Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

SoE & Syllabus 2020-21

First & Second Semester BE

28 June 2018

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

SoE No. FY-201

B.E. SCHEME OF EXAMINATION 2018-19

(Revised Scheme of Examination w.e.f. 2020-21 onward)

First Year BE

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
First Semester Group "A"														
1	1	BS	GE2101	Engineering Mathematics I	**T**	3	1	0	4	4	30	30	40	3
2	1	BS	GE2105	Engineering Physics	**T**	4	0	0	4	4	30	30	40	3
3	1	BS	GE2106	**Lab.:** Engineering Physics	**P**	0	0	2	2	1		60	40	
4	1	HS	GE2107	Communications Skills	**T**	3	0	0	3	3	30	30	40	3
5	1	BES	CV2101	Engineering Mechanics	**T**	3	1	0	4	4	30	30	40	3
6	1	BES	CV2102	**Lab.:** Engineering Mechanics	**P**	0	0	2	2	1		60	40	
7	1	BES	IT2101	Introduction to Computer Programing	**T**	3	1	0	4	4	30	30	40	3
8	1	BES	IT2102	**Lab.:** Introduction to Computer Programing	**P**	0	0	2	2	1		100		
9	1	BES	ME2103	Workshop Practice	**P**	0	0	2	2	1		60	40	
					TOTAL	**16**	**3**	**8**	**27**	**23**				
First Semester Group "B"														
1	1	BS	GE2102	Engineering Mathematics II	**T**	3	1	0	4	4	30	30	40	3
2	1	BS	GE2103	Engineering Chemistry	**T**	4	0	0	4	4	30	30	40	3
3	1	BS	GE2104	**Lab.:** Engineering Chemistry	**P**	0	0	2	2	1		60	40	
4	1	HS	GE2108	Social Sciences	**T**	3	0	0	3	3	30	30	40	3
5	1	BES	EL2101	Electrical Engineering	**T**	3	1	0	4	4	30	30	40	3
6	1	BES	EL2102	**Lab.:** Electrical Engineering	**P**	0	0	2	2	1		60	40	
7	1	BES	ME2101	Engineering Graphics	**T**	1	0	0	1	1	30	30	40	3
8	1	BES	ME2102	**Lab.:** Engineering Graphics	**P**	0	0	4	4	2		100		
9	1	BES	EE2101	Basic Electronics	**T**	3	1	0	4	4	30	30	40	3
					TOTAL	**17**	**3**	**8**	**28**	**24**				

MSEs* = Three MSEs of 15 Marks each will conducted and marks of better 2 of these 3 MSEs will be considered for Continuous Assessment

TA – for Theory : 20 marks on lecture quizzes, 8 marks on assignments, 2 marks on class performance

TA – for Practical : MSPA will be 15 marks each

Chairperson	**Dean (Acad. Matters)**	**June 2020**	**1.02**
		Date of Release	**Version**

Applicable for AY 2020-21 Onwards

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SoE No. FY-201

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(Revised Scheme of Examination w.e.f. 2020-21 onward)

First Year BE

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Second Semester Group "A"														
1	2	BS	GE2102	Engineering Mathematics II	**T**	3	1	0	4	4	30	30	40	3
2	2	BS	GE2103	Engineering Chemistry	**T**	4	0	0	4	4	30	30	40	3
3	2	BS	GE2104	**Lab.:** Engineering Chemistry	**P**	0	0	2	2	1		60	40	
4	2	HS	GE2108	Social Sciences	**T**	3	0	0	3	3	30	30	40	3
5	2	BES	EL2101	Electrical Engineering	**T**	3	1	0	4	4	30	30	40	3
6	2	BES	EL2102	**Lab.:** Electrical Engineering	**P**	0	0	2	2	1		60	40	
7	2	BES	ME2101	Engineering Graphics	**T**	1	0	0	1	1	30	30	40	3
8	2	BES	ME2102	**Lab.:** Engineering Graphics	**P**	0	0	4	4	2		100		
9	2	BES	EE2101	Basic Electronics	**T**	3	1	0	4	4	30	30	40	3
				TOTAL		**17**	**3**	**8**	**28**	**24**				
Second Semester Group "B"														
1	2	BS	GE2101	Engineering Mathematics I	**T**	3	1	0	4	4	30	30	40	3
2	2	BS	GE2105	Engineering Physics	**T**	4	0	0	4	4	30	30	40	3
3	2	BS	GE2106	**Lab.:** Engineering Physics	**P**	0	0	2	2	1		60	40	
4	2	HS	GE2107	Communications Skills	**T**	3	0	0	3	3	30	30	40	3
5	2	BES	CV2101	Engineering Mechanics	**T**	3	1	0	4	4	30	30	40	3
6	2	BES	CV2102	**Lab.:** Engineering Mechanics	**P**	0	0	2	2	1		60	40	
7	2	BES	IT2101	Introduction to Computer Programing	**T**	3	1	0	4	4	30	30	40	3
8	2	BES	IT2102	**Lab.:** Introduction to Computer Programing	**P**	0	0	2	2	1		100		
9	2	BES	ME2103	Workshop Practice	**P**	0	0	2	2	1		60	40	
				TOTAL		**16**	**3**	**8**	**27**	**23**				

MSEs* = Three MSEs of 15 Marks each will conducted and marks of better 2 of these 3 MSEs will be considered for Continuous Assessment

TA – for Theory : 20 marks on lecture quizzes, 8 marks on assignments, 2 marks on class performance

TA – for Practical : MSPA will be 15 marks each

Chairperson	**Dean (Acad. Matters)**	**June 2020**	**1.02**
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			Applicable for AY 2020-21 Onwards

Academic Curriculum :

The syllabus for each subject is divided into six units. A student is evaluated for theory courses through Teachers Assessment (TA), Three Mid Semester examination (MSE) and one End Semester Examination (ESE). The relative weightage is 30% for TA (for Theory : 20 marks on lecture quizzes, 8 marks on activity as decided by teacher mentioned in handout, 2 marks on class performance), 30% for any two better of three MSE, and 40% for ESE. The teacher shall announce the method of TA at the beginning of the semester. All MSE and ESE are compulsory for all students. The marking will be on absolute basis. The total marks are calculated in each course as per the weightage indicated above. Minimum 20% marks out of 40 is necessary for clearing the ESE Examination. Minimum 50% marks are necessary to clear the laboratory courses. No credits are awarded if the student remains absent in the ESE.

The laboratory courses will have Continuous Assessment (CA) which will be based on punctuality, turn to turn assessment of student's work, quality of records maintained, Group Discussions, overall understanding of the experiment and viva-voce examination (as per requirement of structure of course). The CA for laboratory courses shall be 60% and ESE may be on an experiment or viva or written test or a combination of these, and shall carry a weightage of 40%.

Practical Courses with 100% continuous evaluation will not have ESE. The student shall either successfully complete the course or shall get I grade. If the course work is not satisfactory, students will have to Re-register compulsorily.

Advancement to Higher Semesters:

For registration in third semester of UG, a student must have earned a minimum of 60 % credits of first two semesters. The students who are admitted under lateral entry scheme, there shall be no minimum credit requirement.

For registration at fifth semester of UG, a student must have earned all the credits of first two semesters and 60% credits of third and fourth semesters. For students admitted under lateral entry, student must have earned minimum of 60% credit of second year for registration to fifth semester.

For registration at seventh semester of UG, a student must have earned all credits of first four semesters and at least 60% Credits of fifth and sixth semesters. For students admitted under lateral entry, a student must have earned all credits of third and fourth semesters and at least 60% Credits of fifth and sixth semesters.

A student will be allowed to register for the courses only if he/she has cleared all financial dues of the previous year / semester of the Institution and/or Hostel.

A student will not be able to register for the courses if he/she has been debarred from registration on specific grounds.

Academic Syllabus

GE 2101	Engineering Mathematics I			L=3	T=1	P=0	Credits=4

Evaluation Scheme	MSE-I	MSE-II	MSE-III	TA	ESE	Total	ESE Duration
	15	15	15	30	40	100	3 Hrs
	30						

Objectives	Outcomes Students will be able to
• To give basic knowledge of differential Calculus.	• Apply the knowledge of differentiation to develop the Mathematical equations and compute geometrical measures.
• To introduce the concept of partial differentiation.	• Determine the expansion and derivatives of functions of Multiple variables and use it to find extreme values of functions.
• To extend the concept of integration to double and triple integrals.	• Evaluate the integrals of single, multiple variables and use it to find the dimensions of various geometrical figures.
• To introduce the concept of vector Calculus.	• Discuss Calculus of Scalar and vector point function and use appropriate theorems to evaluate integrals of functions of single, multiple variables.

Unit I: Differential Calculus (6 hours)

Successive differentiation; Taylor's and Maclaurin's series for one variable, Curvature and radius of curvature of plane curves (excluding Newton's Method), Circle of curvature.

Unit II: Partial Differentiation (7 hours)

Functions of several variables, First and higher order derivatives, Euler's theorem, Chain rule and total differential coefficient, Implicit functions; Jacobians, Taylor's and Maclaurin's series for two variables, Maxima and minima of functions of two variables.

Unit III: Integral Calculus (6 hours)

Beta and gamma functions, Differentiation of a definite integral, Tracing of Cartesian curves, Rectifications of simple curves, Quadrature: volume and surface of solids of revolution.

Unit IV: Multiple integrals and their Applications (7 hours)

Elementary double integrals, Change of variable (simple transformations) and Jacobian of transformations, Change of order of integration (Cartesian and polar),Applications to find mass, area, volume and centre of gravity ,Elementary triple integrals.

Unit V: Vector Calculus (6 hours)

Vector differentiation, Gradient, Divergence and Curl, Directional derivatives with physical interpretation, Solenoidal and irrational motions, vector fields.

Unit VI: Vector Integration & Application (7hours)

Vector integration: Line, surface and volume integrals, Statement of Stoke's theorem, Gauss divergence theorem and Green's theorem (without proof), Simple applications of these theorems.

Text Books

1. Advance Engineering Mathematics by Erwin Kreyzig, John Wiley and Sons, INC.
2. Engineering Mathematics - by H. K. Dass, 11th revised edition, 2003, S. Chand, Delhi.
3. Advanced Engineering Mathematics - by H. K. Dass, 8th Ed, 2007, S. Chand, Delhi.
4. Engineering Mathematics by Dr. B.S. Grewal.
5. Applied Mathematics by P. N. Wartikar and J.N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.

Reference Books

1. G B Thomas and R L Finney: Calculus and Analytical Geometry, 9th ed, Addison-Wesley, 1999.
2. Calculus-by Michael Spivak and Tom Apostol. (Vols I and II)
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Prakashan, Reprint 2008.

GE 2102	Engineering Mathematics II			L=3	T=1	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	MSE-III	TA	ESE	Total	ESE Duration
	15	15	15	30	40	100	3 Hrs
	30						

Objectives	Outcomes Students will be able to
• To find solution of various types of differential equations.	• Use appropriate Methods to solve first order and higher order differential equations and apply it to find solutions of engineering problems.
• To introduce concepts of Complex variables. •	• Analyse the type of functions of complex numbers and variables, prove Mathematical equations and evaluate the complex integrals.
• To understand Matrix theory.	• Use Matrix method to solve linear equations, evaluate eigen values - eigen vectors and its applications.
• To develop equations of best fit curve and evaluate correlation and regression coefficients.	• Calculate the statistical parameters and derive the equations of best fit curves.

Unit I: Differential Equations - I (7 hours)

First order first degree differential equations: Linear, reducible to linear and exact differential equations (excluding the case of integrating factor); Higher order differential equations with constant coefficients up to method of variation of parameters.

Unit II: Differential Equations - II (6 hours)

Cauchy's and Legendre's homogeneous differential equations; Simultaneous differential equations; Applications of differential equations to electrical circuits, kinematics and vibrations (only up to second order.

Unit III: Complex Numbers (6 hours)

Basic concepts of complex numbers and its various forms. Separation of real and imaginary parts, Hyperbolic functions and their inverse, Logarithm of a complex number.

Unit IV: Complex Variables (7 hours)

Analytic function, Cauchy-Riemann conditions, Harmonic functions, Finding Harmonic conjugates, Cauchy's integral theorem & integral formula (statement only), Taylor's and Laurent's Theorem (statement only) Residue theorem, Evaluation of definite integral involving Sine and Cosine.

Unit V: Matrices (7 hours)

Rank of a matrix, Consistency of system of equations using rank, Characteristics equations, Eigen values and Eigen vectors,Reduction to diagonal form, Cayley Hamilton Theorem (without proof) statement and verification, Sylvester's theorem - statement and its application.

Unit VI: Statistics (6 hours)

Fitting of straight line, y = a + bx, a parabola y = a + bx + cx2, exponential curves and more general curves by method of least squares; Lines of regression and correlation; Rank correlation.

Text Books

1. Advance Engineering Mathematics by Erwin Kreyzig, John Wiley and Sons,INC
2. Engineering Mathematics - by H.K. Dass, 11th revised edition, 2003, S.Chand, Delhi.
3. Advanced Engineering Mathematics - by H.K. Dass, 8th Ed, 2007, S. Chand, Delhi.
4. Engineering Mathematics by Dr. B.S. Grewal
5. Applied Mathematics by P.N.Wartikar and J.N.Wartikar,,Pune Vidyarthi Griha Prakashan, Pune

Reference Books

1. A First course in probability by Sheldon Ross, Sixth Edition, Pearson Education.
2. A text book of Engineering Mathematics by N. P. Bali and Manish Goyal, Laxmi publication / Reprint 2008.
3. Probability and Statistics – By Murray R. Spiegel, Schaum's Outline Series, 3rd Edition, TATA Mc-Graw - Hills.
4. Fundamentals of Mathematical statistics by S. C. Gupta and V. K. Kapoor

GE 2103	Engineering Chemistry			L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	MSE-III	TA	ESE	Total	ESE Duration
	15	15	15	30	40	100	3 Hrs
	30						

Objectives	Outcomes At the end of the course students will be able to
• To impart intensive and extensive knowledge of the subject enriching students to understand the role of Chemistry in the field of engineering. • To develop analytical capabilities of students in characterizing, transforming and using materials in engineering. • To inculcate habit of scientific reasoning to do the task rationally.	• Assess qualitative and quantitative aspects of water as a conventional material for industrial and domestic applications. • Apply the knowledge of basic electrochemistry to understand battery technology, corrosion process and preventive techniques. • Know the basics and assess analytical aspects of industrial materials like fuels and lubricants for efficient utilization. • Recognize the significance of cement and advanced engineering materials in technological applications. • Analyze and generate analytical and instrumental techniques.

Unit I: Water Conditioning Industrial (10 hours)

Specifications of water for industries (paper, textile, beverages and power generation), types of hardness; softening of water by lime-soda process, Zeolite process, De-mineralization process (principle, advantages and limitations). Numerical based on lime-soda and Zeolite process.

Boiler troubles, sequestration (carbonate, phosphate and calgon)

Domestic

Sterilization of drinking water by chlorination, Membrane process (Reverse osmosis) used in water purification.

Unit II: Battery Technology (8 hours)

Thermodynamic functions: energy, entropy and free energy.

Electrochemistry

Basic electrochemistry, half cell potentials, Nernst's equation, Faraday's laws for electrode position,

Battery Technology:

Classification of batteries: Primary, Secondary- Electricity storage density, power density, energy efficiency, cycle life, shelf life.

Rechargeable alkaline storage batteries, Ni-metal hydride.

Lithium ion batteries and H_2-O_2Fuel cell.

Unit III: Corrosion (8 hours)

Introduction to corrosion, electrochemical and galvanic series, Types of corrosion: Chemical and electrochemical corrosion. Mechanisms of electrochemical corrosion, Factors influencing corrosion. Differential aeration theory of corrosion,

Forms of corrosion: Pitting corrosion, Intergranular corrosion, Stress corrosion, Waterline and Microbial corrosion.

Corrosion prevention: Design and material selection, Cathodic and anodic protection, Modifying the environment; Protective surface coatings- tinning, galvanizing, powder coating, metal cladding and electroplating.

Unit IV: Lubricants (8 hours)

Introduction, mechanism, Classification of lubricants: Solid, liquid, semisolid, gaseous and synthetic; Solid lubricant-Graphite

Liquid lubricants, properties of liquid lubricants & significance–Viscosity and viscosity index., Flash and fire point, Cloud and pour point, Aniline point, acid value, saponification number, Steam Emulsion Number.

Greases as Semisolid lubricants - Consistency test and drop point test.

Criteria for selection of lubricants: IC engines, gears, refrigeration, transformer, steam turbines, delicate instruments.

Synthetic lubricants- silicones

Unit V: Fuels (10 hours)

Calorific value, HCV, LCV, Determination of calorific value of fuels by Bomb and Boy's calorimeter.

Solid fuels: Significance of Proximate and Ultimate analysis

Liquid fuels: Fractional distillation of crude oil, Catalytic cracking and its advantages, Knocking in Internal combustion petrol and diesel engines, Octane and Cetane number, Knocking and its relationship with structure of fuels, Doping agents, power alcohol, Blended fuel, Aviation fuel, Rocket propellants, Bio-diesel.

Gaseous fuels: CNG, H_2.

Simple numericals on combustion calculations.

Unit VI: Cement and Advanced Materials (8 hours)

Portland cement: Manufacture, role of microscopic constituents.

Properties-setting and hardening, heat of hydration and soundness

Types of cement-Rapid hardening, High alumina, Portland Pozzolana cement; Ready-mix concrete, Grading of cement.

Advanced materials:

Nanomaterials: Definition of nanomaterials, nano scale. Carbon nano tubes: Different types of CNT; applications of nanomaterials in medicine, environment and electronics. Threats of

Nanomaterials.

Shape memory alloys: Definition, Properties, general applications.

Organic Reactions:

Introduction to reactions involving substitution, addition, elimination, cyclization and ring opening.

Advanced Polymeric materials:

Liquid crystals and liquid crystal polymers (thermotropic and lyotropic), phases of thermotropic polymers: nematic, smectic, cholesteric; advantages, disadvantages and applications.

Text Books

1. A Text book of Engineering Chemistry by S S. Dara; S.Chand & Co New Delhi. Eleventh Edition.
2. Engineering Chemistry by Jain & Jain; Dhanpat Rai & sons New Delhi. Sixteenth Edition.

Practical book

1. A text book on experiments and calculations in engineering Chemistry by S.S .Dara ; S. Chand & Co.

Reference Books

1) Water treatment for industrial and other use by Eskel Nordell, Rein hold Publishing Corporation, New York
2) Chemistry in Engineering by Lloyd A.Munro, Prentice-hall, Inc Nj
3) Applied chemistry for engineers by T.S.Gyngell
4) Water treatment by F.I. Bilane , Mir publisher
5) Fundamentals of corrosion by Michael Henthorne, Chemical Engineering
6) Corrosion Engineering by Mars G. Fontana and Norbert D. Green Mc Graw Hill Book Co. Tokyo
7) Engineering Chemistry B.K.Sharma Krishna Prakashan media private LTD.
8) Chemistry of Advanced Materials CNR Rao RSC Publications
9) Engineering Chemistry(Vol. 1&2) by Rajaram and Kuriakose
10) Engineering Chemistry by R.V.Gadag, A. Nityananda Shetty ; I K International Publishing House New Delhi First Edition
11) A Text book of Engineering Chemistry by Shashi Chawla; Dhanpat Rai & sons, New Delhi
12) A textbook of polymer science Fred. Billmeyer Jr. Wiley India Third edition
13) Chemistry of Engineering Materials, by Rober B Leigeou Mc Graw-Hill Book Company, Inc New York
14) Fuels and Combustion by Amir Circar, Orient Longmans Publication
15) Laboratory manual by Dr. Sudha Rani Dhanpat Rai publication New Delhi
16) A text book of Organic Chemistry 2nd editon by K.S.Tewari,N.K.Vishnoi,S.N. Mehrotra\
17) Organic Chemistry 6th Edition, L.G.Wade, Jr.,Maya Shankar Singh Pearson Publication.

GE 2104	Engineering Chemistry Laboratory	L=0	T=0	P=2	Credits=1

Evaluation Scheme	MSPA-I	MSPA-II	MSPA-III	MSPA-IV	ESE	Total	ESE Duration
	15	15	15	15	40	100	2 Hrs

Total 10 experiments are to be performed
(4 each from Phase I and Phase II and two demonstration experiments)

Course objectives

- To develop analytical ability
- To integrate chemistry fundamentals with practical applications

List of Experiments-Phase I

1) Determination of total hardness of water sample.
2) Determination of alkalinity present in the water sample.
3) Determination of available chlorine in bleaching powder.
4) Determination of copper by iodometric titration.
5) Estimation of Nickel.
6) Determination of COD of water sample.
7) Estimation of metal ions by titrimetry /by spectrophotometer

List of Experiments-Phase II

1) Determination of viscosity by Redwood Viscometer I or II.
2) Determination of cation exchange capacity of an

ion exchange resin.

3) Determination of molecular weight of a polymer.
4) Oil Testing for Flash Point / Cloud Point/Pour Point/Aniline Point
5) Proximate analysis of coal.
6) Determination of surface tension of liquids using stalagmometer.

List of Demonstration Experiment:

1) Determination of pH of water sample by pH meter
2) Determination of conductivity of water sample by conductivity meter
3) Synthesis of urea formaldehyde resin.
4) Synthesis of polymethyl methacrylate

GE 2105	Engineering Physics			L=4	T=0	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	MSE-III	TA	ESE	Total	ESE Duration
	15	15	15	30	40	100	3 Hrs
	30						

Objectives	Outcomes At the end of the course students will be able to
• To understand fundamental principles of engineering physics specifically concern to wave optics, quantum physics, semiconductors, electron ballistics, electron optic devices, , Laser and their engineering applications. • To provide problem solving experience and learning of concepts through it in engineering physics, in both, the classroom and the laboratory learning environment.	• Examine the intensity variation of light due to interference , diffraction and its applications. • Explain fundamentals of quantum mechanics and its application to problems dealing with quantum particle. • Develop ability to classify and analyze the characteristics of semiconductor materials in terms of crystal structures, charge carriers and energy bands for device applications. • Analyze the motion of charged particle in electric and magnetic fields and its applications to electron optic devices. • Illustrate working principle of lasers, ultrasonic waves and its properties for useful applications in the field of industry

Unit I : Wave optics (09 Hours)

Interference, Interference in thin films, Wedge shaped film, Newton's rings, Applications of interference, Antireflection coatings.

Fraunhofer diffraction from a single slit , Multiple slits and circular aperture, Rayleigh criterion .

Self learning topic : Resolving power of grating

Unit II : Quantum Physics (09 Hours)

Wave-particle duality, Wave packet, Heisenberg uncertainty principle, Interpretation of wave function, Schrodinger Equations, Application to infinite potential well.

Unit III : Semiconductor Physics (09 Hours)

Formation of energy bands in solids ; Classification of solids, Energy band diagram of Si/Ge , Intrinsic and extrinsic semiconductors, Conductivity, Law of mass action, Fermi function , Fermi level in intrinsic and extrinsic semiconductors, Dependence of Fermi level on impurity concentration and temperature, Hall effect .

Self learning topic : Direct and Indirect semiconductor materials.

Unit IV: Electron Ballistics (08 Hours)

Motion of a charged particle in uniform electric and magnetic field, Cross field configuration; Electron refraction, Electron lens.

Unit V: Electron Optic Devices (08 Hours)

Cathode ray oscilloscope (CRO), Block diagram, Application of CRO for amplitude , frequency and phase determination , Particle accelerator , Bain bridge mass spectrograph.

Unit VI : Laser (09 Hours)

Interaction of radiation with matter, Population Inversion and Optical resonance cavity , Three and four level laser, Ruby laser, He-Ne laser, Semiconductor laser , Properties and engineering applications of laser.

Self learning topic : CO_2 laser

Text books and Reference Books

Recommended :

1. Fundamentals of Physics: D.Halliday , R. Resnick , J.Walker, Wiley India Pvt., Ltd., New Delhi
2. Electronic devices and Circuits by John Allison, Tata McGraw-Hill
3. Introduction to Modern optics by Ajoy Ghatak, Tata McGraw-Hill
4. Concept of Modern Physics : A.Beiser , Tata McGraw-Hill
5. A concise book of Engineering Physics by S A Band and S A Fadnavis , Dasganu Prakashan
6. A Textbook of Engg. Physics: M. N. Avadhanulu, P. G. Kshirsagar, S. Chand and Company
7. Solid state Physics by S. O. Pillai, New Edge International Publishers
8. Solid State Physics by Palanswamy, SciTech publishers

GE 2106	Engineering Physics Laboratory				L=0	T=0	P=2	Credits=1
Evaluation Scheme	MSPA-I	MSPA-II	MSPA-III	MSPA-IV	ESE	Total	ESE Duration	
	15	15	15	15	40	100	2 Hrs	

Objectives	Outcomes At the end of the course students will be able to
• To become familiar with the proper use of basic measuring instruments commonly found in physics laboratories. • To learn the proper methods and techniques utilized in gathering experimental data and its analysis. • To understand and strengthen the theoretical concepts thorough experimentation.	• Examine the intensity variation of light due to interference , diffraction and its applications. • Develop ability to classify and analyze the characteristics of semiconductor materials in terms of crystal structures, charge carriers and energy bands for device applications. • Analyze the motion of charged particle in electric and magnetic fields and its applications to electron optic devices. • Illustrate working principle of lasers, ultrasonic waves and its properties for useful applications in the field of industry.

Minimum Eight experiments to be performed from the list as given below and one demonstration experiment

1) To study variation of Hall voltage with current and magnetic field; and to determine Hall coefficient, concentration and polarity of charge carriers.
2) To measure the amplitude and frequency of sinusoidal voltage obtained from the secondary of a step down transformer using CRO.
3) To study the static characteristics of semiconductor diode; (Germanium and Silicon diode) in forward and reverse bias mode
4) To determine the forbidden energy gap of a semiconductor by studying the temperature

variation of its receptivity using four probe method.

5) To measure the phase shift introduced by a phase shift network using dual beam CRO .
6) Determination of the velocity of ultrasonic waves in a non electrolytic liquid by ultrasonic interferometer.
7) To determine the radius of curvature of Plano convex lens by using Newton's Rings apparatus.
8) To determine the thickness of thin paper using Air Wedge arrangement.
9) To determine the wavelength of sodium light using Plane Transmission Grating.
10) To determine the forbidden energy gap of a semiconductor by using PN junction diode in reverse biased mode.
11) To study the dependence of Hall coefficient on temperature.

List of demonstration experiment:

To study the Fraunhoffer diffraction pattern of a grating and to determine the wavelength of light using laser source

GE 2107	Communication Skills				L=3	T=0	P=0	Credits=3
Evaluation Scheme	MSE-I	MSE-II	MSE-III	TA	ESE	Total	ESE Duration	
	15	15	15	30	40	100	3 Hrs	
	30							

Objectives	Outcomes At the end of the course students will be able to
• To make students aware about basic concepts and strategies of Technical communication.	• Explain the basics of communication process as well as identify the barriers in communication.
• To introduce the basic concepts of phonetics so as to convey thoughts effectively.	• Classify and describe the different Speech Sounds of English Language.
• To prepare students to stretch beyond their comfort zone in order to become good team members and leaders in the industry.	• Apply different strategies and techniques of presentations, interviews and group communication.
• To develop skills of expressing ideas in simple, concise and direct language so that they can contribute more productively in the organization.	• Drafting reports, memos and emails, considering the professional etiquettes and ethics with appropriate content and context.

Unit-I : Basics of Technical Communication (05 Hours)

The Process of Communication, Levels of Communication, The flow and networks of communication, Barriers to Communication(Intrapersonal, Interpersonal & Organizational Level)

Unit II: Effective Speaking (06 Hours)

Organs of speech, Consonants and Vowel sounds of English Language, Phonetic transcription, Word and Sentence stress, Vocal Cues(Activity of reading phonetic transcription in laboratory) General to Technical Vocabulary.

Unit III: Formal Presentations (06 Hours)

Defining purpose, Analyzing Audience and Locale, Outlining & Structuring , Nuances of delivery(Modes of delivery, Kinesics, Proxemics & Chronemics)

Active listening:-Types of Listening ,Traits of Listening.

Unit IV :Interview Techniques (06 Hours)

Introduction & Objectives of Interview, Types of interview, Job Interview(types of Question and Answering Techniques, failure factors, preparation, process, overcoming nervousness & follow-up)

Telephone interview :-Types, preparation and guidelines. Resume.

Unit V: Group Communication (07Hours)

Introduction, Techniques of Good Comprehension

Group Communication:-Introduction & different forms of group Communication, Body language used on Group Communication, Group discussion (Organizational& GD as a part of selection Process), Meeting (purpose, preparation & Procedure), Symposium & Seminar.

Unit VI: Technical Activities (06 Hours)

Structural Elements & Layout

Report:- Types, Characteristics, Importance of report, formats & prewriting)

E-mail Etiquettes

Text Book:

1) Raman & Sharma, “Technical Communication”, Oxford University Press.
2) T. Balasubramaniam, “Textbook of English Phonetics for Indian Students”, Macmillan India Ltd.

GE 2108	Social Science				L=3	T=0	P=0	Credits=3
Evaluation Scheme	MSE-I	MSE-II	MSE-III	TA	ESE	Total	ESE Duration	
	15	15	15	30	40	100	3 Hrs	
	30							

Objectives	Outcomes Students will be able to
• To meet some of the basic requirements pertaining towards awareness of Social Science	• Explain the basic concepts of Social Sciences. •
• To make them aware of various civilizations to enhance engineering skills	• Describe the development of various Civilizations and their Culture.
• To make them aware of political, economical, social causes and consequences of • industrialization and urbanization during 19th and 20th century.	• Analyze the Impact of Industrialization on society and discuss the Fundamental Concepts of Society. •
• To make them aware of structure and work culture of industrial organisation.	• Explain Industrial Organization and Management.

Unit I: Social Sciences & Its Utility (5 hours)

Meaning & Scope of Social Science, General Utility of Social Sciences to Engineers, Applied Humanities, Social Engineering, Society, Its Type & Characteristics.

Unit II: Human Civilization (6 hours)

Development of human civilization with specific reference to monumental studies of engineering skill, Ancient Indian Civilization:- a) Indus Valley Civilization b) Vedic Civilization c) Indian Art & Architecture.

Unit III: Industrialization & Society (6 hours)

Industrialization and its impact on Society, Concept of Industrial Democracy, Industrial Psychology- meaning, scope & importance ,Industrial Sociology - meaning, scope, importance,

Indian Constitution: significance of Preamble

Unit IV: Fundamental Concept in Social Science (5 hours)

Social Structure and Social System ,Socialization & its means, Social Control and Social Change, Culture - characteristics, merits, demerits .

Unit V: Industrial Organization (6 hours)

Work Organization: Formal and Informal Organization; Power, Authority and Status System,

Selection, Training & Motivation of Workers, Discipline in Industry, Environment in Industry.

Unit VI: Industrial Management (7 hours)

Labor Union Organization, Labor Turn Over, Industrial Unrest, Industrial Fatigue of Workers, Health and Safety of Workers.

Text Books:-

1)Sheikh & Jay, A New Look into Social Science.

2)Khanna OP, Industrial Engineering & Management.

Reference Book:

1) Sociology: Principal of Sociology with an introduction to social thought. By C.N.Shankar Rao,
Publication: S Chand, New Delhi.

2) Social Problems in India, Ram Ahuja, Rawat Publication, New Delhi.

3) Industrial Sociology, Sharma & Sharma

CV 2101	Engineering Mechanics			L=3	T=1	P=0	Credits=4

Evaluation Scheme	MSE-I	MSE-II	MSE-III	TA	ESE	Total	ESE Duration
	15	15	15	30	40	100	3 Hrs
	30						

Objectives	Outcomes Students will be able to
• To make student aware about fundamental concept of static and dynamics. • To introduce the basic concepts of planar force system • To understand the properties of surface, moment of inertia and mass moment of inertia • To learn the dynamics variables applied to kinetics of particles.	• Describe the fundamental concepts of statics and dynamics. • Apply the basic concepts of applied mechanics for solution of problems on planar force system. • Determine the properties of surface like centroid, moment of inertia, etc. for planar surfaces and mass moment of inertia for rigid body. • Analyze pin jointed truss frame structure and beam structure analytically and graphically. • Evaluate the dynamic variables of kinetics of particles and simple lifting machine.

Unit I: Resultant of Plane Force System (9 Hours)

Resultant: Fundamental concepts, system of forces, laws of mechanics, principle of transmissibility of forces, Resolution and Resultant of a 2 Dimensional force system, Moment of force, Principle of moment, Couple, Equivalent force couple system.

Unit II: Equilibrium of Plane Force System

(9 Hours)

Equilibrium: Free body diagrams, Conditions of equilibrium, types of supports, types of beams, types of loads, Application to 2D force system.

Unit III: Friction and Trusses (8 Hours)

Friction: Definitions of friction, Columbus laws of friction, plane friction, belt friction.

Trusses: Definitions, assumptions, types, condition of determinacy of Truss, Analysis of truss by method of joints

Unit IV: Properties of Surfaces (9 Hours)

Centroid: Introduction, First Moment of Area, Problem on Centroid of composite sections.

Area Moment of Inertia: Introduction, Second Moment of Area, Radius of Gyration, Transfer Theorem, Product of Inertia, Moment of Inertia and Product of Inertia with respect to inclined axes, Principal Moments of Inertia.

Unit V : Virtual Work Method and Kinetics of Particle (8 Hours)

Virtual Work Method: Introduction, Principle of virtual work, Application to beam and frame.

Kinetics of Particle: D' Alembert's principle, Translation of bodies and interconnected particles.

Unit VI: Work Energy and Impulse Momentum Method (9 Hours)

Work Energy Method: Introduction, Conservation of energy and problems on connected bodies.

Impulse Momentum Method: Definitions, Principle of conservation of momentum, elastic impact of two bodies, coefficient of restitution, application of impulse momentum method.

Text Books:-

1. Beer F.P. and Johnston E.R; Vector Mechanics for Engineers, 9th edition Tata McGraw Hill Publication, New Delhi. 2007
2. Nelson A., Engineering Mechanics (Statics and Dynamics), ed 2009, Tata Mc-Grew Hill Education Pvt Ltd, New Delhi, 2009
3. Dubey N.H., Engineering Mechanics (Statics and Dynamics) first edition 2013,Tata Mc-Graw Hill Education Pvt Ltd, New Delhi, 2013

Reference Books:-

1. Timoshenko S, Young D. H and Rao J. V, Engineering Mechanics, McGraw Hill Publication, New Delhi, 2007
2. Bhattacharyya B., Engineering Mechanics, Oxford University Press, New Delhi, 2008
3. Hibbeler R. C, Engineering Mechanics (Statics and Dynamics), Pearson Publication, Singapore, 2000
4. Shames I.H. and Rao J.V., Engineering Mechanics (Statics and Dynamics), First Edition, Pearson Publication, New Delhi, 2003
5. Singer F.L, Engineering Mechanics (Statics and Dynamics), Harper and Rowe publication, New Delhi, 1994.
6. http://nptel.ac.in/courses

CV 2102	Engineering Mechanics Laboratory	L=0	T=0	P=2	Credits=1

Evaluation Scheme	MSPA-I	MSPA-II	MSPA-III	MSPA-IV	ESE	Total	ESE Duration
	15	15	15	15	40	100	2 Hrs

Minimum Ten Practical's to be performed from the list as below

1 To verify law of polygonal of forces using Law of Polygon Apparatus.
2 To determine support reactions of a Simply Supported Beam experimentally and analytically.
3 To determine the forces in the members of a Jib Crane Apparatus experimentally and graphically.
4 To determine the coefficient of friction between two surface of different material on Plane Friction Apparatus.
5 To determine the coefficient of friction of Coil Friction Apparatus.
6 To determine the forces in members of a Shear Leg Apparatus experimentally and manually.
7 To determine the mass moment of inertia of a fly wheel using Fly Wheel Apparatus
8 To determine efficiency and law of machine of Differential Axel & Wheel machine.
9 To determine efficiency and Law of machine of Single Purchase Crab machine.
10 To determine efficiency and Law of machine of Double Purchase Crab machine.
11 To find support reactions of a simply supported beam using graphical method and hand calculation.

12 To find the forces in the member of truss using graphical method and hand calculation.

13 To find for a composite figure by using Mohr's circle and hand calculation,

(1) Principle moment of inertia

(2) Moment of inertia and product of inertia about any inclined axis.

Reference Books:-

1) Nelson A., Engineering Mechanics (Statics and Dynamics), ed 2009, Tata Mc-Graw Hill Education Pvt Ltd, New Delhi, 2009

2) Dubey N.H., Engineering Mechanics (Statics and Dynamics) first edition 2013, Tata Mc-Graw Hill Education Pvt Ltd, New Delhi, 2013

3) Beer F.P. and Johnston E.R; Vector Mechanics for Engineers, 9th edition Tata Mc-Graw Hill Publication, New Delhi, 2007

EE 2101	Basic Electronics			L=3	T=1	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	MSE-III	TA	ESE	Total	ESE Duration
	15	15	15	30	40	100	3 Hrs
	30						

Objectives	Outcomes Students will be able to
• To expose all the engineering students to basic principles of Electronics. • To bridge different branches of engineering enabling new inter-disciplinary areas to grow. • To enlightened students to experiment with basic electronic circuits to enable them to understand its basic application of electronics in day to day life.	• Characterize Number systems, semiconductors, diodes, transistors and operational amplifiers. • Design simple analog circuits • Design simple combinational and sequential logic circuits • Identify functions of digital multimeter, Bridges and transducers in the measurement of physical variables

Unit I: Number Systems and Codes (7 Hours)

Introduction, Number System, Binary Number System, Signed Binary Numbers, Binary Arithmetic, 1's and 2's Complement Arithmetic, Octal Number System, Hexadecimal Number System, Codes - BCD code and Gray Code , BCD arithmetic.

Unit II: Digital Principles and Logic Design(8 Hours)

Logic Gates, Boolean Laws & Algebras, Sum of Product & Product of Sum, Combinational Logic Design - Half & Full Adder, Half & Full Subtractor, Sequential Logic Circuits – Flip-flops.

Unit III: Electronic Devices and its Applications (7 Hours)

Introduction, operation and Characteristics of Diode, BJT and FET, Application of Diode as a Rectifier, BJT as a Switch and Amplifier.

Unit IV : OPAMP and its application (8 Hours)

Introduction to Op-Amp, Inverting and Non-Inverting Amplifier, Linear Applications of OP-AMP, Comparator.

Unit V: Measurement and Instruments (7 Hours)

Introduction, Important terms in measurement such as accuracy, precision, sensitivity, Types of errors & their sources, Static & dynamic characteristics of measurement system, Bridges - Wheatstone bridge, Maxwell Bridge, Schering bridge, Meters- Ammeter, Voltmeter and Multimeter.

Unit VI: Sensors and Transducer (8 Hours)

Strain Gauges, LVDT, Classification of transducers, transducers actuating mechanisms, resistive, capacitive, and inductive transducers, thermoelectric & photoelectric transducers, Temperature sensors.

Text Books:-

1. "Modern Digital Electronics" by R. P. Jain, 4th Edition, McGraw Hill Education Private Limited, published in 2015

2. " Electronics Devices and Circuit Theory", by Robert L. Boylestad, Louis Nashelsky, 10th edition, Pearson Private Limited, Published in 2009.

3. "OP-AMP and Linear Integrated Circuit", by Ramakant A. Gayakwad, Prentice Hall India Learning Private Limited, Published in 2002.

4. "Electrical & Electronic measurement & Instrument", A. K. Sawhney, Dhanpat Rai & Co.,18th edition 2008.

EL 2101	Electrical Engineering			L=3	T=1	P=0	Credits=4
Evaluation Scheme	MSE-I	MSE-II	MSE-III	TA	ESE	Total	ESE Duration
	15	15	15	30	40	100	3 Hrs
	30						

Objectives	Outcomes Students will be able to
• **Theory** • To impart fundamental knowledge of electrical circuits and machinery. • To provide problem solving experience and learning of concepts through it in electrical engineering. • **Practical** • To understand and strengthen the electrical engineering fundamentals through experimentation. • To become familiar with basic measuring instruments commonly used in electrical engineering laboratory. • To learn to collect experimental data, its analysis & experimentation. • To learn to communicate and present experimental results in scientific way.	• Reproduce fundamentals of dc circuits, single phase and three phase ac circuits. • Analyze dc circuits, single phase and three phase ac circuits for basic electrical quantities such as current, voltage, power, etc. • Explain, construction, working, testing and applications of various electrical machines. • Analyze performance of various electrical machines. • Perform laboratory experiments and demonstrate competency in collecting, interpreting, analyzing data, communicate and present effectively through ;laboratory journals.

Unit I: D. C. Circuits :

Basics of electrical circuits. Equivalent resistance. Kirchhoff's Laws. Current and Voltage division rule. Mesh and Nodal analysis of dc circuits. Superposition Theorem.

Unit II: A. C. Fundamentals :

Generation of alternating voltage. Values of alternating quantity. Average and rms value by mid – ordinate method and method of integration. Form factor and peak factor. Concept of phasor and its mathematical representation. Concept of phasor diagram. Phasor algebra. Power in a.c. circuit. Concept of power factor, reactive power and apparent power with power triangle.

Single Phase Series A. C. Circuits :

Analysis of purely resistive (R), inductive (L), and capacitive (C) circuit. Concept of inductive and capacitive reactance.

Analysis of series R – L, R – C, and R – L – C circuits for

voltages and current, their waveforms, phasor diagram, impedance triangle, power factor. Series resonance.

Unit III: Single Phase Parallel & Series – Parallel A. C. Circuits :

Concept of conductance, susceptance and admittance. Admittances in series and parallel. Analysis of single phase parallel and series – parallel a.c. circuits with their phasor diagram. Parallel resonance.

Unit IV: Three Phase a.c. Circuits :

Advantages of three – phase system over single – phase system. Generation of three phase a.c. supply. Phase sequence. Interconnection of three phases.

Star or Wye (Y) connection. Phase and line voltages/currents in star connection and their relationships.

Delta (D) or Mesh connection. Phase and line voltages/currents in delta connection and their relationships.

Concept of balanced load. Active, reactive, and apparent power in balanced three phase circuits.

Unit V : Single Phase Transformer:

Working principle. EMF equation. Voltage ratio and turns ratio. Step up and step down transformers. Construction of single phase transformer. Ideal transformer. Transformer on no load with phasor diagram and equivalent circuit. Practical transformer and its equivalent circuit. Referred values. Transformer on load with phasor diagram and equivalent circuit. Voltage Regulation.

Losses in transformer. Open circuit and Short circuit tests on transformer. Efficiency and condition for maximum efficiency. Types of transformer and their applications.

Unit VI : Three Phase Induction Motor:

Construction. Production of rotating magnetic field. Principle of operation. Speed and slip. Frequency of rotor voltage and current. Relationship between rotor copper loss and rotor input. Developed Torque. Torque of an induction motor. Condition for maximum torque. Torque – slip and torque speed characteristics. Applications of three phase induction motor.

Single Phase Induction Motor:

Production of rotating magnetic field. Double – field revolving theory of induction motor. Types of single phase induction motors. Comparison of single phase and three phase induction motor. Applications of single phase induction motor.

Text Books:-

1) "Basic Electrical Engineering", T. K. Nagsarkar and M. S. Sukhija, Oxford Higher Education, 1st Edition, 2005.

2) "Basic Electrical Engineering" , V. N. Mittle and A. K. Mittal , The McGraw Hill Companies, New Delhi, 2nd Edition,2006.

Reference Books:-

1. "Basic Electrical Engineering ", I J Nagrath and D. P. Kothari , McGraw Hill, New Delhi, 2nd Edition, 2002.

2. "Electrical Engineering Fundamentals" Vincent Del Toro, Prentice Hall India, New Delhi, 2nd Ed, 2001

EL 2102	Electrical Engineering Laboratory	L=0	T=0	P=2	Credits=1

Evaluation Scheme	MSPA-I	MSPA-II	MSPA-III	MSPA-IV	ESE	Total	ESE Duration
	15	15	15	15	40	100	-

List Of Experiments:

1) To verify Kirchhoff 's voltage law and Kirchhoff 's current law.
2) To study R – L – C series circuit.
3) To verify Superposition theorem.
4) To study R – L – C parallel circuit.
5) To study balanced three phase star (Y) connected load.
6) To find transformation ratio, regulation and efficiency of a single phase transformer.
7) To study balanced three phase delta (□) connected load.
8) To perform O.C. and S.C. tests on a single phase transformer.

Reference Book :

A text Book of Laboratory Courses in Electrical Engineering", S. G. Tarnekar, P. K. Kharbanda and S. B. Bodkhe, S.Chand , New Delhi.

IT 2101	Introduction to Computer Programming	L=3	T=1	P=0	Credits=4

Evaluation Scheme	MSE-I	MSE-II	MSE-III	TA	ESE	Total	ESE Duration
	15	15	15	30	40	100	3 Hrs
	30						

Objectives	Outcomes Students will be able to
• To impart fundamental knowledge of computer • To provide problem solving experience through C Programming	• Understand computer system, basics of algorithm & flowchart, and demonstrate straight line program using basic 'C' programming language constructs. • Design & Develop programs using different loop control structures, user defined functions, and Pointers. • Analyze and apply concepts of different dimensional Arrays as a data structure & development of programs using the same. • Design and develop programs using basics of Strings, Structures, union and Files in 'C' language.

Unit I: (06 Hours)

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.). Algorithms & Conventions used in writing algorithms, Flowcharts. Overview of Programming Language, sample „C+ code, compiler, operating system, running„ C+ programs, Types of programming errors.

Unit II: (08 Hours)

Character set, variables, identifiers & keywords, Data types, Operators, Types of operators and expressions, size of() operator, constants and its types, Symbolic constant, typedef statement, Introduction to library functions, basic input/output statements, precedence of operators, write straight line programs, Decision control statements: if, if - else and nested if-else statements, else-if ladder statement, switch-case control statement, Programming Examples.

Unit III: (07 Hours)

Loop Structures: While, do while and for loops, break and continue statement„ goto statement, C programs based on these loop structures.

Unit IV: (08 Hours)

Concept of functions, Modular programming, user defined and library functions, function prototypes, formal parameters, actual parameters, return types, function call- call by value, C programs using functions, Recursive functions, comparing recursion against iteration, C programs using recursive

functions, Concepts of pointer.

Unit V : **(09 Hours)**

Introduction to Arrays, One dimensional array, array manipulation, insertion, deletion of an element, searching techniques- Linear and binary search, sorting techniques - Bubble, insertion and selection sort. Two dimensional array: programs for basic matrix operations-addition, multiplication and transpose, converting a matrix in upper or lower triangular matrix, Array as function arguments.

Unit VI : **06 Hours)**

Introduction to strings, string handling functions. Introduction to structures and Union. Concepts of files, Types of files, file opening in various modes, file closing, reading and writing text files, concept of pre-processor directives and macros, Command line Argument.

Text Books:

T1: The C Programming Language - J. B. W. Kernighan & D. M. Ritchie - Prentice Hall

T2: Mastering C - K. R. Venugopal & S. R. Prasad - TMH,2007

T3: Programming in ANSI C - E. Balaguruswamy - Mc Graw Hill Education

Reference Books:

R1: Problem Solving And Program Design In C - Jeri. R. Hanly, Elliot B. Koffman - Pearson Education

R2: Programming with C - Byron Gottfried - Schaum;s Outline Series

R3: How to solve it by computers - R. G. Dromey - Prentice Hall India

IT 2102	Introduction to Computer Programming Lab	L=0	T=0	P=2	Credits=1

Evaluation Scheme	MSPA-I/TA	MSPA-II/TA	MSPA-III/TA	MSPA-IV/TA	Total
	25	25	25	25	100

Objectives	Outcomes Students will be able to
• To impart fundamental knowledge of computer • To provide problem solving experience through C Programming	• Understand computer system, basics of algorithm & flowchart, and demonstrate straight line program using basic 'C' programming language constructs. • Design & Develop programs using different loop control structures, user defined functions, and Pointers. • Analyze and apply concepts of different dimensional Arrays as a data structure & development of programs using the same. • Design and develop programs using basics of Strings, Structures, union and Files in 'C' language.

List of Experiments:

1.a) Introduction to Linux Operating system & it's different commands.

1.b) Introduction to Vi editor, Compilation and Execution of a program in Linux.

1.3) Introduction to Turbo C, Compilation and Execution of a program on Turbo C.

2) Practical based on Arithmetic and Conditional operators.

3) Practical based on Conditional and Unconditional Statements.

4) Practical based on Looping Statements.

5) Practical based on Functions and Recursion. 8)

6) Practical based on 1-D Array.

7) Practical based on 2-D Array.

8) Practical based on Strings and Pointers.

9) Practical based on Structures.

10) Practical based on Files.

ME 2101	Engineering Graphics	L=1	T=0	P=0	Credits=1

Evaluation Scheme	MSE-I	MSE-II	MSE-III	TA	ESE	Total	ESE Duration
	15	15	15	30	40	100	3 Hrs
	30						

Objectives	Outcomes Students will be able to
• To make the students aware of how an industry communicates technical information. • To have three skills, he must be able to imagine, draw clearly and rapidly and to read the drawings drawn by others. • Engineering Graphics aims in teaching the principles of accuracy and clarity while presenting the information necessary to produced products. • To develops the imagination skills that are essential while creation of successful design.	• Transform orthographic projections into isometric projections and vice versa. • Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects. • Built the development of lateral surfaces of various solids and their cut section. • Predict the intersections and intersections of various solid objects. • Justify the use of software tools used for Two dimensional drawings.

Unit I: Theory of Orthographic Projections:

Introduction, Quadrant system, Theory of orthographic projection, Projection method and principle planes, First and Third angle projections,

Unit II: Theory of Isometric Projections:

Theory of isometric projection, Method for drawing isometric views, Different problems on isometric projections.

Unit III: Lines:

Projection of points, Projection of lines, True lengths and inclinations, apparent lengths and inclinations, various positions of lines in different quadrants, Traces of lines, projection of line on auxiliary plane.

Unit IV: Planes and Solids:

Projection planes: (Polygonal Lamina, Circular Lamina), Projection of Perpendicular planes and oblique planes. Auxiliary views (Auxiliary planes) Projection of Solids :(Inclined to One Plane Only) - Polyhedra (Regular and Irregular Polyhedra), Solids of Revolution.

Unit V: Section of Solids and Development of Surfaces:

Types of Section planes, Sectional top view, True shape. Development of different solids using Radial line and parallel line methods.

Unit VI: Intersection of Surfaces of solids:

Intersection between similar solids, Intersection between dissimilar solids, Lines and Curves of Intersection.

Text Books:

1. Engineering Graphics with AutoCAD by D.M. Kulkarni, A. P. Rastogi and A. K. Sarkar, PHI Pvt. Ltd.
2. Engineering Drawing by N. D. Bhatt, Charotar Publishing House Pvt. Ltd.

Reference Books:

1) Engineering Drawing by D. A. Jolhe, , Tata McGraw Hill Publications
2) Engineering Drawing by K. L. Narayana & P. Kannaiah, SciTech Publication
3) Engineering Drawing by R. K. Dhawan, S. Chand Publications

ME 2102	Engineering Graphics Laboratory	L=0	T=0	P=4	Credits=2

Evaluation Scheme	MSPA-I/TA	MSPA-II/TA	MSPA-III/TA	MSPA-IV/TA	Total
	25	25	25	25	100

Sr. No.	List Of Practicals	No. of Practicals
1	Introduction of AutoCAD Basic Commands	02
2	Orthographic Projection	03
3	Isometric Projection	03
4	Projection of Straight Line	03
5	Projection of Planar Surface	03
6	Projection of Solid	03
7	Section and Development of Solid	04
8	Intersection of Surfaces	03
9	**Drawing Sheet 1:** Convention for various lines, Dimensioning and Orthographic Projection	02
10	**Drawing Sheet 2:** Projection of line, planar surface or solid. (Any one)	02
	Total No. of Practical's to be conducted	28

ME 2103	Workshop Practice	L=0	T=0	P=2	Credits=2

Evaluation Scheme	MSPA-I/TA	MSPA-II/TA	MSPA-III/TA	MSPA-IV/TA	ESE	Total	ESE Duration
	15	15	15	15	40	100	2 Hrs

Objectives	Outcomes Students will be able to
• To know the various types of tools, equipment's and measuring instruments used in various sections of workshop and to know the various operations and their applications in Engineering.	• Students will be able to illustrate the carpentry tools, joints, machineries and its applications. • Students will be able to illustrate fitting tools, measuring instruments, machineries and its applications. • Students will be able to illustrate the smithy tools furnaces and hand & power forging equipment's. • Students will be able to illustrate Gas and Electric welding processes, utility, tools and its applications

1. Carpentry:

Identifying some common types of timber and their engineering applications. Names and uses of carpenters tools, various types of wood working joints and their applications.

2. Smithy:

Use of various tools and equipment's in smithy shop. Demonstration of various operations and their applications. Operations of the smith's hearth and various hand and power forging equipment's.

3. Fitting:

Use of Fitting tools, equipment's and measuring instruments, practice in the method of marking and the use of measuring instruments, Chipping, Filling. Drilling, tapping, scraping operations.

4. Welding:

Name and uses of gas and electric welding, tools and equipment gas and electric welding, operation practice.

5. Hand Tools:

Use and handling of common hand tools.

Text Books:

Workshop Technology - I - Hajara Choudhary
Workshop Technology - I - B.S.Raghvanshi
Manufacturing Technology - P.N.Rao
Manufacturing Science - Ghosh & Malic

Reference Books:

Workshop Technology - I - III - Waj Chapman
Manufacturing Processes - I - M Begman