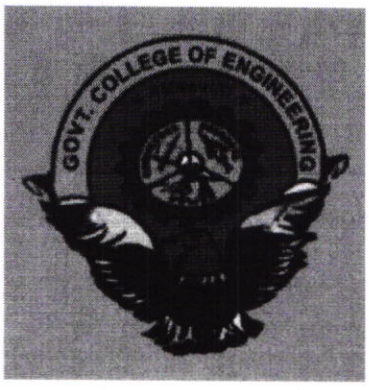
GOVERNMENT COLLEGE OF ENGINEERING

AMRAVATI



B. TECH. FIRST YEAR

CURRICULUM

2020-21

Semester I

Teaching Scheme							Evaluation Scheme						
Category	Course Code	Course Title	Theory	Tutorial	Practical		Theory			Practical		Total	Credits
			Hrs/week	Hrs/week	Hrs/week	Total	MSE	TA	ESE	ICA	ESE		
MC	SHU100	Induction Program	Two weeks mandatory audit course										0
BSC	SHU121	Physics	3	1	---	4	30	10	60	---	---	100	4
BSC	SHU122	Calculus and Linear Algebra	3	1	---	4	30	10	60	---	---	100	4
ESC	EEU121	Basic Electrical Engineering	3	---	---	3	30	10	60	---	---	100	3
ESC	CEU121	Engineering Mechanics	3	---	---	3	30	10	60	---	---	100	3
HSMC	SHU123	English	2	---	---	2	---	---	60	---	---	60	2
BSC/LC	SHU124	Physics Lab	---	---	2	2	---	---	---	50	---	50	1
ESC/LC	EEU122	Basic Electrical Engg Lab	---	---	2	2	---	---	---	50	---	50	1
ESC/LC	CEU122	Engineering Mechanics Lab	---	---	2	2	---	---	---	50	---	50	1
HSMC/LC	SHU125	English Lab	---	---	2	2	---	---	---	50	---	50	1
ESC/LC	MEU121	Workshop Practice I	---	---	2	2	---	---	---	50	---	50	1
		Total	14	2	10	26	120	40	300	250	0	710	21

Semester II

Teaching Scheme							Evaluation Scheme						
Category	Course Code	Course Title	Theory	Tutorial	Practical		Theory			Practical		Total	Credits
			Hrs/week	Hrs/week	Hrs/week	Total	MSE	TA	ESE	ICA	ESE		
BSC	SHU221	Chemistry	4	--	---	4	30	10	60	---	---	100	4
BSC	SHU222	Integral calculus and differential equations	3	1	---	4	30	10	60	---	---	100	4
ESC	CSU221	Programming for Problem solving	3	---	---	3	30	10	60	---	---	100	3
ESC	MEU221	Engineering Graphics	2	---	---	2	30	10	60	---	---	100	2
ESC	MEU222/ ETU221	Basic Mechanical Engineering/ Basic Electronics Engineering	2	---	---	2	30	10	60	---	---	100	2
BSC/LC	SHU223	Chemistry Lab	---	---	2	2	---	---	---	50	---	50	1
ESC/LC	CSU222	Programming for Problem solving Lab	---	---	4	4	---	---	---	50	---	50	2
ESC/LC	MEU223	Engineering Graphics Lab	---	---	4	4	---	---	---	50	---	50	2
ESC/LC	MEU224	Workshop Practice II	---	---	2	2	---	---	---	50	---	50	1
		Total	14	1	12	27	150	50	300	200	0	700	21

TA: Teacher Assessment **MSE: Mid Semester Examination** **ESE: End Semester Examination** **ICA: Internal Continuous Assessment**

MSE Duration: 1.30 Hrs all courses

Important Note:

MEU222 for only Electrical, Electronics & TC, Computer Science, Information Technology and Instrumentation Engineering branch
ETU221 for only Civil and Mechanical Engineering branch

In Semester I, the students of Civil, Mechanical, Electrical & Instrumentation Engineering shall be offered group A courses, and that of Electronics & TC, Computer Science and Information Technology shall be offered group B courses. In Semester II, vice versa.

In addition following courses are offered
SHU122 and MEU121 for all students in Semester I. SHU222 and MEU224 for all students in Semester II.
MEU222 shall be offered in Semester I for Electronics & TC, Computer Science, Information Technology branch. And it shall be offered in Semester II for Electrical and Instrumentation Engineering branch
ETU221 shall be offered in Semester II for Civil and Mechanical Engineering branch.

There should be direct correspondence of group A and group B courses.

Sr. No.	Group A Courses		Group B Courses	
	Course Code	Title of Course	Course Code	Title of Course
1	SHU121	Physics	SHU221	Chemistry
2	EEU121	Basic Electrical Engineering	CSU221	Programming for Problem solving
3	CEU121	Engineering Mechanics	MEU221	Engineering Graphics
4	SHU123	English	SHU223	Chemistry Lab
5	SHU124	Physics Lab	CSU222	Programming for Problem solving Lab
6	EEU122	Basic Electrical Engineering Lab	MEU223	Engineering Graphics Lab
7	CEU122	Engineering Mechanics Lab		
8	SHU125	English Lab		

Category of Course	Definition	Credits
BSC	Basic Science Courses	18
ESC	Engineering Science Courses	21
HSMC	Humanities and Social Sciences including Mgt.Courses	3
	Total Credits	42

SHU100 INDUCTION PROGRAM

Teaching Scheme: Two weeks mandatory course **Credit: 00**

Government College of Engineering, Amravati propose a 2-week long induction program for the UG students entering the institution, right at the begining of first semester. It will be helpful to students to adjust the new environment and inculcate the spirit of vision and mission of the institution. All students admitted to the B.Tech programme will have to take Induction program as an additional requirement with minimum 75% attendance and be completed within first four semesters.

2 weeks duration
• Physical activity • Creative Arts • Universal Human Values • Literary • Proficiency Modules • Lectures by Eminent People • Visits to local Areas • Familiarization to Dept./Branch & Innovations

SHU121 PHYSICS

Teaching Scheme : 03 L + 01T **Total: 04** **Credit : 04**
Evaluation Scheme : 30 MSE + 10 TA + 60 ESE **Total marks : 100**
Duration of ESE : 2 Hrs 30 min.

Course Objectives:

I. To provide exposure about the basic principles of Physics along with the possible applications.
II. To develop an insight that provide necessary foundation for scientific thinking and innovation.
III. To create awareness about vital role played by science & recent advancements in technology.

Wave Optics: *Interference:* Interference at parallel thin film, interference at wedge shaped film, Newton's rings, application of interference in measurement of refractive index, testing of optical flatness of surface, anti-reflection coating.

Diffraction: Fraunhofer diffraction at single and double slit, the Rayleigh criterion for limit of resolution and its application to vision, diffraction gratings and their resolving power

Polarization: Polarization by double refraction, quarter wave plate and half wave plate, production of circularly and elliptically polarized light.

Lasers: Energy levels in atoms, radiation-matter interaction, absorption of light, spontaneous emission of light, stimulated emission of light, population of energy levels, Einstein A and B coefficients, metastable state, population inversion, resonant cavity, excitation mechanisms, lasing action, properties of laser, characteristics of different types of laser, types of laser - solid state laser (Nd–YAG), gas laser (He-Ne), semiconductor laser, applications of Laser in engineering.

Introduction to Quantum Mechanics: Introduction to quantum mechanics, wave nature of particles, wave packet, Heisenberg's uncertainty principle (its experimental illustration), application (non existence of electron in nucleus), wave function, time-dependent and time-independent Schrödinger wave equations, motion of a free particle, solution of stationary-state Schrödinger equation for one dimensional problems–particle in a box.

Semiconductor Physics: Intrinsic and extrinsic semiconductors, dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), carrier generation and recombination, carrier transport: diffusion and drift, pn-junction and its working on the basis of energy band diagrams, Hall effect (Hall voltage and coefficient).

Text Books:

1. A Textbook of Engineering Physics, M. N. Avadhanulu, P. G. Kshirsagar, S. Chand, 2016
2. Textbook of Optics, N. Subrahmanyam, Brij Lal, S. Chand, 2006

Reference Books:

1. Optics, A. Ghatak, McGraw Hill Education, 2012.
2. Engineering Physics, Dattu R. Joshi, Mc Graw Hill Education, 2010.
3. Fundamentals of Physics, D. Halliday, R. Resnick, J. Walker, John Wiley & Sons, 2011

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

SHU121.1 Demonstrate competency, understanding concepts & working principles of physics.

SHU121.2 Understand the concepts in modern physics and will be able to apply them.

SHU122 CALCULUS& LINEAR ALGEBRA

Teaching Scheme : 03 L + 01T **Total 04** **Credit: 04**

Evaluation Scheme: 30 MSE + 10 TA + 60 ESE **Total marks: 100**

Duration of ESE : 2 hrs 30 min.

Course Objectives:

I. To familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra.

II. To equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

Infinite Series:

Convergence of series, tests for convergence: Comparision test, D'Alembert's ratio test, Raabe's test Cauchy's root test, Power series, Taylor's series, series for exponential, trigonometric and logarithm functions, Fourier series, Half range sine and cosine series.

Partial Differentiation:

Partial derivatives of first and higher orders; total derivative, homogeneous function-Euler"s theorem Tangent plane and normal line, Maxima, minima and saddle points, Jacobian and its properties.

Matrices:

Rank of a matrix; Echelon and normal form of a matrix; Homogeneous and non homogeneous system of linear equations; Eigen values and eigen vectors, Diagonalization of matrices, Cayley-Hamilton theorem(without proof), and orthogonal transformation.

Complex Numbers:

De Moivre's theorem, Roots of equation, Hyperbolic & inverse hyperbolic functions, separation of real & imaginary parts, logarithm of complex numbers.

Special Functions:

Beta and Gamma functions and their properties,
Differentiation under integral sign,
Curve tracing (Cartesian and polar).

Text Books:

1. Higher Engineering Mathematics, B. S. Grewal, 43th edition, Khanna publication,new Delhi 2013.
2. A text book of Applied Mathematics, P. N. Wartikar and J. N. Wartikar (Vol I and II), Pune Vidyarthi Griha Prakashan, Pune, 7th Edition, 2003.

Reference Books:

1. Higher Engineering Mathematics, B. V. Ramana, Tata McGraw Hill Publications, 2007.
2. Advanced Engineering Mathematics, H. K. Dass, S. Chand and Sons, 12th edition, 2002.
3. A Text book of Engineering Mathematics, N.P.Bali, Manish Goyal, Laxmi Publications,7th Edition 2008.
4. Advanced Engineering Mathematics, Erwin kreyszig, 9 Edition, John Wiley & Sons, 2006.
5. Calculus and Analytic geometry, G.B. Thomas and R.L. Finney, 9 Edition, Pearson, Reprint, 2002.

Course Outcomes:-The students will be able:-

SHU122.1 to apply differential and integral calculus to notions of curvature and to improper integrals and shall have a basic understanding of Beta and Gamma functions.
SHU122.2 to use the tool of power series and Fourier series for learning advanced Engg. Mathematics.
SHU122.3 to deal with functions of several variables that are essential in most of engineering branches.
SHU122.4. to use the essential tool of matrices and linear algebra in a comprehensive manner.

EEU121 BASIC ELECTRICAL ENGINEERING

Teaching Scheme : 03 L **Total: 03** **Credit: 03**
Evaluation Scheme: 30 MSE +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE : 2 Hrs.30 min.

DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff's Current and Voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

AC Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three- phase balanced circuits, voltage and current relations in star and delta connections.

Magnetic Circuits and Transformers: Basics of magnetic circuits, Magnetic materials, BH characteristics, ideal and practical transformer, losses, regulation and efficiency by direct loading, Auto-transformer, three-phase transformer connections (Star and Delta)

Electrical Machines: Concept of rotating magnetic fields, Construction, working, starting and speed control of three-phase induction motor, Single-phase induction motor and separately excited dc motor. Construction and working of synchronous generators. [No numericals on this Module]

Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Suggested Text / Reference Books

1. D. P. Kothari and I. J. Nagrath, " Basic Electrical Engineering" , Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. L. S. Bobrow, "Fundamentals of Electrical Engineering" , Oxford University Press,2011
4. E.Hughes,"Electrical and Electronics Technology", Pearson, 2010.
5. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

Course Outcomes

EEU121.1 To understand and analyze basic electric and magnetic circuits
EEU121.2 To study the working principles of electrical machines and power converters.
EEU121.3 To introduce the components of low voltage electrical installations

CEU121 ENGINEERING MECHANICS

Teaching Scheme : 03 L Total: 03 Credit: 03
Evaluation Scheme : 30 MSE +10 TA+ 60 ESE Total Marks: 100
Duration of ESE : 2 Hrs.30 min.

Course Objectives:

I. To demonstrate applications of principles of mechanics for solutions of various engineering problems.
II. To inculcate in students, problem solving abilities and enhance their analytical abilities.
III. To enhance students' ability to design by solving open ended problems.
IV. To prepare the students for higher level courses such as Strength of Materials, Electrical Machines, Mechanical Design and Structural Analysis.

Vector Mechanics: Introduction to the principles of mechanics, General Force Systems, Moment of a force about a point and about an axis, Couple and couple moment, Couple moment as free vector, Moment of couple about a line, Resolution and composition of coplanar force system, Reduction of system of forces into a force couple system, Simple resultant, wrench. Resultant and Equilibrium of: Two-dimensional force systems and Three-dimensional force systems

Trusses & Cables: Analysis of simple plane trusses, Method of joints, Method of sections, Static analysis of cables for point loads.

Friction: Concept of friction, impending motion, angle of friction, angle of repose, cone of friction, Coulombs laws of dry fiction, wedge blocks, belt friction, Concept of dynamic friction.

Centroid and Centre of Gravity: Centroid of plane areas, second moment of area, and product of inertia, perpendicular and parallel axis theorem, polar moment of inertia, radius of gyration, Principal axes and principal moment of inertia, centre of gravity, mass moment of inertia.

Kinematics: Kinematics of particles: Basic concepts; Rectangular components; Normal and tangential components; Radial and transverse components; motion curves Relative motion; Dependant motion. Kinematics of rigid bodies: Translational motion; Rotation about a fixed axis; General plane motion; Coriolis acceleration, Instantaneous Centre of Rotation.

Kinetics: Kinetics of rectilinear and circular motion of a particle acted upon by a constant and variable force system, Newton's second law; Impulse momentum principle; Central impact; work energy equation for rigid bodies, Energy principles, concept of dynamic equilibrium.

Virtual Work: Work of a force, Principle of Virtual Work and its Engineering Applications.

Text Books:

1. Vector Mechanics for Engineers, Vol. 1 – Statics and Vol. 2 – Dynamics, Beer and Johnston, 8th edition, Tata McGraw Hill International Edition, 2010.
2. Engineering Mechanics, Vol. 1 – Statics 4/e, 1998 and Vol. 2 – Dynamics, Merriam, 5/e, Wiley International, 2001.
3. Engineering Mechanics, by Dr. K. L. Kumar, Tata McGraw Hill Publications, 2011

References Books:

1. Engineering Mechanics, Irving H. Shames, & Rao, Prentice Hall, New Delhi 2010.
2. Engineering Mechanics, Vol. 1–Statics and Vol. 2–Dynamics, Mokoshi, V.S., Tata MGH Books, 1996.
3. Engineering Mechanics, F.L.Singer, HarperCollins Publishers India, 2001
4. Engineering Mechanics, McLean, 3rd Edition, SCHAUM Series, 1995.
5. Engineering Mechanics, Timoshenko and Young, McGraw Hill Publication.
6. Engineering Mechnaics, R. C. Hibbeler, Pearson Publishers, 2010
7. NPTEL series of IIT.

Course Outcomes:

After Completion of the course, students will be able to

CEU121.1 Students shall be able to apply the principles of mechanics for solving the structures like trusses, cables and beams.

CEU121.2 Students shall be equipped with problem solving ability for rigid body mechanics.

CEU121.3 Students shall exhibit various applications of Newtonian Mechanics in their respective engineering disciplines.

CEU121.4 Students shall be clear in fundamentals before going for higher level courses such as Strength of Materials, Electrical Machines, Engineering Thermodynamics, Structural Analysis, Design of Structures, Machine Designs etc.

SHU123 ENGLISH

Teaching Scheme : 02 L **Total: 02** **Credit: 02**
Evaluation scheme: 60 ESE **Total Marks: 60**
Duration of ESE : 2.30 Hrs

Course Objectives:

I. Improve various types of letter writing skill
II.Improve vocabulary knowledge

Vocabulary Building: The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives, Synonyms, antonyms, one word substitute and standard abbreviations.

Basic Writing Skills : Sentence Structures, Use of phrases and clauses in sentences, Importance of proper punctuation, Creating coherence, Organizing principles of paragraphs in documents, Techniques for writing precisely

Identifying Common Errors in Writing: Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies, Clichés

Nature and Style of sensible Writing: Describing, Defining, Classifying, Providing examples or evidence, writing introduction and conclusion

Writing Practices: Comprehension, Précis Writing, Essay Writing, business letters and resumes.

Suggested Readings:

1. Practical English Usage. Michael Swan. OUP. 1995.

2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts- I-III CIEFL, H yderabad. Oxford University Press.

Course Outcomes:
SHU123.1 The student will acquire basic proficiency in English including reading and listening Comprehension, writing and speaking skills.

SHU124 PHYSICS LAB

Teaching Scheme : 02 P **Total :02** **Credit : 01**
Evaluation Scheme : Internal Continuous Assessment **Total marks : 50**

Course Objectives:

I. Practical aspect of applied physics explore the relationships between physical parameters, cultivate the habit of inquiry and acquires skills of observation.

II. Identification of possible errors, analysis and interpretation of data into results.

III. Introduction to modern scientific and technical tools necessary for professional practice.

This is a representative list of practicals. The student is required to perform minimum eight experiments as per his choice so as to cover entire contents of this course.

List of experiments:

1. Determination of radius of curvature of planoconvex lens by using Newton's rings.
2. Determination of wavelength of spectral lines using diffraction.
3. Determination of grating element-using diffraction of LASER beam.
4. Minimum deviation from a prism.
5. Determination of Specific rotation of optically active liquids.
6. Determination of energy gap in semiconductor.
7. To determine type of semiconductor and Hall coefficient. To determine the carrier concentration and conductivity of a semiconductor using Hall effect.
8. Determination of surface resistivity of given semiconductor by four probes method and study its temperature variation.
9. To determine the Curie temp and relative permittivity of given ferro-electric material.
10. Study of Meissner effect in high TC superconductors and determination of its transition temperature.
11. Study measurement of voltage and frequency using Cathode Ray Oscilloscope.
12. Study characteristics of solar cell at different intensities and determination of maximum workable power.
13. Study of optical fibre characteristics.

Course Outcomes: After completing this course student shall be able to
SHU123.1 Identify probable errors and their rectification.
SHU123.2 Use the techniques, skills and modern engineering tools necessary for professional practice.

EEU122 BASIC ELECTRICAL ENGINEERING LAB

Teaching Scheme : 02 P Total: 02 Credit: 01
Evaluation Scheme : Internal Continuous Assessment Total Marks: 50

This is a representative list of practicals. The student is required to perform minimum eight experiments as per his choice so as to cover entire contents of this course.

List of experiments/demonstrations:

1 Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.

2 Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits to a step change in voltage (transient may be observed on a storage oscilloscope). Sinusoidal steady state response of R-L, and R-C circuits – impedance calculation and verification. Observation of phase differences between current and voltage.Resonance in R-L-C circuits.

3 Transformers: Observation of the no-load current waveform on an oscilloscope (non-sinusoidal wave-shape due to B-H curve nonlinearity should be shown along with a discussion about harmonics). Loading of a transformer: measurement of primary and secondary voltages and currents, and power.

4 Three-phase transformers: Star and Delta connections. Voltage and Current relationships (line-line voltage, phase-to-neutral voltage, line and phase currents).Phase-shifts between the primary and secondary side.Cumulative three-phase power in balanced three-phase circuits.

5 Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), synchronous machine (field winding - slip ring arrangement) and single-phase induction machine.

6 Torque Speed Characteristic of separately excited dc motor.

7 Synchronous speed of two and four-pole, three-phase induction motors.Direction reversal by change of phase-sequence of connections. Torque-Slip Characteristic of an induction motor.Generator operation of an induction machine driven at super- synchronous speed.

8 Synchronous Machine operating as a generator: stand-alone operation with a load.Control of voltage through field excitation.

9 Demonstration of Components of LT switchgear.

Laboratory Outcomes:

EEU122.1 Get an exposure to common electrical components and their ratings.
EEU122.2 Make electrical connections by wires of appropriate ratings.
EEU122.3 Understand the usage of common electrical measuring instruments.
EEU122.4 Understand the basic characteristics of transformers and electrical machines.

ICA - Internal Continuous Assessment shall be based on the practical record and knowledge /skills acquired. The performance shall assess experiment wise by using continuous assessment formats, A and B.

CEU122 ENGINEERING MECHANICS LAB

Teaching Scheme : 02 P Total: 02 Credit: 01
Evaluation Scheme : Internal Continuous Assessment Total Marks: 50

Course Objectives

I. To verify the principles of mechanics experimentally.
II. To develop in the students the skill of using graphical methods / Computer programming for the solution of mechanics problems.
III. To describe the motion of a particle / rigid bodies in terms of its position, velocity and acceleration in different frames of reference.

It is a representative list of practical with minimum seven experiments and minimum three graphical solutions using computer programming. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise.

1.Determination of resultant of coplaner concurrent force system by law of polygon of forces.
2. Determination of reactions at the supports of simple supported beam.
3. Determination of forces in the members of Jib crane.
4. Determination of coefficient of friction between inclined glass planes and different blocks.
5. Determination of coefficient of friction between belt and fixed drum.
6. Determination of mechanical advantage, velocity ratio and efficiency of simple screw jack machine.
7. Determination of mechanical advantage, velocity ratio and efficiency of machine. (Any one machine from differential wheel axle machine, single purchase crabs machine, double purchase crabs machine, worm and worm wheel machine)
8. Experiment on Coriolis acceleration
9. Determination of 'g' by compound pendulum.
10. Determination of moment of inertia of flywheel.
11. Verification of Newton's second law of motion by Fletcher's trolley.
12. Demonstration of direct central impact
13. Verification of Virtual Work Principle
14. Determination of Beam Reactions of a compound beam
15. Motion curves for particles / rigid bodies.

Course Outcomes:

After Completion of Course, the student will be able to

CEU122.1 To know when theory applies and when theory is limited by simplifying assumptions.

CEU122.2 identify reasons why actual measurements will differ from theoretical calculations.

CEU122.3 use the laboratory equipments correctly and safely to perform all experiments

CEU122.4 verify the wide field of engineering mechanics in various engineering applications

SHU125 ENGLISH LAB

Teaching Scheme : 02P **Total: 02** **Credit:01**
Evaluation Scheme: Internal Continuous Assesment **Total Marks: 50**

Oral Communication:

(This unit involves interactive practice sessions in Language Lab)

1. Listening Comprehension
2. Pronunciation, Intonation, Stress and Rhythm
3. Common Everyday Situations: Conversations and Dialogues
4. Communication at Workplace
5. Interviews
6. Formal Presentations

MEU121 WORKSHOP PRACTICE - I

Teaching Scheme : 02P **Total 02** **Credit : 01**

Evaluation scheme: Internal Continuous Assessment **Total Marks: 50**

Course Objectives:

I. To develop skills to prepare carpentry job
II. To develop skills to prepare gas/arc welding job
III. To develop skills to prepare sheet metal job
IV. To develop skills to prepare black smithy job
V. To develop skills of constructing choke & small transformer windings
VI. To develop skills of repairs & maintenance of domestic electrical appliances
VII. To understand different types of wirings & earthing methods
VIII. To identify all parts of a Personal Computer
IX. To assemble a Personal Computer

Group A

Carpentry: Introduction to wood working, kinds of woods, hand tools & machines, Types of joints, wood turning, Pattern making, types of patterns, Pattern making tools.
One job on wood working joint and demonstration of pattern making on wood working lathe.

Welding: Introduction to various welding equipment and welding joints, Demonstration on Gas welding, Electric arc welding, Spot welding, Resistance welding and TIG/MIG welding
One job on Arc welding

Sheet metal: Introduction to primary technology processes involving bending, punching and drawing, sheet metal tools and equipment, their uses, various sheet metal joints, surface development.
One job on sheet metal joint

Group B

Smithy: Introduction to various smithy tools and equipment, Introduction to forging operation,
One job on upsetting, drawing down, flattening

Electrical Workshop: Transformer and choke winding; repair and maintenance of domestic appliances like mixture, grinder, iron, geyser, electric fan, tube light etc.; MCB, ELCB; Different types of wiring. One job on preparation of extension boards, tube light wiring etc.; demonstration of earthing

Computer Hardware Shop : Introduction of Personal/ Micro Computers, PC Main Parts: CPU Box, Monitor & Peripherals, Inside CPU Box. Various terms used in computer memory. Floppy drives, HDD, CD, and SMPS. Identification of cables of computers; Installation of cards, devices and connecting cables

The shops listed in Group A are common to students of all programs and the shops of Group B are allotted as shown below.

Programme Name	Group B	Group A
Civil Engg.	Smithy	For all branches (Carpentry, Welding, Sheet Metal)
Mechanical Engg.	Smithy	
Electrical Engg.	Electrical Workshop	
Electronics & TC Engg.	Computer Hardware shop	
Computer Science & Engg.	Computer Hardware shop	
Information Technology	Computer Hardware shop	
Insrumentation Engg.	Electrical Workshop	

Course Outcomes:
After completion of course students will be able to
MEU123.1 Prepare a job on wood working joints
MEU123.2 Prepare a job using welding operations
MEU123.3 Prepare a sheet metal job
MEU123.4 Prepare a job using smithy operation
MEU123.5 Construct choke & small transformer
MEU123.6 Perform repairs & maintenance of domestic electrical appliances
MEU123.7 Assemble different types of wirings & carry out electrical earthing
MEU123.8 Explain how a PC works, and understand the relationship between hardware and software
MEU123.9 Install, configure, optimize and upgrade personal computers
MEU123.10 Classify and explain the function of different computer hardware components

SHU221 CHEMISTRY

Teaching Scheme : 04 L **Total: 04** **Credit: 04**
Evaluation scheme: 30MSE+10TA+60ESE **Total Marks: 100**
Duration of ESE : 2 hrs 30 min

Course objectives:
I. Have knowledge about engineering materials eg. Refractories, Composite etc.
II. Be aware about Spectroscopic Techniques and Applications.
III. Know Industrial process for softening of water.
IV. Understand the types of Reaction Mechanism.

Spectroscopic techniques and applications: Introduction of Spectroscopy, Principles, Instrumentation and Applications of Fluorescence spectroscopy, AAS (Atomic absorption spectroscopy) and UV- Visible spectroscopy in medicine.

Water treatment: Definition of hardness of water, Types of hardness and softening methods like Lime-Soda, Zeolite and Ion exchange. Units of hardness, Methods of treatment of water for domestic & Industrial purpose, Numerical problems on Lime-soda and Zeolite process. Boiler troubles: Boiler corrosion, Caustic embrittlement, Priming and Foaming, Scale and Sludge formation and internal treatment for Boiler feed water.

Organic reactions and synthesis of a drug molecule: Introduction to reactions involving substitution, addition, elimination, oxidation, reduction etc. Synthesis of a commonly used drug molecule.

Use of free energy in chemical equilibria : Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria.

Engineering Chemistry: Corrosion of metals- definition, types and mechanism of Dry and wet corrosion. Design and Material selection, Anodic & cathodic protection, hot dipping: - galvanizing and tinning. Composite Material- definition, classification and applications. Refractories-Definition, types, properties Requisites of good refractory and manufacturing process of refractory.

Fuel: Classification, Calorific value-gross & net Determination of calorific value by Bomb calorimeter & Boy's calorimeter, Proximate & Ultimate Analysis of coal & its significance, Cracking of petroleum fractions, use of gasoline & diesel in internal combustion engines. Working of IC engine, Knocking, Antiknocking agents, there properties with chemical constitution, Octane number and Cetane number.

Course outcomes: After studying the course, the students will be able to:
SHU221.1 Have knowledge about spectroscopy.
SHU221.2 Understand the types of hardness of water and softening methods.
SHU221.3 Identify types of reaction mechanism.

SHU221.4 Explain of thermodynamic terms.
SHU221.5 Explain engineering materials.
SHU221.6 Understand the working of IC engine.

Recommended Books:

1. Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
2. Fundamentals of Molecular Spectroscopy, by C. N. Banwell
3. Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan
4. Physical Chemistry, by P. W. Atkins
5. Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore.

SHU222 INTEGRAL CALCULUS AND DIFFERENTIAL EQUATIONS

Teaching Scheme : 03 L+01T **Total 04** **Credit: 04**
Evaluation Scheme: 30 MSE + 10 TA + 60 ESE **Total marks : 100**
Duration of ESE : 2 hrs 30 min.

Course Objectives:

I. To familiarize the prospective engineers with techniques in multivariate integration.
II. To familiarize the techniques in ordinary differential equations.
III. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

Multiple Integration:

Double integrals (Cartesian & polar), Change of order of integration in double integrals, Change of variables (Cartesian to polar), Triple integrals, orthogonal curvilinear coordinates, Applications: areas and volumes.

First order ordinary differential equations:

Exact & non exact equations, linear and Bernoulli's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Ordinary differential equations of higher orders:

Linear differential equation with constant coefficient, Second order linear differential equations with variable coefficients: Cauchy-Euler equation, method of variation of parameters, Power series solutions: Legendre polynomials.

Numerical Methods:

Solution of Algebraic and transcendental equations: Bisection method, Newton-Raphson method and Regula-Falsi method.

Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae, Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae.

Text Books:

1. Higher Engineering Mathematics, B. S. Grewal, 43th edition, Khanna publication, new Delhi 2013.
2. A text book of Applied Mathematics, P. N. Wartikar and J. N. Wartikar (Vol I and II), Pune Vidyarthi Griha Prakashan, Pune, 7thEdition, 2003.

Reference Books:

1. Higher Engineering Mathematics, B. V. Ramana, Tata McGraw Hill Publications, 2007.
2. Advanced Engineering Mathematics, H. K. Dass, S. Chand and Sons,12th edition, 2002.
3. A Text book of Engineering Mathematics, N.P.Bali, Manish Goyal, Laxmi Publications,7th edition 2007.
4. Advanced Engineering Mathematics, Erwin kreyszig, 9 Edition, John Wiley & Sons, 2006.
5. An Introduction to Ordinary Differential Equations, E. A. Coddington, Prentice Hall India, 1995.

6. Engineering Mathematics for first year, Veerarajan T.,Tata McGraw-Hill, New Delhi, 2008.

Course Outcomes: The students will able:

SHU222.1. To use the mathematical tools needed in evaluating multiple integrals and their usage.
SHU222.2. To apply effective solution techniques of differential equations that model physical processes.
SHU222.3. To solve mathematical problems using numerical techniques
SHU222.4.To solve various engineering problems with the help of knowledge of differential equations with higher order.

CSU221 PROGRAMMING FOR PROBLEM SOLVING

Teaching Scheme : 03 L **Total:03** **Credits: 03**
Evaluation Scheme: MSE 30 +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE : 2Hrs. 30min.

Course Objectives:

I. To introduce basics of programming and develop logical thinking of students.
II. To help students understand how to model real world problems into the software
III. To implement mathematical statistical, applications into programming using C Language.

Introduction to Programming: Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code, Arithmetic expressions and precedence, Conditional Branching and Loops , Writing and evaluation of conditionals and consequent branching ,Iteration and loops

Arrays: Arrays (1-D, 2-D), Character arrays and Strings

Basic Algorithms: Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

Function: Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference

Recursion: Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

Structure : Structures, Defining structures and Array of Structures

Pointers: Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

File handling

Text Books:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

Reference Books

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

Course Outcomes: The student will able to

CSU221.1 formulate simple algorithms for arithmetic and logical problems and translate the algorithms to programs.
CSU221.2 implement conditional branching, iteration and recursion.
CSU221.3 use arrays, pointers and structures to formulate algorithms and programs.
CSU221.4 apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
CSU221.5 apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.

MEU221 ENGINEERING GRAPHICS

Teaching Scheme : 02 L **Total 02** **Credit: 02**
Evaluation Scheme: 30 MSE + 10 TA + 60 ESE **Total marks: 100**
Duration of ESE : 3 Hrs.

Course Objectives:

I. To inculcate imagination and mental visualization capabilities for interpreting the geometrical details of common engineering objects.
II. To impart knowledge about principles/methods related to projections of one, two and three dimensional objects.
III. To develop in students, graphic skills for communication of concepts, ideas and design of engineering products and expose them to existing national standards related to technical drawings.
IV. To be able to read, understand and apply the knowledge of orthographic projections (production related features and instructions) in manufacturing industry, process industry and other allied engineering application.
V. To create the image of three dimensional figures with the help of isometric projections.

All projections in this course are restricted to First Quadrant only.

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Different types of lines used in drawing practices, dimensioning, Introduction to scale i.e. full size, Reducing scale and enlarging scale.

Conic sections (No focus and directrix method); Cycloid, and Involute; Principles of Orthographic Projections, concepts of four quadrants and conventions used to represent methods of orthographic projection. Projections of Points and lines inclined to both planes (excluding applications of straight lines.)

Projections of Planes: Projection of planes when it is parallel to one & perpendicular to other reference plane, lying in reference plane, inclined to one & perpendicular to other reference plane, inclined to both reference planes. Auxiliary planes - Auxiliary Inclined Plane (AIP) and Auxiliary Vertical Plane (AVP), Use of Auxiliary Plane method for solving the problems.

Projections of Solids: cube, tetrahedron, prism, pyramid, cylinder and cone, projections of above solids when axis perpendicular to one of the reference planes, axis inclined to one & parallel to other reference plane, axis inclined to both the reference planes.

Sections and Sectional Views of Right Angular Solids: Section planes, sectional views, Draw the sectional orthographic views of geometrical solids like Cube, Tetrahedron, Prism, Cylinder, Pyramid, Cone cut by different section planes (when solid is in simple position, when axis is parallel to one & inclined to other reference plane)

Development of surfaces of Regular Solids – Cube, Tetrahedron, Prism, Pyramid, Cylinder and Cone; (No reverse development)

Isometric Projections: Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of Planes, Simple Solids; Conversion of Orthographic projections into Isometric Projections.

Orthographic Projections: Conversion of Pictorial views into Orthographic Projections.

Overview of Computer Graphics: Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects; consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerance; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles; applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command;

Course Outcomes: After completion of course, student will be able to

MEU221.1 Get acquainted with principles of engineering drawing
MEU221.2 Practice standard conventions to prepare engineering drawings
MEU221.3 Visualize the geometry and shape of the products
MEU221.4 Translate the geometrical information of engineering objects into engineering drawings
MEU221.5 Use computer aided drafting/solid modeling software

Text Books:

1 Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2 Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3 D.N. Johle, Engineering Drawing, Tata Megraw-hill publishing Co. Ltd
4 Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
5 (Corresponding set of) CAD Software Theory and User Manuals.

MEU 222 BASIC MECHANICAL ENGINEERING

Teaching Scheme : 02 L **Total:02** **Credit: 02**
Evaluation Scheme: 30 MSE + 10 TA + 60 ESE **Total Marks: 100**
Duration of ESE : 2 hrs. 30 min.

Course Objective:

I. To demonstrate basic concepts of thermodynamics.
II. To get conversant with basics of heat transfer, refrigeration, internal combustion engines, machine element and machine tools

Thermodynamics Thermodynamic work, p-dV work in various processes, p-V representation of various thermodynamic processes and cycles Ideal gas equations, Properties of pure substance, Statements of I and II laws of thermodynamics and their applications in Mechanical Engineering. Carnot cycle for Heat engine, Refrigerator and Heat pump.

Energy conversion devices (Theoretical study using schematic diagrams only) Package Boiler, Turbine(Impulse & Reaction turbine, Gas turbine, Hydraulic turbines), Working principle and applications of Reciprocating I.C. engines, Air motor. Reciprocating pumps (single acting & double acting), reciprocating compressor, rotary compressors, fans, blowers, Study of household refrigerator, window air conditioner, split air conditioner Ratings and selection criteria of above devices. Refrigerants and their impact on environment.

Heat Transfer Statement and explanation of Fourier's law of heat conduction, Newton;s law of cooling, Stefan Boltzmann's law. Conducting and insulating materials and their properties. Selection

of heat sink and heat source. Power Plants (Description with Block Diagrams) Thermal, Hydroelectric, Nuclear and Solar-Wind Hybrid Power Plants.

Machine elements: Power transmission shafts, axles, keys, bush and ball bearings, Flywheel and Governors. Power Transmission Devices Types of Belts and belt drives, Chain drive, Types of gears, Types of Couplings, friction clutch (cone and single plate), brakes (types and applications only) Applications of these devices. Mechanisms:.(Descriptive treatment only) Slider crank mechanism, Four bar chain mechanism, List of various inversions of Four bar chain mechanism, Geneva mechanism, Ratchet and Paul mechanism

Materials Used in Engineering and their Applications Metals – Ferrous and Non-Ferrous, Nonmetallic materials, Material selection criteria Design considerations Steps in Design Introduction to manufacturing processes and Their Applications: Casting, Sheet metal forming, Sheet metal cutting, Forging, Fabrication, Metal joining processes.

Machine Tools (Basic elements, Working principle and types of operations) Lathe Machine – Centre Lathe Drilling Machine – Study of Pillar drilling machine Introduction to NC and CNC machines Grinding machine, Power saw, Milling Machine.

Text Books:

1. P. K Nag "Thermodynamics", Tata McGraw-Hill Publishing Co. Ltd
2. Hajra-Chaudhari " Workshop Technology"

Reference Books:

1. Yunus A. Cengel and Boles," Thermodynamics",Tata McGraw-Hill Publishing Co. Ltd
2. Arora and Domkunwar, "Thermal Engineering", Dhanpat Rai and Sons.
3. R. K. Rajput, "Heat transfer", S Chand Publication, Delhi.
4. V. B. Bhandari "Design of Machine Elements" Tata McGraw-Hill Publishing Co. Ltd

Course Outcome:

At the end of the course: Students will be able apply the basics of Mechanical Engineering.

ETU 221 BASIC ELECTRONICS ENGINEERING

Teaching Scheme : 02 L **Total: 02** **Credit: 02**
Evaluation Scheme: 30 MSE +10 TA+ 60 ESE **Total Marks: 100**
Duration of ESE : 2 Hrs.30 min.

Course Objective:

I.Provide foundation of Electronics through study of basic concepts.
II. Study operational principle of diodes and apply the concept in rectifiers, regulators.
III. Understand the operational principle, characteristics of transistors in various configurations and it's usage as an amplifier and switch.
IV. Introduce the students the basic properties of Op-Amp, analysis and design of electronic circuits using Op-Amp.
V. Understand basic working of a communication system.

Diode: PN junction Diode, Rectifiers, Zener Diode, Voltage Regulator.

Transistor: BJT, Types of configurations, Characteristics and Working principle; Transistor as a amplifier; Transistor as a switch.

FET and MOSFET: FET, MOSFET, CS configuration, CS amplifier.

Op-Amp: Block Diagram, IC741, Parameters; Inverting, Non-inverting and Differential amplifier. Power Semiconductor Devices: Construction, VI Characteristics, Working principle of SCR, DIAC, TRIAC; Applications of Power Electronics.

Communications: Block Diagram, Applications of Communication System.

Text Books:

1. Principles of Electronics, Albert Malvino and David Bates, 8th Edition, McGraw Hill, 2015.
2. Electronic Devices and Circuit Theory, Robert L. Boylestad and Louis. Nashelsky, 11th Edition, Pearson, 2015.
3. Electronics Devices and Circuits An Introduction, Allen Mottershead, 5th Edition, Prentice Hall India, 2003.

Reference Books:

1. Op-amps and Linear Integrated Circuits, R. A. Gaykwad, 4th Edition, Prentice Hall India, 2008.
2. Power Electronics, M. D. Singh and K. B. Khanchandani, 2nd Edition, McGraw Hill , 2008.
3. Electronic Communications, R. Dennis and J. Coolen, 4th Edition, Prentice Hall India, 1995.

Course Outcomes: After Completion of Course, the student will able to

ETU221.1 Characterize diodes, transistors and operational amplifiers.
ETU221.2 Design simple circuits using Op-Amp.
ETU221.3 Understand fundamental principles of electronic communication and construct system model.

SHU223 CHEMISTRY LAB

Teaching Scheme : 02P **Total:02** **Credit:01**
Evaluation Scheme: Internal Continuous Assessment **Total Marks: 50**

Following is the representative list of experiments. Minimum eight experiments are to be performed

List of experiments:

1. Determination of surface tension and viscosity
2. Thin layer chromatography
3. Ion exchange column for removal of hardness of water
4. Determination of chloride content of water
5. Colligative properties using freezing point depression
6. Determination of the rate constant of a reaction
7. Synthesis of a polymer/drug
8. Saponification/acid value of an oil
9. Chemical analysis of a salt
10. Determination of the partition coefficient of a substance between two immiscible
11. liquids Adsorption of acetic acid by charcoal.
12. Determination of cell constant and conductance of solutions
13. Potentiometry - determination of redox potentials and emfs

CSU222 PROGRAMMING FOR PROBLEM SOLVING LAB

Teaching Scheme :04P **Total:04** **Credit: 02**
Evaluation scheme: Internal Continuous Assessment **Total Marks: 50**

Course Objective:

I. To introduce basics of programming and develop logical thinking of students.
II. To help students understand how to model real world problems into the software
III. To implement mathematical statistical, applications into programming using C Language.

The sample list of programs is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same.
Aim of the list is to inform about minimum expected outcomes.

[The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given.]

Tutorial 1: Problem solving using computers:
Lab1: Familiarization with programming environment
Tutorial 2: Variable types and type conversions:
Lab 2: Simple computational problems using arithmetic expressions
Tutorial 3: Branching and logical expressions:
Lab 3: Problems involving if-then-else structures
Tutorial 4: Loops, while and for loops:
Lab 4: Iterative problems e.g., sum of series
Tutorial 5: 1D Arrays: searching, sorting:
Lab 5: 1D Array manipulation
Tutorial 6: 2D arrays and Strings
Lab 6: Matrix problems, String operations
Tutorial 7: Functions, call by value:
Lab 7: Simple functions
Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical integration):
Lab 8 and 9: Programming for solving Numerical methods problems
Tutorial 10: Recursion, structure of recursive calls
Lab 10: Recursive functions
Tutorial 11: Pointers, structures and dynamic memory allocation
Lab 11: Pointers and structures
Tutorial 12: File handling:
Lab 12: File operations

Course Outcomes: The student will able to-
CSU222.1 formulate the algorithms for simple problems and translate given algorithms to a working and correct program
CSU222.2 correct syntax errors as reported by the compilers
CSU222.3 write iterative as well as recursive programs
CSU222.4 represent data in arrays, strings and structures and manipulate them through a program
CSU222.5 declare pointers of different types and use them in defining self-referential structures.
CSU222.6 create, read and write to and from simple text files.

MEU223 ENGINEERING GRAPHICS LAB

Teaching Scheme : 04P **Total:04** **Credit: 02**
Evaluation scheme: Internal Continuous Assessment **Total Marks: 50**

Course Objectives:

I. To inculcate imagination and mental visualization capabilities to read, interpret and construct basic geometrical details of common engineering objects using geometrical instruments as well as graphics software
II. To develop graphical skills related to projections of one, two and three dimensional objects/engineering products
III. To expose them to existing national standards related to technical drawings
IV. To apply the knowledge of orthographic projections (production related features and instructions) in manufacturing industry, process industry and other allied engineering application
V. To create the image of three dimensional figures with the help of isometric projections

VI. To develop capability of computer-aided drawing in engineering area using Solid Modelling software

Half imperial (A2-594 mm X 420mm) sheets are to be drawn from the list shown below.

1) Various Engineering Curves (Four Problems)
2) Projections of Lines (Four Problems)
3) Projections of Planes (Four Problems)
4) Projections of Solids (Four Problems)
5) Projections of Sections of Solids (Two Problems)
6) Development of Surfaces (Two Problems)
7) Orthographic Projections (Two problems on sheet and two problems using CAD software)
8) Isometric drawing and Isometric projections (Two problems on sheet and two problems using CAD software)

Course Outcomes: After completion of course, student will be able to:-
MEU223.1 Apply the standard conventions and practices of engineering drawing
MEU223.2 Construct representative drawings of one, two and three dimensional objects/engineering products with geometric details
MEU223.3 Translate the geometrical information of engineering objects into engineering drawings
MEU223.4 Draw orthographic projections of lines, planes and solids
MEU223.5 Prepare sectional and isometric views of simple solids
MEU223.6 Use computer aided drafting/solid modelling software.

MEU224 WORKSHOP PRACTICE-II

Teaching Scheme : 02P **Total:02** **Credit: 01**
Evaluation scheme: Internal Continuous Assessment **Total Marks: 50**

Course Objectives:

I. To prepare a mould and jobs using casting operation
II. To operate various machines like Lathe, shaper, milling, Drilling machines etc.
III. To prepare a job using various machining operations
IV. To explain the operation of CNC machine
V. To make the students well versed with basic electronic components and PCB designing rules
VI. To learn processes etching, printing, drilling, soldering, testing soldering of electronic components
VII. To be able to set, operate and use survey instruments for Civil Engineering layout.
VIII. To be able to get acquainted with procedure of bar bending, detailing of reinforcements for various structural element
IX. To introduce students with different type of masonry works

Group A

Fitting: Introduction to types of Fits, concepts of interchangeability, different fitting tools & their use, different measuring tools, datum selection, location layout, marking, cutting, shearing, chipping, sizing of metals, drilling and tapping. One job involving fitting to size, male-female fitting with drilling and tapping.

Moulding & Casting: Introduction to moulding tools and equipments; One job on preparation of mould, Demonstration of casting process

Pipe fitting & joints: Introduction to different types of pipefitting and joints; Demonstration of pipe threading and pipe fitting; one job on pipe threading

Group B

Machining processes: Demonstration covering the basic operation on Lathe, Shaper, Drilling and Milling machines, One job on lathe machine covering Turning, Taper Turning and Threading operations, Introduction to CNC operated machines

Electronics Workshop: PCB making, soldering, testing and desoldering of a simple electronic circuit; probe making. One job on above

Civil workshop: Introduction to auto level and theodolite for simple layouts, reinforcement bar bending and tieing, different bonds for brick masonry; preparation of concrete; layout of simple plan, pipe joints making, use of total station, various reinforcement detailing; one job on above

The shops listed in Group A are common to students of all programs and the shops of Group B are allotted as shown below.

Programme Name	Group B	Group A
Civil Engg.	Civil Workshop	For all branches (Fitting, Moulding & Casting, Pipe fitting & Joints)
Mechanical Engg.	Machining Processes	
Electrical Engg.	Electronics Workshop	
Electronics & TC Engg.	Electronics Workshop	
Computer Science & Engg.	Electronics Workshop	
Information Technology	Electronics Workshop	
Insrumentation Engg.	Electronics Workshop	

Course Outcomes: After completion of course student will be able to-

MEU221.1 Prepare a mould and job using casting process

MEU221.2 Operate various machines like Lathe, shaper, milling, Drilling machines etc.

MEU221.3 Prepare a job using various machining operations

MEU221.4 Explain the operation and working of CNC machines

MEU221.5 Built electronic circuits on PCB

MEU221.6 Handle different basic electronics components and equipments

MEU221.7 Record field book and calculate reduced levels.

MEU221.8 Interpret structural drawings and also should be able to distinguish reinforcements detailing of various structural elements

MEU221.9 Distinguish different masonry bond types and their purposes.