

# **GOVT.COLLEGE OF ENGINEERING AMRAVATI**

*(An Autonomous Institute of Government of Maharashtra)*



**B.TECH (FIRST YEAR)**

**I & II SEMESTER**

**CURRICULUM**

**First Year Engineering**

**GOVT.COLLEGE OF ENGINEERING  
AMRAVATI**

**2017-2018**

# Government College of Engineering, Amravati

## Scheme for B. Tech. First Year (W E F 2017-2018)

### SEM I

Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme							Credits
		Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	Theory				Practical		Total	
						TA	CT1	CT2	ESE	ICA	ESE		
SHU101	Engineering Mathematics-I	3	1	---	4	10	15	15	60	---	---	100	4
SHU102	Applied Physics	4	---	---	4	10	15	15	60	---	---	100	4
SHU104	Life Systems	2	---	---	2	4	8	8	30	---	---	50	0
CSU101	Computer Programming	3	---	---	3	10	15	15	60	---	---	100	3
CEU101	Engineering Mechanics	3	1	---	4	10	15	15	60	---	---	100	4
ETU101	Basic Electronics Engineering	2	---	---	2	4	8	8	30	---	---	50	2
MEU101	Workshop Practice-I	---	---	2	2	---	---	---	---	50	---	50	1
SHU103	Applied Physics Lab	---	---	2	2	---	---	---	---	50	---	50	1
CSU102	Computer Programming Lab	---	---	4	4	---	---	---	---	50	---	50	2
CEU102	Engineering Mechanics Lab	---	---	2	2	---	---	---	---	50	---	50	1
ETU102	Basic Electronics Engineering Lab	---	---	2	2	---	---	---	---	50	---	50	1
Total		17	2	12	31	48	76	76	300	250	0	750	23

### SEM II

Course Code	Name of the Course	Teaching Scheme				Evaluation Scheme							Credits
						Theory				Practical		Total	
		Theory Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	TA	CT1	CT2	ESE	ICA	ESE		
SHU201	Engineering Mathematics-II	3	1	---	4	10	15	15	60	---	---	100	4
SHU202	Applied Chemistry	4	---	---	4	10	15	15	60	---	---	100	4
MEU201	Engineering Graphics	3	---	---	3	10	15	15	60	---	---	100	3
EEU201	Basic Electrical Engineering	2	---	---	2	4	8	8	30	---	---	50	2
SHU203	Environmental Studies	3	---	---	3	10	15	15	60	---	---	100	3
MEU202	Workshop Practice-II	---	---	2	2	---	---	---	---	50	---	50	1
SHU204	Applied Chemistry Lab	---	---	2	2	---	---	---	---	50	---	50	1
MEU203	Engineering Graphics Lab	---	---	4	4	---	---	---	---	50	---	50	2
EEU202	Basic Electrical Engineering Lab	---	---	2	2	---	---	---	---	50	---	50	1
SHU205	General Proficiency-I	1	---	2	3	---	---	---	---	50	---	50	2
Total		16	1	12	29	44	68	68	270	250	0	700	23

**TA: Teacher Assessment      CT: Class Tests      ESE: End Semester Examination      ICA: Internal Continuous Assessment**

ESE Duration: 2.00hrs for ETU101, EEU201 & SHU104, 3.00 hrs for MEU201 and 2.30 hrs for the remaining courses.

Note: 50% students shall be offered group A courses and remaining 50% shall be offered group B courses in a semester. In the next semester, the students who registered for group A courses in previous semester shall register for group B courses and vice versa.

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	SHU102	Applied Physics	SHU202	Applied Chemistry
2	CEU101	Engineering Mechanics	MEU201	Engineering Graphics
3	SHU103	Applied Physics Lab	SHU204	Applied Chemistry Lab

# SHU101 ENGINEERING MATHEMATICS-I

**Teaching Scheme: 03L+01T      Total 04**  
**Marking Scheme: 15 CT1+15CT2+10TA+60ESE**  
**Duration of ESE: 2Hrs. 30min**

**Credit: 04**  
**Total Marks: 100**

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## Course Objectives

- I. To develop mathematical skills in linear algebra to solve engineering problems.
- II. To provide students with skills in differential calculus, series, complex algebra which would be helpful while simplifying the technical problems.
- III. To understand the basic concept of partial derivative and its applications.

## Matrices :

Rank of matrix by Echelon & Normal form, consistency of simultaneous equations in n unknowns, Solution of homogeneous & non homogeneous system of simultaneous equations, linear dependence of vectors, eigen values & eigen vectors, Cayley Hamilton theorem (statement).

## Complex Numbers:

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

## Successive Differentiation :

Standard formulae, Leibnitz's theorem, expansion of functions in power series, Taylor's & Maclaurin's series.

## Infinite Series:

Tests for convergence, Comparison test, Ratio test, Root test, Raabe's test, range of convergence.

## Partial Differentiation:

First & second order partial differentiation of composite, parametric, Implicit & explicit functions, Euler's theorem on homogeneous functions, Jacobian & its properties, Maxima & minima of two variable functions.

## Text Book:

1. Higher Engineering Mathematics, B. S. Grewal, 43<sup>th</sup> edition, Khanna publication, new Delhi 2013.

## Reference Books:

1. Higher Engineering Mathematics, B. V. Ramana, Tata McGraw Hill Publications, 2007.
2. A text book of Applied Mathematics, P. N. Wartikar and J. N. Wartikar (Vol I and II), Pune Vidyarthi Griha Prakashan, Pune, 7<sup>th</sup> Edition, 2003.
3. Advanced Engineering Mathematics, H. K. Dass, S. Chand and Sons, 12<sup>th</sup> edition, 2002.
4. A Text book of Engineering Mathematics, N.P. Bali, Manish Goyal, Laxmi Publications, 7<sup>th</sup> edition 2007.

**Course Outcomes:** After Completion of course, the Students will be able

SHU101.1 to solve the problems in engineering related to linear algebra.

SHU101.2 to simplify & solve the problems related to complex variable.

SHU101.3 to find n-times differentiation, series representation of function and justify convergence of series.

SHU101.4 to apply the knowledge of partial derivative in different areas.

## SHU102 APPLIED PHYSICS

**Teaching Scheme : 04 L + 00T Total 04**

**Credit: 04**

**Evaluation Scheme : 15 CT1 + 15 CT2 + 10 TA + 60 ESE**

**Total marks : 100**

**ESE duration : 2 hrs 30 min.**

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### **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.

### **Ray Optics:**

*Lens aberrations:* chromatic, achromatic, spherical, distortion, astigmatism, coma, measure of correct aberrations.

*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 slit and double slit, diffraction grating, characteristics of diffraction grating.

*Polarization:* polarization by double refraction, Quarter wave plate and half wave plate, Production circularly and elliptically polarized light.

### **Solid State Physics:**

*Crystallography:* Crystal structure, Unit cell, Cubic crystal structure: SC, BCC and FCC. Unit cell characteristics: Effective number of atoms per unit cell, atomic radius, nearest neighbor distance, coordination number, atomic packing fraction, Miller indices, Bravais lattice Inter-planar distance between adjacent planes.

*Band theory of solids:* band structure of Sodium, Silicon and Diamond; Fermi-Dirac Distribution function, Fermi level in intrinsic semiconductor (quantitative) and in extrinsic semiconductor (qualitative), semiconductor conductivity, Formation of PN- junction and its working on the basis of energy band diagrams, Hall effect, Introduction to Solar Cell & its principle.

### **Dielectrics and Superconductivity:**

*Dielectrics:* Introduction, polarization, field vectors, induced and permanent dipole, polar and non polar dielectrics, polarization an atomic view, types of polarization, internal field in solids, measurement of dielectric constant, ferroelectrics, piezoelectrics, applications.

*Superconductivity:* Introduction to superconductivity, Critical temperature and magnetic field, Meissner effect, Isotope effect, Josephson effect, types of superconductors, applications of superconductivity

### **Quantum Physics:**

Wave packet, Heisenberg's uncertainty principle (its experimental illustration), application (non existence of electron in nucleus), wave function, Schrödinger wave equations, motion of a free particle, and particle in one-dimensional potential well, Tunneling effect.

**Fundamentals of LASER:**

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.

**Sound & Ultrasonics:**

*Sound:* Definitions of velocity, frequency, wavelength, intensity, loudness (expression), timber of sound, reflection of sound, echo. Reverberation, reverberation time, Sabine's formula, remedies over reverberation, absorption of sound, absorbent materials, conditions for good acoustics of a building, Noise, its effects and remedies.

*Ultrasonics:* Production of ultrasonics by Piezoelectric and magnetostriction, Detection of ultrasonics, Engineering applications of Ultrasonics(non-destructive testing, cavitation, measurement of gauge).

**Text books:**

1. Perspectives of Modern Physics, Arthur Beiser, McGraw Hill International Edition, 2006
2. Engineering Physics, Dattu R Joshi, McGraw Hill Education (India), 2010
3. Text Book of Engineering Physics by M. Avadhanulu and Kshirsagar, 9<sup>th</sup> Edition, S. Chand publication, 2008.

**Reference Books:**

1. Fundamentals of Physics by D Halliday, R Resnik and J Walker, 6<sup>th</sup> Edition, John Wiley & Sons Inc., 2005.
2. Introduction to Solid State Physics, C Kittel, 7th Edition, J Wiley & Sons. Inc., 2005.

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

SHU102.1 Demonstrate competency and understanding of the basic concepts & working principles of physics.

SHU102.2 Understand the concepts in modern physics and will be able to apply them.

SHU102.3 Understand utilization of concepts related to sound, optics and ultrasonics

**SHU104 - LIFE SYSTEMS**

<b>Teaching Scheme</b>	<b>: 02 L + 00T</b>	<b>Total 02</b>	<b>Audit</b>
<b>Evaluation Scheme</b>	<b>: 08 CT1 + 08 CT2 + 4 TA + 30 ESE</b>		<b>Total marks : 50</b>
<b>ESE duration</b>	<b>: 2 hrs.</b>		

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**Course Objectives:**

- I. To inspire students make them creative and groom them with the emergence of knowledge in the areas of fundamental, basic and applied biological systems through engineering.
- II. To provide the fundamental background of Biological system, Biological process, Biological materials, Molecular Design, Structure, physiology and mechanism of Sensory organs and artificial organ study.

III. Explain the theory and practice of Molecular Biology, Genetics and recombinant DNA technology. Select and apply experimental procedures to the spectrum of fields making use of biotechnology.

IV. Basic requirement regarding set up of Plant Tissue culture Laboratory. Media preparation and Tissue Culture methods.

V. Describe the use of in-vitro cultivation of medicinally important plants and its commercial applications.

### **Fundamentals of Biology:**

Introduction to cells, Structure and functions of organelles from plant cell, animal cell and bacteria. Membrane receptors, Chemistry of Biology: Bonds, Acids, Bases, Buffers, carbohydrates, lipids, proteins, Nucleic acids.

### **Fields, Forces and Flows in Biological systems:**

Introduction to electric fields, fluid flows, transport phenomena and their applications to biological systems. Flux and continuity laws, Maxwell's equations. Applications include biomolecular transport in tissue and electrophoresis.

### **Molecular structure of Biological materials:**

Basic molecular structural principles of biological materials. Molecular structures of various materials of biological origin: Collagen, spider silk, bone, bee wax. Molecular design of new biological materials for nanotechnology.

### **Structure of sensory organs and artificial organs:**

Eye and Ear: Optics of eye- Retina, Photochemistry of vision- Accommodation, Neurophysiology of vision – EOG (Electrooculography). Physiology of internal ear- Mechanism of hearing, auditory pathways, hearing test. Study of artificial organ- Eye, limbs, Teeth, Stem cells- Embryonic and adult

### **Genetics and Genetic engineering:**

DNA, RNA, Mutations and DNA repair mechanisms. Central dogma of protein synthesis, Replication, Transcription, translation. Genetic code, DNA Biosensors, Basic of genetic engineering. Cloning vectors- Properties of good vector, plasmid, cosmid and bacteriophages, Agrobacterium mediated gene transfer in plants

**Tissue culture:** Requirements for plant Tissue culture; Setting of Tissue culture lab; Culture media, Centrifugation, Cryopreservation; Anther and pollen cultures; Tissue culture of medicinal plants; Applications of plant tissue culture.

### **Text Books:**

1. Human physiology Vol. I and II., Chatterjee C C, 11<sup>th</sup> ed. Arun Printers, Calcutta, 2016
2. Cell and Molecular Biology, Karp, G., 7<sup>th</sup> ed., John Wiley and Sons Inc., 2013
3. Introduction to Bioengineering, Berger, S. et al., Oxford University Press, 1996
4. Plant tissue culture, Kalyankumar Dey, New central Book publications, Calcutta, 1997
5. Genetics Vol.I and II, C. B. Powar, Himalaya Publishing House, 2007

### **Reference books:**

1. Molecular Biology of Gene, James Watson, 5<sup>th</sup> LPE edition, Person Publication.

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

SHU104.1 Understand the biological basics and molecular processing of biological materials.

SHU104.2 Use the techniques, skills and modern engineering tools necessary for sensory organs and artificial organ study.

SHU104.3 Outline the Molecular characterization and organisation of biological systems.

SHU104.4 Describe the molecular genetics and recombinant DNA technology.

SHU104.5 Understand the mechanism of Molecular Biology, Genetics and Genetic

## **CSU101 COMPUTER PROGRAMMING**

**Teaching Scheme: 03 L**

**Total 03**

**Credit: 03**

**Evaluation scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE**

**Total Marks: 100**

**Duration of ESE: 2hrs.30min.**

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### **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 Operating Systems

### **C Fundamentals:**

Keywords, Character set, Built-in Data Types, Variables, Expressions, Operators & their precedence. Single character I/O, String I/O, Format specifiers for scanf( ) and printf( ) functions.

### **C Control Structures:**

Decision-making using if, if-else and switch-case statements, Loops using for, while, do-while statements, break and continue statements. Functions: declaration, definition and parameter passing mechanism.

### **Scope Rules and Arrays (C Programming):**

Storage classes: automatic, static, extern, register type. Introduction to arrays: single dimension and multi-dimensional. Strings, Arrays of strings and string related functions.

### **Pointers(C Programming):**

Definition and uses of pointers. Address of operator, pointer arithmetic, Pointers and functions, Pointers and Arrays, Arrays of pointers, Pointers and Strings.

### **Structures and Files(C Programming):**

Declaring and using the structures. Operation on structures. Arrays of structures, Pointers to structures. Introduction to Files. File types. File handling functions. Command line arguments.

**Graphics in C:** Graphics mapping, Resolution, Graphics- text, Linking Graphic Library, Graphics modes, Drawing line, circle, arc and ellipse.

### **Text Book:**

1. C: The Complete Reference, Herbert Schildt, 4<sup>th</sup> Edition, McGraw-Hill Publication, 2005.
2. C How to program, 8<sup>th</sup> Edition, Harvey Deitel, Paul Deitel, Pearson, 2016

### **Reference books:**

1. The C Programming Language, 2<sup>nd</sup> Edition, Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall, Inc., 1988.
2. Programming in ANSI C, Balaguruswamy, 3<sup>rd</sup> Edition, Tata McGraw-Hill, 2004.

### **Course Outcomes:**

**After Completion of course students will able to**

- CSU101.1** Solve problem through computer programming
- CSU101.2** Use different memory allocation methods

## CEU101 ENGINEERING MECHANICS

**Teaching Scheme: 03L + 01 T**

**Total 04**

**Credits: 04**

**Evaluation Scheme: 15 CT1 + 15 CT2 + 10 TA + 60 ESE**

**Total Marks: 100**

**Duration of ESE: 2hrs.30 min.**

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**Course Objectives:** The students will be able

- 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 friction, 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, 8<sup>th</sup> 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 McGraw Hill Books, 1996.
3. Engineering Mechanics, F.L.Singer, HarperCollins Publishers India, 2001
4. Engineering Mechanics, McLean, 3<sup>rd</sup> Edition, SCHAUM Series, 1995.
5. Engineering Mechanics, Timoshenko and Young, McGraw Hill Publication.
6. Engineering Mechanics, R. C. Hibbeler, Pearson Publishers, 2010
7. NPTEL series of IIT.

**Course Outcomes:**

After Completion of Course, the student will be able to

- CEU101.1 Students shall be able to apply the principles of mechanics for solving the structures like trusses, cables and beams.
- CEU101.2 Students shall be equipped with problem solving ability for rigid body mechanics.
- CEU101.3 Students shall exhibit various applications of Newtonian Mechanics in their respective engineering disciplines.
- CEU101.4 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.

## ETU101 Basic Electronics Engineering

Teaching Scheme: 02L

Total: 02

Credit : 02

Valuation Scheme: 8 CT1+8 CT2+4 TA+30 ESE

Total Marks: 50

Duration of CT: 40 min. Duration of ESE: 1Hrs. 30min.

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### Course Objectives:

- 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 its 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, 8<sup>th</sup> Edition, McGraw Hill, 2015.
2. Electronic Devices and Circuit Theory, Robert L. Boylestad and Louis. Nashelsky, 11<sup>th</sup> Edition, Pearson, 2015.
3. Electronics Devices and Circuits An Introduction, Allen Mottershead, 5<sup>th</sup> Edition, Prentice Hall India, 2003.

### Reference Books:

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

### Course Outcomes:

After Completion of Course, the student will able to

ETU101.1 Characterize diodes, transistors and operational amplifiers.

ETU101.2 Design simple circuits using Op-Amp.

ETU101.3 Understand fundamental principles of electronic communication and construct system model.

## MEU101 WORKSHOP PRACTICE-I

Teaching Scheme: 02P

Total: 02

Credit: 01

Evaluation Scheme: Internal Continuous Assessment

Total Marks: 50

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### 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

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
CIVIL	Smithy
MECHANICAL	Smithy
ELECTRICAL	Electrical Workshop
ENTC	Computer Hardware shop
COMPUTER	Computer Hardware shop
INFORMATION TECHNOLOGY	Computer Hardware shop
INSRUMENTATION	Electrical Workshop

### 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

### **Course Outcomes:**

After completion of course students will be able to-

- MEU101.1 Prepare a job on wood working joints
- MEU101.2 Prepare a job using welding operations
- MEU101.3 Prepare a sheet metal job
- MEU101.4 Prepare a job using smithy operation
- MEU101.5 Construct choke & small transformer
- MEU101.6 Perform repairs & maintenance of domestic electrical appliances
- MEU101.7 Assemble different types of wirings & carry out electrical earthing
- MEU101.8 Explain how a PC works, and understand the relationship between hardware and software
- MEU101.9 Install, configure, optimize and upgrade personal computers
- MEU101.10 Classify and explain the function of different computer hardware components

## **SHU103 - APPLIED PHYSICS LAB**

**Teaching Scheme : 02 P Total :02**

**Credit : 01**

**Evaluation Scheme : Internal Continuous Assessment**

**Total marks : 50**

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### **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 instructor may choose experiments as per his choice so as to cover entire contents of this course. Minimum eight experiments from list given should be performed.

### **List of experiments:**

1. Determination of energy gap in semiconductor.
2. Determination of activation energy of a thermistor.
3. Determination of surface resistivity of given semiconductor by four probes method and study its temperature variation.
4. To determine type of semiconductor and Hall coefficient.
5. To determine the carrier concentration and conductivity of a semiconductor using Hall effect.
6. Determination of LASER beam characteristic.
7. Recording and reconstruction of hologram.
8. Study of optical fiber characteristics.

9. To determine the Curie temp and relative permittivity of given ferro-electric material.
10. Determination of specific charge of an electron (e/m) by Thomson method
11. Measurement of voltage and frequency by using cathode ray oscilloscope.
12. Determination of radius of curvature of plano-convex lens by using Newton's rings.
13. Determination of grating element-using diffraction of LASER beam.
14. Determination of wavelength of spectral lines using diffraction.
15. To determine slit width from the study of Fraunhofer diffraction pattern (single slit/double slit).
16. Determination of Specific rotation of optically active liquids.
17. To determine magnetic susceptibility of given paramagnetic liquid by Quincke's method.
18. To study characteristics of solar cell at different intensities and determination of maximum workable power.
19. Study of Meissner effect in high TC superconductors and determination of its transition temperature

**Course Outcomes:** After completing this course student shall be able to

SHU103.1 Identify probable errors and their rectification.

SHU103.2 Use the techniques, skills and modern engineering tools necessary for professional practice.

## **CSU102 COMPUTER PROGRAMMING LAB**

**Teaching Scheme: 04P**

**Total: 04**

**Credit: 02**

**Evaluation Scheme: Internal Continuous Assessment**

**Total Marks: 50**

### **Course Objectives:**

- I. To enhance analysing and problem solving skills
- II. To develop practical programming skills of students using C Language
- III. To implement mathematical statistical, applications into programming using C Language

The programs should cover arrays, Functions, Pointers, Structures, Files and the Command-line arguments. It is expected that the candidate demonstrate adequate to high skills with these tools and programming with C.

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.

1. Write a program to implement different loops in 'C'
2. To write a program which uses the concept of functions.
3. To write at least two programs to use arrays and perform operations such as matrix addition, multiplications, transpose etc, sorting of array
4. Write programs to do string operations such as copy, concatenate, reverse etc
5. Write at least two programs to use pointer concepts.
6. Write at least two programs to implement structures, array of structures, pointers to structures, passing structures to functions etc.
7. Write a program to create a file and sort data in it.
8. Write a program to draw line, circle and ellipse.

**Course Outcomes:**

After Completion of course students will able to

- CSU102.1** Design, develop, test and document structured programs in C
- CSU102.2** Use standard library functions
- CSU102.3** Write user-defined function definitions
- CSU102.4** Use the common data structures found in C

**CEU102 ENGINEERING MECHANICS LAB**

**Teaching scheme: 02 P**

**Credit: 01**

**Evaluation scheme: Internal Continuous Assessment**

**Total marks: 50**

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**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

- CEU102.1** To know when theory applies and when theory is limited by simplifying assumptions.
- CEU102.2** identify reasons why actual measurements will differ from theoretical calculations.
- CEU102.3** use the laboratory equipments correctly and safely to perform all experiments

CEU102.4      verify the wide field of engineering mechanics in various engineering applications

**ETU102 BASIC ELECTRONICS ENGINEERING LAB**

**Teaching Scheme:** 02P      Total: 02

**Credit:** 01

**Evaluation Scheme:** Internal continuous Assessment

**Total Marks:** 50

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**Course Objectives:**

- I. Design and construct simple electronic circuits to accomplish a specific function.
- II. Understand various Electronics Components their capabilities and limitations and make decisions regarding their best utilization in a specific situation.

**It is a representative list of practical with minimum Seven/Eight experiments.** The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise.

**List**

1. To plot V-I characteristics of Ge and Si P-N junction diode and compute their junction potential.
2. To plot V-I characteristics of Zener diode and compute its junction potential and breakdown voltage.
3. To plot and study the characteristics of a Zener diode as Voltage Regulator.
4. To implement Half wave, Centre tap Full wave and Bridge rectifiers.
5. To plot and study I/P and O/P characteristics of BJT in CB and CE configurations.
6. To plot and study I/P and O/P characteristics of a transistor as a switch.
7. To plot and study I/P and O/P characteristics of FET in CS configuration.
8. To plot and study I/P and O/P characteristics of MOSFET in CS configuration.
9. To plot and study the V-I characteristics of SCR, DIAC, TRIAC.
10. To measure the gain of Inverting and Non-Inverting Amplifier using Op-Amp 741.

**Course Outcomes:**

After Completion of Course, the student will able to

ETU102.1 Build a circuit using diode, transistor etc on a breadboard.

ETU102.2 Verify the working of diodes, transistors and their applications.

ETU102.3 Build a common emitter/base/collector amplifier and explore the operation.

ETU102.4 Learn to design and control the gain of non-inverting, inverting amplifiers using operational amplifiers.

ETU102.5 Verify the working of power devices.

## SHU201 ENGINEERING MATHEMATICS-II

**Teaching Scheme : 03 L + 01 T      Total 04**  
**Evaluation scheme : 15CT1 + 15CT2 + 10TA + 60 ESE**  
**Duration of ESE : 2Hrs. 30min**

**Credit : 04**  
**Total Marks : 100**

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### Course Objectives

- I. To understand the mathematical tools(functions) to simplify the integrals.
- II. To develop the concepts of double and triple integral and its applications.
- III. To provide students with skills in differential equation to simplify the engineering problems.
- IV. To develop the techniques of finding the series representation of periodic functions.

### Beta and Gamma Functions:

Evaluation of Single integration using Beta and Gamma Functions, Leibnitz's rule of Differentiation under integral sign. Curve tracing (Cartesian and polar)

### Multiple Integration:

Double integration, Change of order of integration, Double integration of Polar coordinates, Change of variable, Triple integration, Area bounded by plane curves and volume of solids using multiple integration.

### Differential Equations of First order and first degree:

Solution of ordinary differential equations of 1<sup>st</sup> order and 1<sup>st</sup> degree : non-homogeneous, exact , non-exact, non-linear. Applications to orthogonal trajectory in Cartesian and polar coordinates, Electrical circuits and Newton's law of cooling,

### Fourier Series:

Expansion of Functions (continuous and discontinuous) in Fourier Series, Change of interval, Half range Fourier Series,

### Text Book:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna publication, 41<sup>th</sup> edition, New Delhi, 2011.
2. A text book of Applied Mathematics, P. N. Wartikar and J. N. Wartikar (Vol I and II), Pune Vidyarthi Griha Prakashan, Pune, 7<sup>th</sup> 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, 12<sup>th</sup> edition, 2002.
3. A Text book of Engineering Mathematics, N.P. Bali, Manish Goyal, Laxmi Publications, 7<sup>th</sup> edition 2007.

**Course Outcomes:** After completion of the course, the students should be able to

SHU201.1 to evaluate complicated integrals.

SHU201.2 to apply the knowledge of multiple integral in real world problems.

SHU201.3 to apply the knowledge of differential equation to simplify the engineering problems.

SHU201.4 to find the series representation of periodic functions.



## SHU202 APPLIED CHEMISTRY

Teaching Scheme: 04L+00T

Total: 04

Credit:04

Evaluation Scheme: 15CT1+15CT1+10TA+60ESE

Total Marks: 100

ESE Duration: 2 hrs 30 min

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**Course objectives:** Students shall be able to gain

I Basic knowledge about Nanomaterials.

II Knowledge about types of boiler problems, various physical and Chemical techniques for water treatment and its analysis.

III Broad and fundamental knowledge of the polymers, Mechanism of Corrosion and preventive methods.

IV Knowledge about Basic of Fuel Knocking, Antiknocking agents Octane number, Cetane Number.

**Corrosion of metals:** Corrosion of metals, prevention of corrosion. Causes & consequences of corrosion, Dry, wet corrosion & its mechanism, Waterline corrosion, intergranular corrosion, soil corrosion and stress corrosion. Design and Material selection, Anodic & cathodic protection, hot dipping - galvanizing and tinning.

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

**Fuels:** Classification, 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. Knocking, chemical constitution & Knocking properties, Octane number, Cetane number, Antiknocking agents. Combustion and Numerical problems based on it.

**Lubricants:** Classification & Mechanisms, testing of lubricants Viscosity & viscosity Index, Flash point & fire point, Carbon Residue Cloud & pour point. Criteria for selection of lubricants for I.C. engines, cutting tools, gears, & transformers.

**Polymer and Rubber:** Thermosetting and Thermoplastic, preparation, properties and uses of polyvinyl chloride, Polytetrafluoroethylene, Bakelite, silicon Polymer, Rubber: Synthesis, properties and uses of Styrene rubber, Nitrile rubber, Butyl Rubber

**Refractory's:** Requisites of good refractory, classification, properties, raw materials, manufacture of acidic (Fire clay & Silica), Basic (magnesite & Dolomite), and Neutral (carbon & Silicon Carbide) Refractory's.

**Chemistry of Nano material:** Nano materials, definition, properties and applications. Explosives and Propellants: Explosives, Classification, precautions during storage, blasting fuses, important explosives, Rocket propellants, classification of propellants.

**Composite Material:** Particle-Reinforced Composite, Large particle Composites, dispersion-strengthened Composites, Fiber-Reinforced Composites, Continuous aligned, Discontinuous aligned & Random oriented, structural Composites, Laminar & Sandwich Panel

**Cement:** Cement: Raw materials, Classification of Cement

**Text Books:**

1. Engineering chemistry S.S.Dara, 12th Edition, S.Chand and company pvt.ltd, New Delhi, 2010.
2. Engineering chemistry, Jain and Jain, Dhanpat Rai Publishing Company

**Reference Books:**

1. Engineering Chemistry, J.C.Kuriacase & J. Raja ram, Tata McGraHills Publishing Company Limited, New Delhi (2004).

**Course Outcomes:** After completion of the course students will be able to

SHU-202 .1 Understand and classify nanomaterials and its applications

SHU-202 .2 Understand about types of boiler problems, various physical and chemical Techniques for

Water treatment and its analysis

SHU-202 .3 Classify and understand the knowledge about the polymers.

SHU-202 .4 Understand the mechanism of corrosion and preventive Methods.

SHU-202 .5 Understand Knocking, Antiknocking agents, Octane number, Cetane number

## **MEU201 ENGINEERING GRAPHICS**

**Teaching Scheme: 03L**

**Total 03**

**Credits: 03**

**Evaluation scheme: 15 CT1+15 CT2+10 TA+60 ESE**

**Total Marks: 100**

**Duration of ESE: 3.00Hrs.**

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**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.

**Introduction to Scale:**

Plain, Diagonal, Comparative and Vernier

**Loci of point:**

Introduction, Locus of Points on Simple arrangement mechanism, Four bar mechanism, Slider cranks mechanism.

**Engineering Curves:**

Construction of Ellipse, Parabola and Hyperbola by different methods; to draw cycloid, epicycloids, hypocycloid, involutes, and Archimedean spiral (Tangent and Normal to above curves)

**Projections of Points, Lines and Planes:**

Introduction to planes of projection, reference planes, projections of points and lines in different quadrants; Projections of lines and planes inclined to both the planes

**Projections of Solids:**

Polyhedron, Solids of revolution, solids in simple position, axis perpendicular to a plane, axis parallel to both the planes, axis parallel to one plane and inclined to the other, Axis inclined to both the plane

**Section of solids:**

Section planes-sections, true shapes of section, section of prisms, section of pyramid, section of cylinders, sections of cones

**Orthographic Projection:**

Introduction to Orthographic Projections, I and III angle method of projections, conversion of simple views into orthographic views

**Isometric views and projections:**

Isometric scales, Isometric view, Isometric projection, Isometric views of objects

**Text Books:**

1. Engineering Drawing, Bhat N. D., Charotar Publishing House, 49<sup>th</sup> Edition, 2007, New Delhi
2. Engineering Graphics, Jolhe D. A., Tata McGraw Hill, 1st Edition, 2008, New Delhi

**Reference Books:**

1. Engineering Drawing, Shah M. B., Pearson Education, 1<sup>st</sup> Edition, 2007, New Delhi
2. Engineering Graphics using AutoCAD, Kulkarni D. M., PHI Learning private Ltd., 1<sup>st</sup> Edition, 2009. New Delhi

**Course Outcomes:**

After completion of course, student will be able to:

- MEU201.1 Know and understand the conventions and the methods of engineering drawing
- MEU201.2 Imagine and visualize the geometric details of engineering objects
- MEU201.3 Translate the geometrical information of engineering objects into engineering drawings
- MEU201.4 Comprehend the theory of projection
- MEU201.5 Improve their visualization skills which can be applied in developing new products.

## **EEU201 BASIC ELECTRICAL ENGINEERING**

**Teaching Scheme: 02 L + 00 T    Total 02**

**Credit: 02**

**Evaluation Scheme: 08 CT1 + 08 CT2 + 04 TA+ 30 ESE**

**Total Marks: 50**

**Duration of ESE: 2.00 Hrs.**

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**Course Objectives:**

- 1) To impart basic knowledge of electrical quantities like current, voltage, power, energy, resistance etc.
- 2) To provide knowledge of analysing and solving electric and magnetic circuits
- 3) To explain working principles and applications of DC and AC machines
- 4) To highlight the importance of DC and AC (single phase and three phase) supply systems
- 5) To explain the need of different voltage levels for generation, transmission and distribution

## **Fundamentals**

Review of basic concept of voltage, current, power, energy, resistance, resistivity and conductivity. Series and parallel circuits, star-delta transformation, Kirchoff's laws.

## **Electromagnetism and Electromagnetic Induction**

Basic concept of magnetic flux, flux density, MMF, reluctance, magnetic field intensity, leakage and fringing of flux, series magnetic circuits.

Concept of self and mutual induction. Coefficient of coupling, energy stored in magnetic circuit, Magnetization curves

## **Single Phase A.C. Circuits**

RMS, average values, form factor and peak factor for sinusoidal waveform only. Single phase A.C. series and parallel circuit with resistance, inductance and capacitance. Phasor diagrams, series and parallel resonance, impedance triangle, active and reactive power

## **Electrical Machines**

Working principle and applications of dc shunt and series motors and three phase & single phase induction motors. Working principle of dc generator, alternator and single phase transformer

## **Introduction to Electrical Power System**

Balanced three phase circuit, star and delta balanced load. Relationship of phase and line values of voltage and current for star and delta connections, power in three phase circuit.

Structure of power system: generation, transmission and distribution through different voltage levels.

### **Text Books:**

- 1) Electrical Engineering Fundamentals, V. Del Toro, Second edition, Prentice Hall of India, New Delhi, 2014
- 2) Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Third edition Tata McGraw-Hill Education Pvt. Ltd., 2009

### **Reference Books:**

- 1) Electrical Engineering: Principles and Applications, Allan R. Hambley, Second edition, Prentice Hall, New Jersey, 2005
- 2) Basic Electrical Engineering, A. E. Fitzgerald, D. E. Higginbotham and A. Grabel, Fifth Edition, Tata Mc-Graw Hill Education Pvt. Ltd., 2007

### **Course Outcomes:**

After completion of the course, the students should be able to –

- 1) Understand the basic concepts of electric and magnetic circuits
- 2) Analyze and solve electric and magnetic circuits
- 3) Understand the working principles of various electrical machines and identify the type of electrical machine for given application
- 4) Differentiate between DC and AC (single phase and three phase) supply with their applications
- 5) Understand the structure of power system and need of different voltage levels for generation, transmission and distribution

## SHU203 ENVIRONMENTAL STUDIES

Teaching Scheme: 03L+00T

Total: 03

Credit:03

Evaluation Scheme: 15CT1+15CT1+10TA+60ESE

Total Marks: 100

ESE Duration: 2 hrs 30 min

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### Course objective:

- I Knowledge about water, soil, noise and Air pollution and about adverse effect on the environment and their preventive measures.
- II Awareness about Environment protection acts such as wild life protection act.
- III Knowledge about conservation of energy resources, nuclear accidents and holocaust.
- IV Knowledge about conservation of biodiversity.

**The Multidisciplinary Nature of Environmental Studies:** Definition, scope and importance, Need for public awareness.

**Social issues and Environment:** From Unsustainable to sustainable development, urban problems related to energy, Water conservation, rainwater harvesting, and watershed management Resettlement and rehabilitation of people, problems.

**Environmental ethics:** Issues and possible solution, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Wasteland reclamation. Consumerism and Waste products, Environment protection act, Air (prevention & control) act, Water (prevention and control) act, Wildlife protection act, Forest conservation act, Issues involved in enforcement of environmental legislation.

**Human population and environment:** Environment and human health, Human rights, Role of Information Technology in Environment and human health, Public awareness

**Natural Resources:** Conventional Energy Resources: Definition, Classification, Composition, Energy Content types: Coal, Petroleum, Natural Gases, Hydro geothermal, Nuclear. Environmental Implication of Energy uses, on-conventional Energy Resources: Solar Energy, Wind Energy, Tidal energy, Geothermal Energy, Hydropower's and Biogas.

### Ecosystem and Biodiversity:

Concept of ecosystem, Structure and function of ecosystem, Producer, consumer, decomposers, Energy flow in the ecosystem. Ecological succession, Food chains, food webs and ecological pyramids, Introduction, types, characteristic features, structure and function of following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystem (rivers, oceans)

**Biodiversity:** Introduction, Definition, genetic, species and ecosystem diversity, biogeographically classification of India, India as mega-diversity nation, Hot spots of biodiversity, Threats to biodiversity, habitat loss, poaching of wildlife, man wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity- In-situ and Ex-situ conservation of Biodiversity

**Environmental Pollution:** Definition, Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste, Management, Causes effects and control measures, Role of individual in prevention of pollution, Hazardous waste management, Biomedical waste management, Disaster management: floods, earthquake, cyclone and landslides.

### Field Work: Report to be submitted to Deptt

Visit to a local area to document environmental assets- river/forest/grass land/hill/mountain.

Visit to Urban/rural/industrial/agricultural area

### Text Books:

1. The Biodiversity of India, Bharucha Erich, Marin Publishing Pvt. Ltd., Ahmadabad

2. Hazardous Waste Incineration, Brunner R.C., McGraw Hill Inc., 1989.
3. Environmental Management, Wagner K.D., W.B. Saunders Co., Philadelphia, USA, 1998.
4. Environmental Studies, Benny Joseph, 1st edition, Tata McGraw-Hill Publ, 2005.

#### **References Books:**

1. Marine pollution, Clark R.S., Clanderson Press Oxford (TB)
2. Environmental Chemistry, De A.K. Wiley Eastern Lmt.
3. Environmental Chemistry, Sharma B.K., Goal Publ. House, Meerut. 2001

**Course outcome:** After completion of course students will be able to aware about  
 SHU-203.1 Environmental pollution and Posses the knowledge about their adverse effect on the environment and their preventive measures implementation  
 SHU-203.2 Environment protection acts and its applications  
 SHU-203.3 Conservation of energy recourses  
 SHU-203.4 Conservation of biodiversity

### **MEU202 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 like etching, printing, drilling, soldering, testing and de-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 elements
- IX. To introduce students with different type of masonry works

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

<b>Programme Name</b>	<b>GROUP B</b>
CIVIL	Civil Workshop
MECHANICAL	Machining Processes
ELECTRICAL	Machining Processes
ENTC	Electronics Workshop
COMPUTER	Electronics Workshop
INFORMATION TECHNOLOGY	Electronics Workshop
INSRUMENTATION	Electronics Workshop

## **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 tying, 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

### **Course Outcomes:**

After completion of course student will be able to-

- MEU202.1 Prepare a mould and job using casting process
  - MEU202.2 Operate various machines like Lathe, shaper, milling, Drilling machines etc.
  - MEU202.3 Prepare a job using various machining operations
  - MEU202.4 Explain the operation and working of CNC machines
  - MEU202.5 Built electronic circuits on PCB
  - MEU202.6 Handle different basic electronics components and equipments
  - MEU202.7 Record field book and calculate reduced levels.
  - MEU202.8 Interpret structural drawings and also should be able to distinguish reinforcements detailing of various structural elements
  - MEU202.9 Distinguish different masonry bond types and their purposes.
-

## SHU204 APPLIED CHEMISTRY LAB

Teaching Scheme: 02P

Total: 02

Credit: 01

Evaluation Scheme: Internal Continuous Assessment

Total Marks: 50

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### Course objectives:

- I. To provide students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technical competence.
- II. To provide the knowledge of Identification of properties

Following is the representative list of experiments. Minimum eight experiments to be performed covering the Curriculum of SHU 202 Applied Chemistry

### List of experiments

1. Preparation of Urea formaldehyde Resin
2. Preparation of Phenol formaldehyde Resin
3. Determination of Pour point and Cloud point of lubricating oil.
4. Determination of flash point of lubricating oil by Abel/Pensky Marten's apparatus
5. Determination of viscosity of given lubricating oil.
6. Determination of hardness of water by EDTA titration method.
7. To verify Beer's law.
8. Determination of conductivity of a given sample using conductometer.
9. Determination of DO in water sample.
10. Determination of Refractive index by Abbe's refractometer.
11. Determination of chloride in Water sample.
12. Determination of moisture content in coal sample
- 13 Determination of Acid value in lubricant oil
- 14 Determination of chlorine in Water sample.
- 15 Estimation of Ferrous and ferric iron present in the given solution.

**Course outcomes:** After completion of this course student shall be able to

SHU204.1 Understands the objective of their chemical experiments, perform the experiments

SHU204.2 Record and analyze the results.

SHU204.3 follows the proper and safe procedures to use chemicals in the experiment

SHU204.4 Interpret the results through proper writing in the journals



## MEU203 ENGINEERING GRAPHICS LAB

**Teaching Scheme: 04P**

**Total 04**

**Credits: 02**

**Evaluation scheme: Internal Continuous Assessment**

**Total Marks: 50**

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### **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

It is representative list of practical. The instructor may choose experiments as per his/ her requirements (so as to cover entire contents of the course) from the list or otherwise. Minimum Six experiments should be performed.

- 1) Loci of Points (Three Problems)
- 2) Various Engineering Curves (Four Problems)
- 3) Projection of Lines (Four problems)
- 4) Projection of Planes (Four problems)
- 5) Projections of Solids (Four problems)
- 6) Orthographic Projection (four problems on each: First and Third angle projection)
- 7) Isometric drawing and Isometric projections (Two problems)
- 8) Preparation of sheet using Solid modeling software

### **Course Outcomes:**

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

- MEU203.1 Apply the standard conventions and practices of engineering drawing
- MEU203.2 Construct representative drawings of one, two and three dimensional objects/engineering products with geometric details
- MEU203.3 Translate the geometrical information of engineering objects into engineering drawings
- MEU203.4 Draw orthographic projections of lines, planes and solids
- MEU203.5 Prepare sectional and isometric views of simple solids
- MEU203.6 Use computer aided drafting/solid modelling software in their respective engineering field.

## **EEU202 BASIC ELECTRICAL ENGINEERING LAB**

**Teaching Scheme: 02 P**

**Credit: 01**

**Evaluation Scheme: Internal Continuous Assessment**

**Total Marks: 50**

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### **Course Objective:**

- 1) To impart capability to use abstractions to analyze and design simple electric circuits
- 2) To develop skill of constructing electric circuits and taking measurements
- 3) To develop skill of drawing conclusions from the readings obtained and calculations made in context of electrical engineering
- 4) To explain the working principle and construction of DC and AC machines
- 5) To provide knowledge of various earthing schemes and earth leakage circuit breaker

It is representative list of practical. The instructor may choose experiments as per his/ her requirements (so as to cover entire contents of the course) from the list or otherwise. Minimum eight experiments should be performed.

- 1] To verify Kirchoff's laws
- 2] To plot B-H curve for a magnetic material
- 3] To draw phasor diagram for RLC Series circuit
- 4] To draw phasor diagram for RLC parallel circuit
- 5] To verify relationship between line & phase values (of voltage and current) in balanced STAR connection
- 6] To verify relationship between line & phase values (of voltage and current) in balanced DELTA connection
- 7] To find the transformation ratio of a single phase transformer
- 8] Load Test on any one motor
- 9] Load test on any one generator
- 10] Study of three phase induction motor
- 11] Study of various earthing schemes
- 12] Study of Earth Leakage Circuit Breaker (ELCB)

### **Course Outcomes:**

After completion of the course, the students should be able to –

- 1) Analyze and design simple electric circuits
- 2) Construct the circuits for experiments and take measurements
- 3) Derive conclusions on the basis of the readings/ observations/ calculations/ graphs in context of electrical engineering
- 4) Identify the major parts of electrical machine
- 5) Incorporate the importance of earthing schemes and ELCB

# SHU205 GENERAL PROFICIENCY-I

**Teaching Scheme: 01L+02P      Total 03**  
**Evaluation Scheme: Internal Continuous Assessment**

**Credit: 02**  
**Total Marks: 50**

## **Course Objectives**

- I. To build the basics of English vocabulary.
- II. To provide understanding of basic English Grammar.
- III. To develop writing skills.
- IV. To develop understanding about personality.
- V. To build ability for self analysis.
- VI. To develop a student as an efficient individual with positive attitude.

## **Communication skill :**

Listening comprehension, rapid reading and intensive reading skill, oral skill with emphasis on conversational practice, vocabulary development.

Remedial grammar - word order, clause structure, sentence types, articles, tenses, active and passive forms, preposition.

Advanced grammar and usage – adverbials, conditionals, modals, infinitives, gerunds, reported speech.

Writing skills through paragraphs and simple essays. Guided and free composition essays of expository, descriptive, narrative, argumentative and reflective types.

## **Personality skill:**

Definition of Personality, determination of personality- biological, psychological and socio culture factor need for personality development, self analysis through SWOT analysis and Johari window.

Elements of motivation, seven rules of motivation, technique and strategies for self motivation, importance of self esteem and enhancement of self esteem, goal setting.

Positive thinking, goals and techniques for positive thinking, enhancement of concentration through positive thinking, practicing of positive life style.

Nurturing creativity, decision making, problem solving, thinking power-seven steps for dealing with doubt.

Professional ethics, moral values- character, commitment, conviction, confidence, devotion, social and professional behavior and responsibilities.

## **Topics for assignments/practicals:**

Minimum eight assignments/practicals based on above topics. The representative list is given below:

1. Collection of new words concerning various subjects.
2. Construction a model on grammatical unit.
3. Reading a poem or short story.
4. Telling a story.
5. Writing report on audio speech based on the topics of personality skills.
6. Delivering a seminar or speech on the topics of personality skills.
7. Observation of recorded seminar or speech delivered by students and suggestion for improvement.
8. Summarizing a chapter from current popular novel.
9. Role playing through dialogues.
10. Identifying self personality, SWOT analysis.

11. Personality test on decision making, thinking power etc.

**Text Books:**

1. Learners English grammar and Composition, N.D. Prasad, A Rao, 2<sup>nd</sup> edition S. Chand and Company, New Delhi, 2008
2. Technical Communication Principle and Practices, Meenakshi Raman, Sangeeta Sharma, 4<sup>th</sup> edition, Oxford University Press, 2007.

**Reference Books:**

1. Professional Communication Skills, Alok Jain, Pravin S.R.Bhatia, A.M.Sheikh, 3<sup>rd</sup> edition, S.Chand and company, New Delhi, 2005.
2. Effective English Communication, Krishna Mohan, Meenakshi Raman, 3<sup>rd</sup> edition, Tata MacGraw Hill, New Delhi, 2003.
3. Power of positive thinking, D. J. Mile, 2<sup>nd</sup> edition, Rohan Book Company, Delhi, 2004.
4. All about self motivation, Pravesh Kumar, 3<sup>rd</sup> edition Goodwill publishing House, New Delhi, 2005.
5. Personality Development, E.B. Hurlock, 5<sup>th</sup> edition, Tata McGraw Hill, New Delhi 2006.

**Course Outcomes:** After completion of the course, the students should be able to –

SHU205.1 accumulate basic vocabulary needed for effective communication.

SHU205.2 learn proper sentence construction in English Language.

SHU205.3 develop ability for effective writing.

SHU205.4 develop understanding about personality and ability for self analysis.

SHU205.5 Self analyze and will lead a student for his/her positive development.

SHU205.6 develop himself as an efficient individual useful for the development and welfare of society.