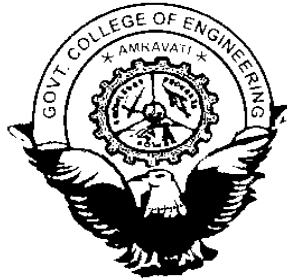


GOVT.COLLEGE OF ENGINEERING AMRAVATI

(An Autonomous Institute of Government of Maharashtra)



B.TECH (FIRST YEAR) I & II SEMESTER CURRICULUM

First Year Engineering

**GOVT.COLLEGE OF ENGINEERING
AMRAVATI
2012-13**

Preamble

The present education needs to improve its international competitiveness and the employability of its student community. In this age of information technology the education paradigm is shifting from teaching to learning and the role of teacher is a facilitator. The focus of education should be student centered and thrust should be on learning by the students than teaching by the faculty. The contact hours should be optimized so that student can approach to library, use Internet and take up self-study to improve his/her skills.

This curriculum structure of the B. Tech First Year has been framed by considering guidelines of NKC (National Knowledge Commission), which suggests appropriate importance of basic courses, core courses and interdisciplinary/elective courses to fulfill the varied needs of the industry. It has been prepared to compete with the leading Engineering institutions of the country such as different IITs, NITs and other autonomous institutions.

Almost every course in the B. Tech First Year structure has undergone some modifications once or twice in the period of last four years. The highlights of the present curriculum are listed as follows:

1. The electrical Engineering course (Theory and Lab) is divided into two courses, viz. (i) Basic Electrical Engineering and (ii) Basic Electronics Engineering.
2. Evaluation of all Lab courses is 100% internal through continuous evaluation (Internal continuous Assessment).
3. Introduction of new shops such as electrical shop, computer hardware shop, electronics shop and civil shop along with the conventional shops.
4. To improve the communication skill and soft skills of the student General Proficiency is introduced at the First Year level itself.
5. Previous non-credit course Environmental Studies is assigned credits.
6. To improve the practical view of the students more lab hours and/or credits are assigned for Engineering Graphics Lab and Computer Science Lab courses.
7. Total number of courses offered to first year is 20 and the contact hours per week are 29.
8. The total number of credits of four Year B.Tech Degree programme are 184 (contact hours per week are between 29 & 24).
9. A new course Living System based on biological Sciences is included as per BOM suggestion.

Even though the structure is revamped in the light of NKC suggestions it includes many modifications that have been proposed by different DFBs, which reflects change in the mindsets after going through four years of academic autonomy. The board has tried its best to make it more recent and effective.

GOVERNMENT COLLEGE OF ENGINEERING, AMRAVTI.

Scheme for B. Tech. First Year

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	Living Systems	2	---	---	2	4	8	8	30	---	---	50	0
CSU101	Computer Science	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 Science 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 Hrs /week	Tutorial Hrs/week	Practical Hrs/week	Total	Theory				Practical		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
4	CEU102	Engineering Mechanics Lab	MEU203	Engineering Graphics Lab

SHU101 ENGINEERING MATHEMATICS-I

Teaching Scheme: 03 L + 01 T Total- 04

Credit: 04

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

Total Marks: 100

Duration of ESE: 2Hrs. 30min

Matrices:

Rank of Matrix by Echelon and Normal form, Consistency of Simultaneous Equations in n-unknowns, Solution of Homogeneous and Non-homogeneous system of Simultaneous Equations, Linear dependence of Vectors, Eigen values and Eigen vectors, Cayley Hamilton theorem (statement).

Complex Numbers:

Demoivre's theorem and its applications, Roots of Complex Numbers, Hyperbolic and inverse Hyperbolic Functions, Separation of Real and Imaginary parts, logarithm of Complex Numbers.

Successive Differentiation:

Standard formulae, Leibnitz's theorem, Expansion of Functions in power series, Taylor's and Maclaurin's series, Indeterminate form and L'Hospital rule.

Partial Differentiation:

First and second order Partial Differentiation of Composite, Parametric, Implicit and explicit Functions. Euler's theorem on Homogeneous Functions, Jacobian and its Properties, Maxima and Minima of two variable Functions.

Text book:

1. 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.

References books:

1. Advanced Engineering Mathematics-H. K. Dass, S. Chand and Sons, 12th Edition
2. Higher Engineering Mathematics by B. S. Grewal, Khanna publication, 6th edition, New Delhi, 1976..
3. A Text book of Engineering Mathematics by N.P.Bali, Manish Goyal, Laxmi Publications, 7th edition 2007.
4. Higher Engineering Mathematics-B. V. Ramana, Tata McGraw Hill Publications, 2007.

SHU102 - APPLIED PHYSICS

Teaching Scheme : 04L + 00T

Credit : 04

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

Total marks : 100

Duration of ESE : 2hrs.30min.

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, antireflection coating.

Diffraction: Fraunhofer and Fresnel, Fraunhofer Diffraction at single slit, double slit and multiple slit (qualitative), diffraction grating, characteristics of diffraction grating.

Polarization: Polarization by reflection, Brewster's law, polarization by double refraction, Nicol prism, elliptically and circularly polarized light, Quarter wave plate and half wave plate, Production circularly and elliptically polarized light, application of polarization (LCDs), photo-elasticity.

Physics of Semiconductors:

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.

Dielectrics, superconductors and magnetic materials:

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.

Introduction to superconductivity, critical temperature and magnetic field, Meissner effect, effect of isotope, Josephson effect, types of superconductors, Applications of superconductivity.

Magnetic materials– types and properties, domain theory, hysteresis, hard and soft magnetic materials, applications.

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.

LASER & Optical Fiber:

Interaction of radiation with matter: absorption, spontaneous and stimulated emission, metastable state, population inversion, pumping mechanism, optical resonator, LASER beam characteristics, He Ne gas LASER, Industrial applications of LASER. Introduction to optical fiber, propagation of light through a cladded fiber, types of optical fiber, fiber materials and fabrication, optical fiber communication system, fiber optic sensors.

Electric and Magnetic Fields:

Motion of electron in uniform electric field – parallel, perpendicular and inclined fields, electrostatic deflection, Motion of electron in uniform magnetic field – parallel, perpendicular and inclined fields, magnetostatic deflection, e/m by Thomson's method, Lorentz force, electrostatic focusing, magnetic focusing, an electron microscope, cathode ray oscilloscope and its applications, positive rays, q/m of positive rays by Thomson's parabola method, study of isotopes by Bainbridge mass spectrograph.

Text books:

1. Fundamentals of Physics by D Halliday, R Resnik and J Walker, 6th Edition, John Wiley & Sons Inc., 2005.
2. Text Book of Engineering Physics by M. Avadhanulu and Kshirsagar, 9th Edition, S. Chand publication, 2008

Reference Books:

1. Fundamentals of Optics, F A Jenkins & H E White, 4th Edition, Mc-Graw Hill Publications, 1976.
2. Concepts in Modern Physics, A Beiser, 5th Edition, Tata Mcgraw Hill Publication, 2001.
3. Introduction to Modern Physics by F K Richtmyer, E H Kennard and J N Cooper, 6th Edition, Tata Mcgraw Hill Publication, 1997.
4. Introduction to Solid State Physics, C Kittel, 7th Edition, J Wiley & Sons. Inc., 2005.

SHU104 LIVING SYSTEMS

Teaching Scheme: 02L + 0T Total- 02
Evaluation scheme: 8CT1+8CT2+4TA+30ESE
Duration of ESE : 2hrs.

Audit
Total Marks: 50

Biomolecular Engineering

Molecular basis of living systems, Biophysics of proteins, Cellular systems and dynamics, Biophysical basis of life, Metabolic pathway analysis: carbohydrate, Concept of diffusion, osmosis, active transport and water potential.

Human Anatomy

Structure and function of following:

Types of Tissues - Epithelial, Connective and Muscular. Skeletal system, Digestive system, Respiratory system, Cardiovascular system, Excretory system, Nervous system.

Introduction to Natural and Artificial Organs

Structure of the sensory organs viz. Eye, Ear, Skin, Nose, Tongue;
Study of artificial organs viz. Eye, limbs, Teeth.

Biological Thermodynamics

Energy transformation in biological systems - laws of thermodynamics, The concept of free energy, Weak bonds in biological systems, Importance of high molecular bonds, Weak and strong bonds determining macromolecular structure.

Biomechanics

Body segment parameters, external forces and moments, Muscle and joint mechanics, Mechanics of anatomical structures and tissues.

Text Books:

1. Human Physiology Vol. I & Vol. II, Chatterjee C C.; 11th Edition; Arun Printers, Calcutta 1994
2. Molecular Biology of the Gene, James Watson, 5th LPE edition, Person Publications (2008).

Reference Books:

1. Cell Biology, Singh, S.P. and Tomar, B.S., Rastogi Publications Meerut.
2. Cell and Molecular Biology - Karp,G ,6th Edition, J Wiley & Sons.
3. Botany An introduction to Plant Biology, 4th edition, James D. Mauseth, Jones and Bartlett Publishers.
4. Test Book of Botany, V. Singh, P.C. Pande, and D.K. Jain, Rastogi publication.
5. E books and recent literature related to the topic available on Internet.

CSU101 COMPUTER SCIENCE

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.

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.The Complete Reference, By Herbert Schildt, Fourth Edition, Published by McGraw-Hill Publication. 2005.

Reference books:

1. The C Programming Language, Second Edition, by Brian W. Kernighan and Dennis M. Ritchie, Published by Prentice Hall, Inc., 1988.
2. Programming in ANSI C, by Balaguruswamy, 3rd Ed., Published by Tata McGraw-Hill, 2004.

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.

Force Fundamentals:

Force, moment of a force, couple, resolution and composition of coplanar force system, reduction of system of forces into a force couple system, wrench. Free body diagrams, equations of equilibrium, equilibrium of co-planer force system, equilibrium of non-coplanar concurrent force system.

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.

Properties of areas:

Centroid of plane areas, second moment of area, and product of inertia, perpendicular and parallel axis theorem, polar moment of inertia, radius of gyration, definition of principal axes and principal moment of inertia.

Kinematics:

Definitions of displacement, velocity, acceleration and their relations, Rectilinear motion under constant and variable acceleration, motion curves, simple relative motion between two particles.

Kinetics:

Kinetics of rectilinear and circular motion of a particle acted upon by a constant and variable force system, D'Alembert's principle, concept of dynamic equilibrium.

Work-Energy method:

Work, power and energy, work energy equation for a motion of particles, system of particles, work energy equation for rigid bodies.

Text Books:

1. Vector Mechanics for Engineers, Vol. 1 – Statics and Vol. 2 – Dynamics, Beer and Johnson, 8th edition, Tata McGraw Hill International Edition, 2007.
2. Engineering Mechanics, Vol. 1 – Statics 4/e, 1998 and Vol. 2 – Dynamics, Merriam, 5/e, Wiley International, 2001.

References Books:

1. Engineering Mechanics – Statics and Dynamics, Irving, H., Sharmes, 4th Edition, Prentice-Hall of India Pvt. Ltd., 1996.
2. Engineering Mechanics, Vol. 1 – Statics and Vol. 2 – Dynamics, Mokoshi, V.S., Tata McGraw Hill Books, 1996.
3. Engineering Mechanics, Timo-shenko and Young, 4th Edition, McGraw Hill, 1995.
4. Engineering Mechanics, McLean, 3rd Edition, SCHAUM Series, 1995.

ETU101 BASIC ELECTRONICS ENGINEERING**Teaching Scheme: 02L****Total: 02****Credit : 02****Evaluation Scheme: 8 CT1+8 CT2+4 TA+30 ESE****Total Marks: 50****Duration of ESE: 02Hrs.**

Only qualitative treatment

P-N junction diodes and Applications: Construction, working and V-I characteristics of P-N junction diode, Zener diode, Light Emitting Diode and Photodiode, applications like Diode as a switch and Rectifiers (Half Wave Rectifier, Centre-Tap and Bridge Full Wave Rectifier), Shunt Capacitor filter and Zener diode Voltage Regulator.

Transistors and it's Applications: Construction, working and V-I characteristics of BJT, need of biasing, Voltage divider biasing method for CE configuration, Transistor CE amplifier, Introduction to Direct coupled, RC-coupled, LC-coupled and Transformer coupled amplifier, Transistor as a switch; construction, working and V-I characteristics of FET and MOSFET in Common Source configuration.

Power Semiconductor Devices and Op Amp: Construction, operating principle and V-I characteristics of UJT, SCR, DIAC, TRIAC (in 1st and 3rd quadrants only). Block diagram of Op-Amp, Ideal Op-Amp, Equivalent circuit of Op-Amp, Important Op-Amp parameters, Applications of Op-Amp as Inverting amplifier, Non-Inverting amplifier and Single stage Differential amplifier.

Text Books:

1. Principles of Electronics, Malvino, 5th edition, Tata McGraw Hill, 1993
2. Electronic Devices and Circuit Theory, R. Boylestad and L. Nashelsky, 9th edition, Prentice Hall Publications, 2007
3. Basic Electronics, B.L. Theraja, 3rd edition, S.Chand & Company, 1987
4. Basic Electronics, Bernard Grob, 9th edition Tata McGraw Hill, 2003

Reference Books

1. Electronics Devices and Circuits, Allen Mottershead, 5th edition, Prentice Hall Publications, 2003
2. Op-amps and Linear Integrated Circuits, R. A. Gaykwad, 4th edition, Prentice Hall of India, 2008
3. Power Electronics, M. D. Singh and K. B. Khanchandani, 6th edition, Tata McGraw Hill Publications, 2006

MEU101 WORKSHOP PRACTICE-I

Teaching Scheme: 02P

Total: 02

Credit: 01

Evaluation Scheme: Internal Continuous Assessment

Total Marks: 50

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

Programme Name	GROUP B
CIVIL	Smithy
MECHANICAL	Smithy
ELECTRICAL	Electrical Workshop
ENTC	Comp Hardware shop
COMPUTER	Comp Hardware shop
INFORMATION TECHNOLOGY	Comp Hardware shop
INSRUMENTATION	As per class they belong to

Group A

Carpentry

Introduction to carpentry tools, Machine tools, joints; one job on wood working joints
Introduction to different types of pattern, pattern making tools 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 sheet metal tools and equipments, their uses, sheet metal joints, Surface development; One job on sheet metal joint

Group B

Smithy

Introduction to various smithy tools and equipments, 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; Demonstration of motor rewinding, 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

SHU103 APPLIED PHYSICS LAB

Teaching Scheme: 02P

Total: 02

Credit: 01

Evaluation Scheme: Internal Continuous Assessment

Total Marks: 50

It is a representative list of practicals. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise.

Minimum eight experiments 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 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. Study of optical fiber characteristics.
8. To determine the Curie temp and relative permittivity of given ferro-electric material.
9. Determination of specific charge of an electron (e/m) by Thomson method
10. Measurement of voltage and frequency by using cathode ray oscilloscope.
11. Determination of radius of curvature of plano-convex lens by using Newton's rings.
12. Determination of grating element-using diffraction of LASER beam.
13. Determination of wavelength of spectral lines using diffraction.
14. To determine slit width from the study of Fraunhofer diffraction pattern (single slit / double slit).
15. Determination of Specific rotation of optically active liquids.
16. To determine magnetic susceptibility of given paramagnetic liquid.
17. Determination of wedge angle of given wedge-shaped thin film.

CSU102 COMPUTER SCIENCE LAB

Teaching Scheme: 04P

Total: 04

Credit: 02

Evaluation Scheme: Internal Continuous Assessment

Total Marks: 50

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, concate, 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.

CEU102 ENGINEERING MECHANICS LAB

Teaching Scheme: 02 P

Credit: 01

Evaluation Scheme: Internal continuous Assessment

Total Marks: 50

It is a representative list of practicals. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise.

Minimum seven experiments from following group along with minimum three graphical solutions.

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. Determination of 'g' by compound pendulum.
9. Determination of moment of inertia of flywheel.
10. Verification of Newton's second law of motion by Fletcher's trolley.
11. Demonstration of direct central impact
12. Study of gear trains

ETU102 BASIC ELECTRONICS ENGINEERING LAB

Minimum eight experiments shall be performed from the list given below. The experiments to be carried shall cover entire curriculum and the list is just a guideline.

List

1. To plot V-I characteristics of Ge and Si P-N junction diode and compute their junction potential. To study P-N junction diode as a switch.
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 implement the Capacitance input filter and plot its output waveform.
6. To plot and study I/P and O/P characteristics of BJT in CB and CE configurations.
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 I/P and O/P characteristics of a transistor as a switch.
10. To study Photo transistor as an Optical switch.
11. To plot and study frequency response of RC-Coupled Amplifier.
12. To plot and study frequency response of Direct Coupled Amplifier.
13. To plot and study the V-I characteristics of SCR, DIAC, UJT.
14. To measure the gain of Inverting and Non-Inverting Amplifier using Op-Amp 741.

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

Beta and Gamma Functions:

Definition and Properties of 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 co-ordinates, 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 1st order and 1st degree : non-homogeneous, Exact and non-exact, Linear and non-linear. Applications to orthogonal trajectory and Electrical circuits.

Fourier Series:

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

Text book:

1. 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. Advanced Engineering Mathematics-H. K. Dass, S. Chand and Sons, 12th Edition, 2002.
2. Higher Engineering Mathematics by B. S. Grewal, Khanna publication, 6th edition, New Delhi, 1976..
3. A Text book of Engineering Mathematics by N.P.Bali, Manish Goyal, Laxmi Publications, 7th edition 2007.
4. Higher Engineering Mathematics-B. V. Ramana, Tata McGraw Hill Publications, 2007.

SHU202 APPLIED CHEMISTRY

Teaching Scheme :04 L + 0T Total :04 Credit: 04
Evaluation Scheme: 15CT1 + 15CT2 + 10TA + 60ESE Total Marks: 100
Duration of ESE: 2.00Hrs.30min

Corrosion & Its Control:

Causes & consequences of Corrosion, Electrochemical & Galvanic series. Dry & wet corrosion & its mechanism, types of corrosion-Pitting corrosion, 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:

A) 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.

B) Boiler feed water & troubles: -Requirement and treatment of Boiler feed water, Boiler corrosion, Caustic embrittlement, Priming & Foaming, Scale & Sludge formation and internal treatment for Boiler feed water

Fuels:

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. Knocking, chemical constitution & Knocking properties, Octane number, Cetane number, Antiknocking agents. Flue Gas Analysis by Orsat Method, Combustion and combustion Problem.

Lubricants:

Classification & Mechanisms, testing of lubricants i) Viscosity & viscosity Index ii) Flash point & fire point iii) Carbon Residue and iv) 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

Refractories:

Requisites of good refractory, classification, properties, raw materials, manufacture of acidic, (**Fire clay & Silica**), Basic (magnesite & Dolomite), Neutral (carbon & Silicon Carbide) Refractories. Refractories for special application: pure oxide, mixed oxide, non oxide, insulating, monolithic **refractories** Failure of Refractories

Composite Material:

Particle-Reinforced Composite, Large particle Composites, dispersion-strengthened Composites, Fiber-Reinforced Composites, Continuous aligned, Discontinuous aligned & Random oriented, structural Composites, Laminate & Sandwich Panels.

Instrumental Methods of Chemical Analysis:

Principle, Instrumentation and application of spectroscopic technique, Colorimetry, UV-Visible, AAS, Flame photometry

Chemistry of Nano material:

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

Text Book:

1) Engineering Chemistry by S.S. Dara, S. Chand & Company LTD, 11th Edition.2006

Reference Books:

- 1) Chemistry in Engineering and Technology Vol 1 & Vol` 2 By J. C. Kuricose and J Raja ram. Tata McGraw Hill Publication
- 2) Text Book of Engineering Chemistry by Jain & Jain, 15th Edition,2006, Dhanpatrai Publ. Comp.

MEU201 ENGINEERING GRAPHICS

Teaching Scheme: 03L

Total 03

Credit: 03

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

Total Marks: 100

Duration of ESE : 3.00Hrs.

Introduction

Significance and scope of Engineering drawing, introduction to scale; Scale: -Plain, Diagonal, Comparative and Vernier

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

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

Reference Books:

1. Shah M. B., Engineering Drawing, Pearson Education, 1st Edition, 2007, New Delhi
2. Shah P. J., Engineering Drawing, S. Chand Publication, 1st Edition, 2008. New Delhi

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.

Fundamentals

Basic concept of Voltage, Current, Power, Energy and relationship between them
Resistance Resistivity, Conductivity, Temperature effect on resistance and temperature coefficient of resistance. Series and parallel circuits, Star-Delta transformation, Kirchoff's laws, Superposition theorem, Thevinin's theorem, Nortons Theorem, Maximum Power Transfer Theorem

Electromagnetism and circuit

Basic concept of Magnetic flux, Flux density, MMF, Reluctance, Magnetic field intensity and their relationship Leakage and fringing of flux, Series and Parallel Magnetic circuits

Electromagnetic Induction

Principles of Electromagnetic induction self and mutual induction coefficient of coupling and Energy stored in magnetic circuit, Magnetization curves

A.C. Fundamentals

RMS, Average values form factor, peak factor for Sinusoidal Wave form only

Single Phase A.C. Circuits

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

Polyphase Circuits

Balanced Three phase circuits: Production of three phase supply, Star and Delta balanced load. Relationship of phase and line values of voltage and current for Star and Delta connections

Text Books:

- 1) Principle of Electrical Engineering -Del Toro V. PHI-2005

Reference Books:

- 1) Electrical Engineering Principles and Applications , Second edition Allan R. Hambley , PHI 2005
- 2) Basic Electrical Engineering – Fitzgerald A.E. TMH 2004
- 3) Basic Electrical Engineering –Theory and Problems – Cathey J.J. McGra Hill 2006.

SHU203 ENVIRONMENTAL STUDIES

Teaching Scheme: 03L

Total :03

Credit:03

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

Total Marks:100

Duration of ESE: 2.00Hrs.30min.

The Multidisciplinary Nature of Environmental Studies

- Definition, scope and importance
- Need for public awareness.

Social Issues and The 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, Hydrogeothermal, Nuclear. Environmental Implication of Energy uses.

Non-conventional Energy Resources: Solar Energy , Wind Energy, Tidal energy, Geothermal Energy, Hydropowers and Biogas.

Ecosystems

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/ grassland/ hill/ mountain.

Visit to local polluted site-Urban/rural/industrial/agricultural

Text Books:

1. The Biodiversity of India, Bharucha Erach, Marin Publishing Pvt. Ltd., Ahmedabad.
2. Environmental Chemistry, De A.K. Wiley Estern Lmt.

Reference Books:

1. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc.
2. Marine pollution, Clark R.S., Clanderson Press Oxford (TB)
3. Environmental Chemistry, Sharma B.K., 2001 Goel Publ., House, Meerat.
5. Environmental Management, Wagner K.D., 1998, W.B. Saunders Co., Philadel phia, USA
6. Environmental Studies, Benny Joseph, 1st edition, 2005, Tata Mcgraw-Hill Publ.

MEU202 WORKSHOP PRACTICE-II

Teaching Scheme: 02P

Total: 02

Credit: 01

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

Programme	GROUP B
CIVIL	Civil Workshop
MECHANICAL	Machining processes
ELECTRICAL	Machining processes
ENTC	Electronics workshop
COMPUTER	Electronics Workshop
INFORMATION TECHNOLOGY	Electronics workshop
INSRUMENTATION	As per class they belong to

Group A

Fitting

Introduction to different fitting tools, their use, different measuring tools; Introduction to taps & dies; one job on fitting

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

Demonstrations showing basic operations on lathe, shaper, drilling and milling m/cs; one job on lathe machine covering Turning, Taper Turning and Threading operations

Electronics Workshop

PCB making, soldering, testing and desoldering of a simple electronic circuit; probe making; one job on above

Civil workshop

Introduction to autolevel and theodolite for simple layouts, reinforcement bar bending and tying, different bonds for brick masonry; preparation of concrete; one job on above

SHU204 APPLIED CHEMISTRY LAB

Teaching Scheme: 02P

Total: 02

Credit: 01

Evaluation Scheme: Internal Continuous Assessment

Total Marks: 50

It is a representative list of practicals. The instructor may choose experiments as per his requirements (so as to cover entire contents of the course) from the list or otherwise.

Minimum eight experiments from the following group.

List of experiments:

1. Preparation of phenol formaldehyde resin
2. Preparation of urea formaldehyde resin
3. Determination of Pour point and Cloud point of lubricating oil
4. Determination of flash point of a lubricating oil by Abel's/ 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. Acid-base titration by Potentiometric method.
12. Determination of pH of solution by pH-meter.
13. Determination of NaOH and Na₂CO₃ in given alkali mixture.
14. Determination of chloride ions in water sample.
15. Determination of chlorine in water sample.

MEU203 ENGINEERING GRAPHICS LAB

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

Introduction to AUTOCAD, Importance, advantages, various commands and Tool bars.

Each student will have to submit seven drawing sheets (drawn manually) **and two sheets using AUTOCAD** on above syllabus.

List of Drawing Sheet:

1. Various Engineering Curves
2. Projection of Lines (Four problems)
3. Projection of Planes (Four problems)
4. Projections of Solids (Four problems)
5. Orthographic Projection (four problems on each: First and Third angle projection)
6. Isometric drawing and Isometric projections (Two problems)
7. Two problems on Orthographic projections of machine elements using AUTOCAD
8. Two problems on Isometric projections of machine elements using AUTOCAD

EEU202 BASIC ELECTRICAL ENGINEERING LAB

Teaching Scheme: 02 P

Credit: 01

Evaluation Scheme: Internal Continuous Assessment

Total Marks: 50

It is representative list of practicals. The instructor may choose experiments as per his 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 verify Thevenin's theorem
- 3] To verify Superposition theorem
- 4] To verify Norton's theorem
- 5] To plot phasor diagram for RLC Series circuit
- 6] To plot phasor diagram for RLC parallel circuit
- 7] To verify relation between line & phase values in balanced STAR connection
- 8] To verify relation between line & phase values in balanced DELTA connection

SHU205 GENERAL PROFICIENCY-I

Teaching Scheme: 01L + 02P

Total: 03

Credit : 02

Evaluation Scheme: Internal Continuous Assessment

Total Marks: 50

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 a 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. Constructing 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 student and suggestions 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. V. Prasad, A Rao, 2nd edition S. Chand and Company, New Delhi, 2008
2. Technical Communication Principle and Practices, Meenakshi Raman, Sangeeta Sharama, 4th edition, Oxford University press, 2007

Reference Books:

1. Professional Communication Skills, Alok Jain, Pravin S., R. Bhatia, A. M. Sheikh, 3rd edition, S. Chand and Company, New Delhi, 2005
2. Effective English Communication, Krishna Mohan, Meenakshi Raman, 3rd edition, Tata MacGraw Hill, New Delhi, 2003
3. Power of Positive Thinking, D. J. Mile, 2nd edition, Rohan Book Company, Delhi, 2004
4. All About Self motivation, Pravesh Kumar, 3rd edition Goodwill Publishing House, New Delhi, 2005
5. Personality Development, E. B. Hurlock, 5th edition Tata MacGraw Hill, New Delhi, 2006.