

NORTH MAHARASHTRA UNIVERSITY JALGAON
FIRST YEAR ENGINEERING
(COMMON TO ALL BRANCHES OF ENGINEERING)

W. E. F.2005 –2006

STRUCTURE OF TEACHING AND EVALUATION

F . E. (Common)

W. E. F. 2005 –06

First Term

Sr.	Subject	Teaching scheme Hours/ week			Examination Scheme				
		Lecture	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Engineering Physics – I	2	-	*2	2	50	25	-	
2	Engineering Chemistry – I	2	-	*2	2	50	25	-	
3	Professional communication	2	1	-	2	50	25	-	
4	Engineering Math's – I	3	1	-	3	100	25	-	
5	Elements of Electronics Engineering	3	1	2	3	100	25	-	
6	Engineering Mechanics	3	1	2	3	100	25	-	
7	Engineering Graphics – I	1	-	2	-	-	25	-	25
8	W/S Practice	-	-	2	-	-	50	-	
	Total	16	4	10	-	450	225	-	25
	Grand Total	30				700			

* Alternate Week

Second Term

Sr.	Subject	Teaching scheme Hours/ week			Examination Scheme				
		Lecture	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Engineering Physics – II	2	-	*2	2	50	25	-	
2	Engineering Chemistry – II	2	-	*2	2	50	25	-	
3	Elements of Civil Engineering	2	-	*2	2	50	25	-	
4	Elements of Electrical Engineering	2	-	*2	2	50	25	-	
5	Introduction to Computing	2	-	2	2	50	25	-	
6	Engineering Maths – II	3	-	-	3	100	25	-	
7	Engineering Thermodynamics	3	-	2	3	100	25	-	
8	Engineering Graphics – II	1	-	2	-	-	25	-	25

9	W/S Practice	-	-	2	-	-	25	-	
	Total	17	2	12	-	450	225	-	25
	Grand Total	31			700				

TERM – I	
ENGINEERING PHYSICS	
Teaching Scheme:	Examination Scheme:
Lecturers:- 3 Hrs / Week Practical :- 3 Hrs / Week (Alternate week)	Paper Duration: - 2 Hrs. Theory Paper:- 50Marks Term work:- 25 Marks
Unit I	06 Hrs. Marks : 10
Electrical Properties: Band theory of solid, Classification of solid on the basis of band theory, Fermi – Level and position of Fermi – Level in intrinsic (with derivation i.e. $E_f = (E_c + E_v) / 2$) and extrinsic semiconductors. Conductivity in semiconductors, Formation of P-N junction, Diode under forward and reverse bias. Display devices – LED, LCD, Plasma.	
Unit II	06 Hrs. Marks : 20
Magnetic Material and Spectroscopy : Classification of magnetic materials into Paramagnetism, Diamagnetism & Ferromagnetism, Hysteresis loop, Hard and soft magnetic materials. Ferrites – production, properties Application of Superconductivity- Properties of superconductor, Meissner's effect, Application of superconductor, Meissner's effect, Application of superconductor Zeeman effect (normal and anomalous) experimental arrangement, Nuclear Magnetic Resonance, Magnetic Resonance Imaging.	
Unit – III	09 Hrs. Marks : 20
A)X- Rays and Lasers:- Production of X – rays (Coolidge tube), continuous and characteristic X – rays, Bragg's law Laser, properties and mechanism of Laser, Ruby Laser, He – Ne Laser, Fiber Optics Principle, Construction & Applications, Holography. B) Modern Physics:- Modern of charged particle in electric field, magnetic field, and Combined field; Electron microscope, Block diagram, principle and working of cathode ray oscilloscope, Bainbridge Mass Spectrograph.	
Practicals :-	
Any Five Experiments of the following.	
<ol style="list-style-type: none"> 1. Semiconductor diode characteristics 2. Band gap in semiconductor materials 3. Experiments based on Laser 4. Uses of C.R.O. 5. Fiber optics communications 6. Study of Display Devices 7. Hysteresis curve 8. Magnetic susceptibility measurement 	
Text Books	
<ol style="list-style-type: none"> 1. Text book of Engineering Physics By M.N. Avadhanulu & P.G.Kshrisagar, S. Chand & co. 2. Engineering Physics By Sen, Gaur, Gupta, Dhanpat Rai. 3. A text book of Engineering Physics By B.L.Taeraja, S. Chand and Co. 4. Engineering Physics – I Prof . Pawar Prof. Talele 	
Reference Books:-	

<ol style="list-style-type: none"> 1. Physics for Engineer, By Mvasan, M.R. New Age. 2. Solid state Physics, By S.O.Pillai, Wiley Eastern. 3. Moders Physics, By J.B.Rajan. THM. 4. Optics By Brijalal and Subramanyam, S. Chand and Co. 5. Optics By Ajay Ghatak, THM 6. Concept of Modern Physics, TMH. 	
TERM – I	
ENGINEERING CHEMISTRY	
Teaching Scheme:	Examination Scheme:
Lecturers:- 2 Hrs / Week Practical:- 2 Hrs / Week(Alternate week)	Paper Duration: -2 Hrs. Theory Paper: - 50 Marks Term work:-25 Marks
Unit- I	06 Hrs. (Marks 10)
Chemical Bounding:- <ol style="list-style-type: none"> 1. Introduction 2. Explanation with Suitable example of electrovalent bond, covalent bond, & coordinator bond. 3. Concept of hybridization – Sp Sp², Sp³ type of hybridization on with one example of each. 4. Metallic bond , explanation of metallic properties:- <ol style="list-style-type: none"> a) Electrical and thermal Conductivity b) Metallic luster c) Malleability & ductility d) M.P. 5. Structure and bounding organ metallic of Fe & Cametals. Role of metals biology, oxygen Carrier and Electron transfer 	
Unit – II	07 Hrs. (Marks : 10)
Water:- <ol style="list-style-type: none"> I) Introduction II) Definition of hard & software. Types of hardness (Temporary & permanent hardness) III) Units if hardness IV) Estimation of hardness by EDTA method V) Estimation of chloride by Mohr’s Method. VI) Water treatment by <ol style="list-style-type: none"> a) Sedimentation b) Coagulation C) Filtration d) Sterilization VII) Process of softening of water :- <ol style="list-style-type: none"> a) Lime – soda process (Continuous process) and Numerical based On lime – soda process b) Zeolite & denomination methods. 	
Unit – III	06 Hrs. (Marks : 10)
Lubricants :- <ol style="list-style-type: none"> I) Introduction, Mechanism of lubrication – Fluid film, Boundary. Extreme Pressure Lubrication. II) Classification of lubricants :- Solid, Semisolid, Liquid, Synthetic, Emulsion, one example each. III) Properties of lubricants & its significance. <ol style="list-style-type: none"> A) Physical Properties – Viscosity, Viscosity index Redwood Viscometer, Flash & fire point, Oiliness, could and power point. B) Chemical properties – Specification value, neutralization number, Emulsification. 	
Unit – IV	06 Hrs. (Marks : 10)

Electrochemistry :-		
I) Introduction Nernst theory of single electrode potential, Nernst equation. Electrochemical series, galvaric series, type of cells (electrolytic & electrochemical).		
II) Arrhenius theory, Electrolysis explanation with figure		
III) Faradays I & II law of electrolysis & numerical based on it.		
IV) Conductivity Definitions of :- a) Conductivity b) Specific conductivity c) Equivalent conductivity d) Lomic mobility. e) Molar conductivity		
V) Measurement of conductance by conduct metric titration of weak acid & weak base titration.		
VI) Oswald dilution law with brief expiation Buffer Solution & pH.		
PRACTICAL:- (Any five experiments of the following)		
1. Estimation of total hardness of given of a sample of water by EDTA method. 2. Estimation of chlorides in a given sample of water by Mohr's method. 3. Determination of saponification value of an oil 4. Preparation of polystyrene by bulk polymerization. 5. Determination of Viscosity by Ostwald's Viscometer 6. Determination of percentage purity of Oxalic acid 7. Estimation Fe (Iron) content of water by calorimeter 8. Idometric titration (Estimator of phenol) 9. Phenol water system (phase rule) 10. Conduct meter totration (HCL against NaOH) 11. Determination of NaOH & Na ₂ CO ₃ in given alkali mixture		
Note:- Their will be total five question. One question on each unit. Fifth question will be on any combination of units 1,2,3 & 4 Fifth question will also carry TEN marks. Candidate will be required to solve five question totally for full marks.		
Text Books :-		
1. A text book of Engg. Chemistry : BY M.M.Uappal. Khanna publications Delhi. 2. A text book of Engg. Chemistry : S.S.Dara 3. Engg. Chemistry : By B.K.Sharma S. Chanda publications 4. Engg. Chemistry : By Jain & Jain Dhanpatrai Publications 5. Engg. Chemistry : By Prof Bhusari & Others		
Reference Books:-		
1. Basic Inorganic Chemistry by Cotton & Willkinson John Weily. Drd Education 2. Physical Chemistry : By Puri & Sharma Bhal & Tuil 3. Essential of Physical chemistry : By Bhal Tuil & Bhal 4. Environmental Chemistry : By B.K.Sharma (Geol publications House) 5. Polymer Science : By V.R. Gowarikar (Weily Eastern Ltd.) 6. Polymer science and Technology: By Joel and Fried (PHI) 7. Laboratory Manual of Engineering Chemistry: By Dr. Sudharani (Dhanpat Rai Pub. Co.) 8. Chemistry of 8 th Edition: By Raymond Chang (TMH)		
TERM – I		
PROFESSIONAL COMMUNICATION		
Teaching Scheme:		Examination Scheme:
Lecturers:- 2 Hrs / Week Tutorial:- 1 Hrs / Week		Paper Duration: - 2 Hrs. Theory Paper: -50 Marks Term work:-25 Marks
Unit I	Hours	Marks
Testing written comprehension ability		10
• Comprehension passage of 500 words	1 ½	3
• Multiple Choice Questions Office Drafting: Notes, Memo and Fax	1 ½	4

• Office drafting : Notice, Memo Fax	1	3
Unit II	Hours	Marks
Business correspondence		10
• General principles of business, correspondence	½	1 ½
• Ramification of business letters	½	1 ½
• Letter giving instructions, enquiry and answers to enquiries, complaints, & adjustments, letter using action, employment letter, applications and resumes	3	7
Unit III	Hours	Marks
Proposal Writing		10
• Proposal – Definition and kinds	½	1 ½
• Division of format proposal. (front Meter, Title Page, Summary/Abstract, table of concept etc.)	½	1 ½
• Statement of Request Body - statement of problems, background Scope, Methodology, Advantage and Disadvantage	3	7
Unit IV	Hours	Marks
Report Writing		10
• Characteristics of Business report	½	1 ½
• Structures report : Front page main body back matter	½	1 ½
• Style of reports: Definition, the specific attitude, readability of reports, Choice of words and phrases, Construction and length of sentences, Construction and length of paragraphs, Line out or break up of Memoranda format report , Blank from reports, Frozen Reports Memoranda for report, Periodic report, Miscellaneous reports	3	7
Unit V	Hours	Marks
Writing scientific and Semi-Technical articles		10
• Source material, Topic Sentences, Literature review	1 ½	5
• Tables Figures footnotes, bibliography and references	1 ½	5
• Group Discussion and interview Techniques	3	--
Term Work:		
<ol style="list-style-type: none"> 1. Reading Comprehension and writing answers to various queries 2. Business correspondence letters (Minimum 2 or 3) 3. To paper one proposal for sanction of grants 4. To paper one report for set up for new industry 5. To write one Scientific / Semi Mechanical article. 6. G. D. (Group Discussion) 7. Interview Techniques 8. Oral Communication 		
Text Book:		
<ol style="list-style-type: none"> 1. Sharma R. C and Mohan K. Business Correspondence and report writing, TMH third edition 2. Sharma S.D. A Textbook of spoken and writing English Vikas 1994 3. Sunny Tharappan, Communicative English, Mangalore HRD System Pvt. Ltd. 2003 edition 4. Huckin, Technical writing and professional Communication, McGraw Hill. 5. Professional Communication – Prof Pathak , Prof . Pati 		
Reference Books:-		
<ol style="list-style-type: none"> 1. Rizvi, Effective Technical Communication, TMH 2005 edition. 2. Sasikumar, Spoken English, A Self Learning Guide to Conversation prentice. TMH 3. Prasad, How to paper fro groupe Discussion and Interview, TMH 4. CDC TTTI Bhopal, A Course in Technical English Book-II Somaiya, Publication Pvt. LTD. Mumbai. 		

TERM – I	
ENGINEERING MATHEMATICS – I	
Teaching Scheme:	Examination Scheme:
Lecturers:- 3 Hrs / Week Tutorial:-1 Hrs / Week	Paper Duration:-3 Hrs. Theory Paper:-100 Marks Term work:-25 Marks
UNIT:- I	8 Hrs (Marks 20)
Linear algebra and applications.	
<ol style="list-style-type: none"> 12. Rank of Matrix. 13. Normal form, canonical form. 14. Reduction to normal and canonical form. 15. System of linear equation :- consistency and inconsistency by using rank of matrix. 16. Linear dependence and in dependence of vectors. 17. Characteristic equation of matrix eigen values and eigen vectors. 18. Orthogonal matrices. 19. Caley – Hamilton theorem. 	
UNIT:- II	8 Hrs. (Marks20)
Calculus of function of one variable	
<ol style="list-style-type: none"> 1. Introduction to successive differentiation. Leibnitz's theorem (without proof). 2. Taylor's and Maclaurin's theorem (without proof). Expansion of functions into Taylor's and Maclaurin's series. 3. Indeterminate forms, L Hospital's rule, Limits. 	
UNIT:-III	8 Hrs. (Marks 20)
Integral calculus (some special functions)	
<ol style="list-style-type: none"> 1. Gamma function. 2. Beta function. 3. Rule of differentiation integral sign. 4. Error function. 	
UNIT :-IV	8 Hrs. (Marks20)
Differential equation of first order and first degree.	
<ol style="list-style-type: none"> 1. Introduction to definition of differential equation, and degree of differential Equation variable separable form, differential equation reducible to variable Separable form, use of polars, homogeneous differential equation, equations Reducible to homogeneous differential equation. 2. Exact differential equation. 3. Differential equation reducible to exact differential equation (By using Integrating Factor). 4. Linear differential equation of first order first degree. 5. Differential equation reducible to linear differential equation of first order and first degree. 	
UNIT :-V	8 Hrs. (Marks 20)
Application of D.E. of first order and first degree.	
<ol style="list-style-type: none"> 1. Rectilinear motion , motion under gravity.(except project file motion). 2. Applications to electrical circuits I – R, R-C, L-C Circuits. 3. Newton's law of cooling. 4. Conduction of heat. 5. Atmospheric pressure. 	
Term work :- One assignment on each unit often problem:-	

Text Books :-	
<ol style="list-style-type: none"> 1. Engineering Mathematics-I, II By P.N. wartikar ,pune vidyarthi Gruha 2. Advanced Engineering Mathematics (7th Edition)by Erwin Kreyszig, Wiley Eastern Ltd. 3. Advanced Engineering Mathematics by C.R. Wiley, TMH Sixth edition. 4. Engineering Mathematics by Prof. Chaudhari. Prof. Singh Prof. Narkhede, Prof. Gokhale 	
Reference Books:-	
<ol style="list-style-type: none"> 1. Higher Engineering Mathematics, by B.S. Grewal, Khanna Publications. 2. Engineering Mathematics by Shanti Narayan. 3. Advanced Engineering Mathematics by H.K. Das, S. Chand & Company. 4. Engineering Mathematics by B.V. Ramana (2nd edition)TMH 	
TERM – I	
ELEMENTS OF ELECTRONICS ENGINEERING	
Teaching Scheme:	Examination Scheme:
Lecturers:-3 Hrs / Week Tutorial:-1 Hrs / Week Practical:-2 Hrs / Week	Paper Duration: - 3 Hrs. Theory Paper: - 100 Marks Term work:- 25 Marks
UNIT:- 1	8 Hrs. (20 Marks)
Semiconductor of Diodes	
<p>Classification of Materials as insulator, conductors & semiconductors, Types of Semiconductors, intrinsic , extrinsic & extrinsic semiconductors P- type & N- Type, majority & minority charge carriers, Drift current.</p> <p>The FN junction, Formation of Depletion layer, Junction voltage, Effect of Temperature on Junction voltage forward & reverse biased PN junction Reverse saturation current, V-I characteristics, Junction Breakdown Zener & Avalanche breakdown, junction capacitance & equivalent circuit, PN junction diode parameters, Applications diode ratings or specification Ideal diode & Real Diode, Introduction to Zener Diode</p>	
UNIT II	8 Hrs.. (20 Marks)
(A) Bipolar junction Transistor	
Introduction, Emitter, Base & Collector of Transistor, Transistor construction & biasing, Transistor circuit configuration, Common base, common Emitter, Common Collector, Leakage current & Thermal Runway.	
(B) Field Effect Transistor :-	
Introduction, Symbol, Classification of FET, Basic construction of JFET, Operation & characteristics, MOSFET, Depletion & Enhancement type MOSFET, Construction working FET application.	
UNIT III	
(A)	3 Hrs. (10 Marks)
Opto & Power Devices.	
Introduction, Wavelength & frequency, Spectral Response of Human eye, LED, Photo emissive devices, Photo Diode.	
(B)	5 Hrs. (10 Marks)
UJT, SCR, Triac, DIAC, SCS.	
Construction, Parameters, Characteristics, Operation & Application.	
UNIT IV	
(A)	4 Hrs. (10 Marks)
Operational Amplifiers & power Suppliers	
Ideal operational Amplifier, Inverting & Non-inverting amplifier, Difference amplifier, Virtual Ground Concept, Summing Amplifier, Voltage follower.	
(B)	4 Hrs. (10Marks)

DC Power Supplies. Introduction, unregulated & Regulated Power Supplies, Rectifiers, Regulation, Zener Diode Shunt Regulator, Transistor Series Voltage Regulator, Voltage Dividers, Multipliers, Complete Power Supply.		
UNIT V		
(A)	2 Hrs.	(5 Marks)
Cathode Ray Oscilloscope. Introduction, Cathode Ray Tube, Theory & Construction, Applications.		
(B)	2 Hrs.	(5 Marks)
Electronic Instruments. Electronic Voltmeters, Differential Amplifiers, DC Voltmeters, Electronic Multimeters		
(C)	4 Hrs.	(10 Marks)
Logic Circuit: Binary Numbers, Conversion of Decimal Numbers to Binary Numbers, HEX & OCTAL Numbers, Conversion to Binary from, AND OR NOR, NAND & all Logic Gates, Symbols & Truth Table read case.		
Texts and Reference Books:		
<ol style="list-style-type: none"> 1. Majvine Electronic Principle TMH Sixth edition. 2. Bernand Grob, Basic Electronics, TMH Nineth edition 3. B.L. Theraja, Basic Electronics (Solid State) 4. Robert Boylestud & Louis Nashelsky, Electronics Device & circuit Theory, PHI 5. Spawned A.K. Electrical & Electronic Measurement & Instrumentation, Dhanpat Rai, & Sons. 6. John D Rydce, Electronics fundamentals and Applications, PHI, Fifth edition. 7. Jain P.R. Modern Digital Electronics, TMH third edition. 8. R.P.Punagin, Basic Electronics, TMH. 9. Elements of Electronic Engineering : Godse, Bakshi 		
List of Experiments:-		
<ol style="list-style-type: none"> 1. Study of Measuring instrument, Power Supplies & Single Generator. 2. Color coding of Resistors, Capacitors & Inductors. 3. Testing of Diode & V-1 Characteristics of P-N diode & Zener Diode. 4. Study of CRO: (a) Voltage / Frequency Measurement (b) Function of all Controls. 5. To study Half wave & Full wave Rectifier. 6. To study Transistor fault location & identifying terminals. 7. Characteristics curve for (any one of CE, CC ,CB , configuration of transistor.) 8. Verification of parameters of Operational Amplifier. 9. Study of inverting & Non inverting amplifier using Op- Amp. 10. Study of Logic Gates. 11. Implementation simple Boolean expression Gates. 		
Note:- The term work should include a minimum of eight experience from the above list)		
TERM – I		
ENGINEERING MECHANICS		
Teaching Scheme:		Examination Scheme:
Lecturers:-3 Hrs / Week		Paper Duration : -3 Hrs.
Tutorial:-1 Hrs / Week		Theory Paper: 100 Marks
Practical:-2 Hrs / Week		Term work:-25 Marks
UNIT :- I		
A)	(4 Hrs..)	(10 Marks.)

Resultant of force system: - Introduction, Basic concept, Principles of Mechanics, Force types of Force System, composition and Resolution of forces, Resolution of Concurrent force System in Plane Moment Couple Varignon's Theorem, Equivalent Force system, Resultant of Non-Concurrent Force System in plane, Introduction to Space forces, Resultant of Concurrent Forces stem in Space.		
B)	(4 Hrs.)	(10 Marks.)
Equilibrium of force system: Introduction body constraints, type of supports & Loads free body diagram. Conditions of Equilibrium sum, Equilibrium of two, forces in Plane Lami's theorem. Equilibrium of forces in plane. Reaction of determinate beam (Simple and compound beam Equilibrium of concurrent force system in space.)		
UNIT :-II		
A	(4 Hrs..)	10 Marks.
Center of gravity: - Introduction, center of Gravity/ centroid of composite plane Figures as curves II)Moment of inertia:- Introduction, radius of gyration, polar moment of inertia, Parallel as theorem moment of Inertia of composite plane figures.		
B)	(4 Hrs..)	10 Marks.
Analysis of structure:- plane trusses, method of Joints , method of sections, cable selected point loads frames, plane frames Principles of virtual work applied to statically determinate beams.		
UNIT :-III		
A)	(4 Hrs..)	10 Marks.
Kinematics of Rectilinear motion of particle:- Introduction, Basic concept, Equations of motion, variable acceleration, motion under gravity Motion curves, Relative motion		
B)	(4 Hrs..)	10 Marks.
Kinetics of Rectilinear motion of particles:- Introduction, Basic concept, Newton's second law, work energy principle. D'Alemberts Principles, Impulse momentum principle Direct central Impact.		
UNIT :-IV		
B)	(4 Hrs..)	10 Marks.
Rotational Motion of rigid bodies:- 1) Kinematics:- Introduction, Equation defining rotation of rigid bodies about a centroidal axis. 2) Kinetic:- Basic concept, Mass Moment of Inertia, Motion under a constant torque, Newton's second law		
B)	(4 Hrs..)	10 Marks.
Plane motion of rigid bodies:- 1. Kinematics:- Introduction of general plane motion, Instantaneous center of rotation. 2. Kinetics:- Introduction, D'Alemberts principle, Work energy principle, Rolling Motion with slipping, Compound Pendulum.		
UNIT V:		
A)	(4 Hrs..)	10 Marks.
Friction: Introduction, Laws of friction, Simple contact friction, adhesion friction, belt friction (flat) and block wedge friction		
B)	(4 Hrs..)	10 Marks.
Curvilinear motion:- Basic concept, Equation of motion in Crested Path and Polar Coordinators, Motions of Projectiles, Introduction of kinetics of curvilinear motions, Newton's second law.		

Term Work :-	
The term work shall consists of a record of laboratory experiments and drawing a listed below	
List of Experiments :	
(Any 8 Experiments of the following)	
<ol style="list-style-type: none"> 1. Reaction of Beam 2. Flat belt Friction 3. Forces in plane truss – jib crane. 4. Study of Simple machines and verification of Law of Machine (any two) 5. Moment of Inertia of Fly Wheel 6. Compound Pendulum 7. Tensional of Pendulum 8. Demonstration of concept of the following <ol style="list-style-type: none"> a) Impact of elastic bodies and coefficient of restitution b) Rolling of various bodies 9. Study of space force 10. Compulsory Graphical work : <ol style="list-style-type: none"> a) Graphic station : (Minimum 4) problems of graphical solution of Static, Problems b) Graphic Dynamics : (Minimum 3) Problems on Graphical solution of Dynamic role. 	
Text Books : (Latest Edition)	
<ol style="list-style-type: none"> 1. Engineering Mechanics (Static of Dynamics), by M. S. Palanichamy, S. Nagan, TMH. 2. Engineering Mechanics, By A.K Tayal, Umesh Publication 3. Engineering Mechanics, by S.S. Bhavikate (New Age Publication) 4. Engineering Mechanics : Prof Gupta. 	
Reference Books : (New Edition)	
<ol style="list-style-type: none"> 1. Engineering Mechanics (Static & Dynamics) Schaum’s series by E.W. Nelson, C.L Best.W.G.c Lean ,TMH 2. Vector Mechanics (Static of Dynamics) By P.P. Beer and E.R. Johnson, TMH 3. Engineering Mechanics (Static of Dynamics) by Ferdinand, L Singer , Harper and Rowe Publication 4. Engineering Mechanics (Static of Dynamics) by I.H. Shames, PHI Publication 5. Engineering Mechanics (Static of Dynamics) by R.C. Hibbeler, McMillan Publication. 6. Engineering Mechanics (Static of Dynamics) by J.B. Meriam and Craige, John Wiely and Sons Publication 7. Engineering Mechanics (Static of Dynamics) by Author P. Boreri and Richard J Schmidt, Brooks/ Cole Publication 8. Engineering Mechanics (Static of Dynamics). By V.S. Mokashi, TMH 	
TERM – I	
ENGINEERING GRAPHICS – I	
Teaching Scheme:	Examination Scheme:
Lecturer / week : 1 Hour Practical /week: 2 Hrs.	Term work: 25 Marks Oral: 25 Marks
<ol style="list-style-type: none"> 1. Scope of the subject, types of lines used in practice, Dimensioning Scales (S.p.1998) 2. Concept of orthographic Projection, Horizontal Plane, Vertical Plane. To draw front view Top View and side View of Simple objects 3. Projection of points in all Quadrants. 4. Projection of Straight lines, Line inclined to both the reference planes, Location of Tracks 5. Projection of planes Like Triangles, Quadrilateral Polygons, Circles (Inclined to both the planes) 6. Projection of solids Cone, Pyramids, Cylinders, Prisms, (Axis inclined to both the reference plane 7. Section of solids – Cone, Pyramids, Cylinders, Prisms, (cut by AVP & AIP) 8. Development of Lateral Surface – Development of Cylinders, Prisms, Cone, Pyramids 	
Term Work:-	

1. Sheet No 1:- Lines, Lettering, Dimensioning and Numberings 2. Sheet No 2 :- Projection of Straight Lines – (3 Problems) 3. Sheet No 3 :- Projection of planes – (3 Problems) 4. Sheet No 4 :- Projection of Solids – (3 Problems) 5. Sheet No 5 :- section of solids – (3 Problems) 6. Sheet No 6 :- Development of Lateral surfaces (2 Problems)	
Note:- Oral Examination based on T.W.	
Text and reference Book.	
1. Elementary Drawing by N.D.Bhatt. Charotar Publishing House India. 2. Engineering Graphics by M.L.Dabhade. 3. Engineering Drawing by M.B. Shah and B.C.Rana Pearson Education India Ltd. 4. Engineering Graphics : Prof Phakatkar	
TERM – I	
WORKSHOP PRACTICE – I	
Teaching Scheme:	Examination Scheme:
Practical:- 2 Hrs / Week	Paper Duration : - 2 Hrs. Term work :-50 Marks
A) CARPENTRY SHOP	
T Lap joint & Bridle Joint	6 Hrs. 1 Job each
B) FOUNDRY:-	
1) Preparation of mould of any pattern	2 Hrs. 1 Job each
2) Casting of any sample pattern	4 Hrs. 1 Job
C) WELDING SHOP:	
1) Gas welding practice by student on mild steel flat	2 Hrs. 1 Job
2) Lap Joints by Gas Welding and Arc Welding	2 Hrs. 1 Job
3) Demonstration of Brazing	2 Hrs. 1 Job
D) Fitting Shop	
1. Fitting – Finishing of two sides of a secure pieces by filling	2 Hrs.
2. Drilling of 2 holes of size 5 mm & 12 mm diameter in fitting job	2 Hrs.
3. Tapping of 5 mm diameter hole on above job	2 Hrs.
Note:	
1. Candidates are required to finish the job to the following limits a. Carpenter + 2mm -2mm b. Fitting + 0.5 mm - 0.5 mm c. Welding 3 mm Linear 5 ⁰ angular. 2. Workbook to be submitted Compromising of job drawing, operation sheet for a given job along with sketches of tools used for processing 3. No separate journals or file is to prepared	
TERM – II	
ENGINEERING PHYSICS –II	
Teaching Scheme:	Examination scheme:
Lecturers:- 2 Hrs / Week Practical:- 2 Hrs / Week (Alternate week)	Theory Paper:-50 Marks Term work:-25 Marks
Unit:-I	05 Hrs. (Marks10)

Quantum Mechanics:- Wave nature of matter, De – Broglie’s Wave, Wavelength of matter wave, Heisenberg’s uncertainly principle with illustration, Schrodinger’s time independent and time dependant wave equation, physical significance of wave function, Application of Schrodinger’s time independent wave equation to the problem of Practical in ride box		
Unit:-II	10 Hrs.	(Marks10)
<p>A) Acoustics:- Elementary acoustics, Echo, Reverberation time, Reverberation time, (Sabine’s formula formula with ought derivation) Industry Level Acoustical planning of building , Factors affecting the architectural acoustic of building, Limits of Audibility, Ultrasonic waves by piezoelectric and magnetostriction oscillator, Engineering applications of ultrasonic waves.</p> <p>B) Environmental Physics:- Energy Source (Conventional) Introduction of non conventional energy source – Solar water heater, Solar Cell, Biogas, Wind energy, Tidal Energy.</p> <p>Energy Source (Non Conventional) Introduction to Nuclear Fission, Chain reaction & Nuclear Reactor.</p>		
Unit:-III	10 Hrs.	(Marks 10)
<p>Optics:-</p> <p>A) Interface, Michelson’s Interferometer, Application of Interface.</p> <p>B) Diffraction of waves, Classes of diffraction, Diffraction at a single slit, Plane Diffraction grating, condition for principal maximum and minimum, Rayleigh’s criterion resolution, resolving power of grating and telescope.</p> <p>C) Polarisation : Polarization by reflection , Brewster’s Law , double Refractor, Nicol pris law of malus, Dichroism, polaroid’s , engineering application of Polarization</p>		
Practical :-		
<p>Any five experiments of the following :-</p> <ol style="list-style-type: none"> 1. Wavelength by diffraction grating. 2. Solar cell Characteristics 3. Ultrasonic interferometer 4. Sound level multi meter . 5. e/m by Thomsons method. 6. Ultrasonic Detector 7. Michel sons Interferometer 8. Resolving power of Telescope 		
Text Books :-		
<ol style="list-style-type: none"> 1. Engineering Physics By Sen, Gaur, Gupta, Dhanpat Rai. 2. A Text book of Sound by wood 3. Concepts of Modern Physics, By S.L. Gupta And S. Gupta, Dhanpat Rai. 		
Reference Books :-		
<ol style="list-style-type: none"> 1. Atomic Physics, by Richards and Wehar and Adair, Narosa Publication. 2. Atomic and Nuclear Physics, By Brijlalal and Subramanyam, S. Chand 3. Modern Physics by J.B. Rajan TMH. 4. Engineering Physics, By P.V. Naik, Pearson Education. 5. Optics by Ajay Ghatak, THM. 6. Physics of Nuclear Reactor, Garg and Khothari, THM 7. Solar Energy fundamentals and Applications, H.P. Garg and J Prakash, TMH. 8. Engineering Physics- II : Prof Pawar , Prof. Talele 		
TERM – II		

ENGINEERING CHEMISTRY –II	
Teaching Scheme:	Examination Scheme:
Lecturers :-2 Hrs / Week Practical :-2 Hrs / Week (Alternate week)	Theory Paper Duration: -2 Hrs Term work:-25 Marks Paper: -50 Marks
Unit – I	07 Hrs. (Marks : 10)
Structure Reactivity & Mechanism :-	
<p>I) Explain with suitable Example of :- Inductive effect, mesomeric effect, Hyper Conjugation, effect, electrometric effect.</p> <p>II) Isomerism – Optical isomers, Conditions of optical activity. Optical Isomerism on compounds containing 1 & 2 Asymmetric carbon atom (ex lactic acid & tartaric acid) racemic modification.</p> <p>III) Conformation analysis :- Conformation of cyclohexane (chair and boat conformation) Conformation of mono & disubstituted cyclohexane.</p> <p>IV) Types of reagents – Nucleophile, Electrophile & free radicals.</p> <p>V) Preparation properties & application of following gaseous fuel. a) water Gas b) Producer Gas c) Natural Gas d) LPG</p> <p>VI) Advantage and disadvantage Solid, Liquid & Gaseous fuel.</p>	
Unit – II	06 Hrs. (Marks : 10)
Environmental Chemistry & pollution :-	
<p>I) Environmental Chemistry – segments of environment, Lithosphere, Hydrosphere, Biosphere and Atmosphere Green House effect, formation and depletion of Ozone layer.</p> <p>II) Water Pollution :- Sources of water pollution such as domestic and industrial sewage. Types of water pollutions and its role in water pollution such as organic and inorganic, sediments, radioactive & thermal pollutions.</p> <p>III) Control of water Pollutions</p> <p>IV) Air pollutions a) Definition sources of air pollution b) role of pollutants such as, CO, NO_x SO₂, CO₂ & Hydrocarbons. c) Acid rain</p> <p>V) Control of air pollution Environmental and pollution</p> <ul style="list-style-type: none"> ○ Water pollution – pollutants (organic and inorganic sediments, radioactive and ○ Control of water pollution ○ Air pollution – air pollutants, SO₂, CO, NO, CO₂, and Hydrocarbon ○ Acid rain ○ Air pollution, control of gaseous pollutants ○ Combustion, absorption, adsorption ○ Control of air pollution 	
Unit – III	06 Hrs. (Marks : 10)
Polymers :-	
<p>I) Introduction, Classification of polymers.</p> <p>II) Preparation :- Properties & applications of following polymers a) Polyethylene b) Nylon – 66 c) Polystyrene d) Teflon f) Polycarbonate g) Polyurethane h) Epoxy resins</p> <p>III) Mechanism of addition polymerization</p> <p>IV) Rubber :- a) Natural & synthetic rubber brief explanation with suitable examples. b) Vulcanization of rubber by accelerated sulphur method.</p> <p>V) Preparation, properties of application of following synthetic Rubber :- a) Buna – S b) Buna – N c) Neoprene d) Butyl Rubber</p>	
Unit – IV	06 Hrs. (Marks : 10)
Fuels:-	

<ul style="list-style-type: none"> i. Definition, Classification of fuel. ii. Definition of calorific Value, Gross Calorific Value, Units of Calorific value. iii. Solid fuel, Coal, proximate & ultimate analysis of coal as an solid fuel. Determination of Calorific value by Bomb Calorimeter iv. Liquid Fuel, Fractional distillation of petroleum v. Gaseous Fuel : Determination of Calorific value by Boy's Calorimeter vi. a) Water Gas b) Producer Gas c) Neoprene d) LPG vii. Advantage & Disadvantage of Solid, Liquid & Gaseous fuel.
Unit – V 06 Hrs. (Marks : 10)
Environmental Chemistry & pollution :-
I) Environmental Chemistry:-
Segments of environment, Lithosphere, Hydrosphere, Biosphere and Atmosphere Green House effect, formation and depletion of Ozone layer.
II) Water Pollution:-
Sources of water pollution such as domestic and industrial sewage. Types of water pollutions and its role in water pollution such as organic and inorganic, sediments, radioactive & thermal pollutions
III) Control of water Pollutions
IV) Air pollutions
<ul style="list-style-type: none"> 1. Definition sources of air pollution 2. Roll of pollutants such as, CO, NO_x SO₂, CO₂ & Hydrocarbons. 3. Acid rain
VII) Control of air pollution
Environmental and pollution
<ul style="list-style-type: none"> i. Water pollution – pollutants (organic and inorganic sediments, radioactive and ii. Control of water pollution iii. Air pollution – air pollutants, SO₁₂, CO, NO, CO₂, and Hydrocarbon iv. Acid rain v. Air pollution, control of gaseous pollutants vi. Combustion, absorption, adsorption vii. Control of air pollution
Practicals :-
Any five experiments of the following
<ul style="list-style-type: none"> 1. Determination of partition coefficient of iodine between water and CCL₄ 2. Determination of Electro chemical equivalent of the (CU) Copper using copper Voltmeter 3. Estimation of (CU) copper from brass iodometrically. 4. Potentiometric titration 5. Estimation of (ZN) zine from brass volumetrically 6. Determination of% of calcium in cement 7. Preparation of phenol formaldehyde resin 8. Estimation of commercial caustic soda (Acid based Titration) 9. Determination of moisture & ash of coal in given sample of coal 10. Use of PH meter 11. Determination of acid value of resin and vegetable oil.
Note:- Their will be total five question one question on each unit. Fifth question will be on any combination of Units 1, 2, 3 & 4. fifth question will also carry Ten marks. Candidate will be required to solve five questions totally for full marks.
Text Books:-
<ul style="list-style-type: none"> 1. A text book of Engineering Chemistry By : M.M.Uppal Khann Publication Delhi. 2. A text book of Engineering Chemistry By : S.S. Dara 3. Engineering Chemistry By : B.K.Sharama S.Chand Publication Delhi 4. Engineering Chemistry By : Jain & Jain Dhanpatrai Publications. 5. Engineering Chemistry – II , By Prof Bhusari and Others

Reference Books :-	
1) Basic in organic Chemistry By :- Cotton and Will Kinson John Wiley Drd. Education. 2) Physical Chemistry By :- Puri & Sharma Bhal & Tuli 3) Essentials of Physical Chemistry : Bhal Tuli & Bal 4) Environmental Chemistry By : B.K. Sharma (Geol Publishing house) 5) Polymer Science By :- V.R. Gowariker (Wiley Eastern Ltd.) 6) Polymer Science & Technology Geol and Friend (Prentice – Hall of India) 7) Laboratory Manual of Engineering Chemistry By :- Dr. Sudharani (dhanpatrai Pub. Co.)	
TERM – II	
ELEMENTS OF CIVIL ENGINEERING	
Teaching Scheme:	Examination Scheme:
Lecturers:- 2 Hrs / Week Practical:- 2 Hrs / Week (Alternate week) Term work:- 25 Marks	Paper Duration: 2 Hrs. Theory Paper:- 50 Marks
Unit – I	05 Hrs. (Marks : 5)
A) Basic concepts in major subject such as Fluid Mechanics, Water resource Engineering. Structural Engineering Transportation Engineering Geo – Technical Foundation Engineering, Quantity surveying . B) Various Civil Engineering Structures, Their uses & types such as bridges, Dams, Canals, ESR, GSR,	
Unit –II	05 Hrs. (Marks : 5)
Chain tape correction for absolute length , Compass, Bearings, W.C.B. & R.B. system, local attraction, its detection and correction.	
Unit –III	05 Hrs. (Marks : 5)
Vertical Measurements :- Definitions , Bench Marks their types, Leveling Instruments calculation of, R.L. Line of collim	
Unit –IV	05 Hrs. (Marks : 10)
A) Types of structures, load bearing, framed and composite structure, Industrial structures, Principal of planning for Residential & Industrial Buildings B) Rules and Regulations Regarding height of Building, Set Back, Building Line, F.S.I / F.A.R. foundations and its board classification, and introductions to various parts of superstructures	
Unit –V	05 Hrs. (Marks : 10)
Engineering properties and used of stone, bricks, lime, cement, mortar and – concrete, tiles, timber, Steel, aluminum, glass, tar, and bitumen, rubber, plastic.	
Term Work.	
<ul style="list-style-type: none"> ▪ Chaining and ranging a line with location sketches and stations ▪ Observation of bearing and calculation of included angles. ▪ Leveling by rise and fall or collimation method. ▪ Five Assessments one based on each unit. 	
Text Books:-	
1) Surveying leveling part I ; T.P. Kanetkar & Kulkarni (for unit I.II.III.) Pune Vidyarthi Gruha Prakashan. 2) Building construction By B.C. Punmia (for unit IV), Laxmi Publication. 3) Engg. Materials – by S.C. Rangawala (for unit V) Charotar Publishing House. 4) Elements of Civil Engineering By : Prof Phadke and others.	

Reference Books:-	
1) Surveying Vol. I By B.C. Punima (for unit I.II.III.) Laxmi Publication.	
2) Surveying and Leveling by: N.N. Basak , (for unit I.II.III.) THM.	
3) Building construction By : S.C. Rangawala (for unit IV) Charotar Publishing House	
4) Civil Engineering Materials :- Agrawal Ohari (Fro Unit V) Indian Publication	
5) Engg Materials by : S.C. Rangawala (for unit V) Charotar Publishing House	
TERM – II	
ELEMENTS OF ELECTRICAL ENGINEERING	
Teaching Scheme:	Examination Scheme
Lecturers :- 2 Hrs / Week	Theory Paper:-50 Marks
Practical :- 2 Hrs / Week (Alternate week)	Term work:-25 Marks
Unit 1	(10 Marks)
(5 Hrs..)	
D.C. Circuit :- Concept of EME, P.D. and current resistance, effect of temperature on resistance, resistance – temp. Coefficient classification of electric network.. Ohm’s law , Krichhoffs law and their application for network solution, simplification of net work using series and parallel combination and Star Delta transformation	
Unit II	(10 Marks)
(5 Hrs..)	
Magnetic Circuit : Magnetic effect of electric current, law of magnetic course, magnetic field, concept of MMF, magnetic Flux, Flux Density, Reluctance permeability and field strength and their units. Cross and dot convention current, simple series and parallel magnetic circuit, compression between electric circuit and magnetic circuit. Force on current carrying conductor in magnetic field, fleming’s rules	
Unit III	(10 Marks)
(5 Hrs..)	
A. C. Fundamentals:- Representation of an a. c. source polarity of a. c. source, generation of a.c. voltage, concept of instantaneous, peak average and r.m.s. values cycle, period, frequency, peak factor and from phase difference, phasor representation and indication of phase difference in it. Rectangular and polar representation of phasor.	
Unit IV	(10 Marks)
(5 Hrs..)	
A.C. Circuit . Study of a.c. circuit consisting of purely resistive, purely inductive, purely capacitive type and corresponding voltage and current phaser diagram. Concept of reactance study of series and parallel ircuit consisting resistance, inductance, and its phasor, combination of to development concept of impedance, admittance conductance, susceptance.	
Unit : V	10 Marks
(5 Hrs..)	
Necessity of earthing, its types, fuses safety precaution in working with electricity, circuit and operation of filament lamp, fluorescent tube, mercury vapor , sodium vapor lamp.	
Text and Reference Books :-	
1) Allen Hambley :- Electrical engineering principles & applications :- 2 nd edition , Prentice hall of India	
2) NAIDU :- Introduction of electrical engineering, TMH.	
3) Vincent del toro :- Principle of electrical Engineering :- 2 nd edition , Prentice hall of India	
4) Edward Hughes :- Electrical Technology – 7 th Edition, person education India.	
5) B.H. Deshmukh – Basic electrical engineering, Nirali Prakashan	
6) Giorgio Rizzoni, Principles and Applications of electrical engineering , TMH 4 th Edition	
7) Elements of Electrical Engineering : Prof Deshmukh and Others	
List of Experiments : (any four)	
1) Study of electrical symbols and components	
2) Verification of krichhoff’s law	
3) study of R-L-C Series circuit	
4) study of R-L-C parallel series circuit	
5) Study of fluorescent tube circuit & mercury vapor lamp	
6) Study of house wiring	

TERM – II	
INTRODUCTION TO COMPUTING	
Teaching Scheme:	Examination Scheme
Theory:- 2 Hrs./ Week Practical:-2 Hrs./ Week	Paper:- 50 marks Term work:-25 marks Paper Duration:-2 Hrs.
Unit I:-	4 Hrs. (10 Marks)
Computer Architecture : Introduction , CPU, Memory, Communication between various units computer sys. Instruction format , Instruction Set, Multiprocessor sys. Primary Memory: RAM, Types of RAM , ROM, Types of ROM. Secondary Memory :- Classification, magnetic type, Magnetic Disk, Optical Disc.	
Unit II:-	4 Hrs. (10 Marks)
I/O Devices : Keyboard , pointing devices, Digital Camera, Scanners, Printers , Plotters, Monitors Projectors, Terminals. Operating System : Introduction , Evolution of operating system, Types and function of operating sys.	
Unit III:-	4 Hrs. (10 Marks)
Windows Operating System : Introduction, windows, Operating and closing of programs, operating files and folders, Customizing the Desktop, Setting fonts, Windows Accessories, Windows sys, installation of hardware and software, Printer interfacing, Using shortcut keys in windows. Internet Basics : Introduction, Evolution of internet, basic internet terms , Getting connect internet , internet applications, E – Mail, Searching the web.	
Unit IV:-	4 Hrs. (10 Marks)
Computer Language : Introduction, Evolution of programming languages, Classification programming languages, Features of good programming, languages. Computer Program: Introduction ,Algorithm, Flow chart, Pseudo code (P Code) program Testing Debugging, Program documentation , characteristics of good program.	
Unit V:-	8 Hrs. (10 Marks)
C Language : Introduction, Data types, Operators, Keywords, Main () Function, Control statement Loop statements, Arrays.	
References :-	
<ol style="list-style-type: none"> 1. Introduction to computer Science, Person Publications (for Unit I, II, IV) IPL Series. 2. D. Ravichandran, Introduction to computers and communication, TMH (for Unit II, III) 3. Balaguruswami, Programming in ANSIC, TMH, 3rd Ed. (for Unit V) 4. A.B.Patil. D. Ravichandran, Computer fundamentals, TMH 5. Peter Norton, Introduction to computers, Fifth Edition, THM. 	
Term Work Assignment:	
<ol style="list-style-type: none"> 1. Study of Motherboard with its all components details. 2. Study of I/O Devices: keyboard, Mouse, Printer and scanner. 3. Study of DOS and windows commands (Actual execution on computers is expected) 4. Search for an information on any search engine on internet 5. Creation of E mail Account 6. Paper a document using word processing software like MS – word etc. Use at least formatting features 7. Create a presentation using MS- Power Point or any other presentation software. 8. Write a programming in C Language to accept and display the personal details of user 9. Write a menu driven program in perform arithmetic operations on given data 10. Find the largest and smallest elements in an array. 11. Write a program for searching an elements in an array 12. Write a program for sorting the elements in an array 	

All the assignment are compulsory. For assignments 8 to 12 algorithm, flower chart and printout of code with comments as well as output is necessary.	
<ol style="list-style-type: none"> 1. Every Unit has equal marks (10 marks) 2. One simple program (5 marks) will be asked in unit 5 . Flower chart will carry marks and program will carry 3 marks 3. In Unit 3, exact key sequence for doing various windows operation should not be asked in the paper 	
TERM – II	
ENGINEERING MATHEMATICS – II	
Teaching Scheme	Examination scheme
Lecturers:- 3 Hrs / Week Tutorial:-1 Hrs / Week (Alternate week)	Paper:- 100 marks Term work:-25 marks Paper Duration:-3 Hrs.
Unit 1-	8 Hrs. (20 Marks)
Calculus of fundamentals of several variables :	
<ol style="list-style-type: none"> i) Partial derivatives (Definition, rules, Theorems) ii) Euler’s Theorem on homogenous functions (without proof) iii) Total Derivative, differentiation of implicit function iv) Charge of independent variable 	
Unit II-	8 Hrs. (20 Marks)
Application to Calculus of functions of several variables .	
<ol style="list-style-type: none"> i) Jacobians and its applications ii) Errors and approximates iii) Simple problems in extreme of functions with one constraint iv) Method of lag ranges multipliers 	
Unit III-	8 Hrs. (20 Marks)
A) Curve Tracing	
<ol style="list-style-type: none"> i) Cratessian curves ii) Polar curves. 	
B) Fourier series	
<ol style="list-style-type: none"> i) Definition of Fourier series ii) Full range Fourier series on $c S x c + 2 L$ iii) Half range Fourier series on $() S x L$ 	
Unit IV-	8 Hrs. (20 Marks)
Multiple integrals with application	
<ol style="list-style-type: none"> i) Introduction to coordinate system ii) Double integration iii) Triple integration iv) Applications to areas and volume 	
Unit V-	(8 Hrs.) (20 Marks)
Vector Calculus	
<ol style="list-style-type: none"> i) Definition, physical meaning of vector differentiation ii) Tangential and normal correspondents of acceleration, Radial and transverse components velocity and acceleration. Law of force (orbital motion) iii) Vector differential operator (∇) iv) Gradient of scalar point function, directional derivative and maximum directional derivative v) Divergence and curl of vector functions vi) Irrotational and Solenoidal vector fields 	
Term Work : One assignment on each unit of ten problems	

Text Books :-	
1.	Engineering Mathematics – I , II By P.N. Wartikar, Pune Vidyarthi Gruha.
2.	Advance Engineering Mathematics (7 th Edition) by Erwin Kreyszig, Wiley Eastern Ltd.
3.	Advance Engineering Mathematics by C.R. Wylie , TMH 6 th Edition
Reference Books :	
1.	Higher Engineering Mathematics, by B.S. Grewal, Khanna Publications
2.	Engineering Mathematics by Shanti Narayan
3.	Advance Engineering Mathematics by H.K.Das, S Chanda and Co.
4.	Advance Engineering Mathematics by B.V. Ramana (2 nd Edition) TMH
5.	Engineering Mathematics – II By Singh, Gokhale, Chaudhary, Narkhede, Mujumdar
TERM – II	
ENGINEERING THERMODYNAMICS	
Teaching Scheme	Examination Scheme
Lecturers :- 3 Hrs / Week Practical:- 2 Hrs / Week Tutorial:-1 Hrs/ Week	Theory Paper :- 100 Marks Term work :- 25 Marks Paper Duration:-3 Hrs.
Unit:- 1	(Marks 20)
Fundamentals and Definitions: -	
1. System, Surrounding and Boundary, Control Volume, state, state function point function, Thermodynamic Equilibrium, Units and Dimensions.	(1 Hr)
2. Microscopic and Microscopic View Point, Thermodynamic Properties, Extensive And Inter Process, Quasi – Static, Process Cycles.	(1 Hr)
3. Energy, Flow Energy, Potential And Kinetic Energy, Heat And Sensible Heat, Latent Heat, Convention	(1 Hr)
4. Work :- Displacement, Shaft Power Numerical.	(2 Hr)
5. Zeroth Law and thermodynamics, Temperature and Temp, Scale, Numerical	(1 Hr)
6. Pressure and its measurement, Manometer, Bourdon’s pressure Gauge and Numerical	(2 Hr)
Unit:- II	(Marks 20)
First law of thermodynamics :-	
1. Joule’s Experiments for cycle process, internal energy as a property	(1 Hr)
2. Application of first law for a closed system under going cycle, numerical	(1 Hr)
3. Enthalpy and Internal Energy Of and ideal Gas, Specific Heat, Cv and Cp	(1 Hr)
4. Principle of conversation of mass and energy, steady flow process continuity equation	(1 Hr)
5. Steady flow energy equation and its application	(2 Hr)
6. Numerical of SFEE	(2 Hr)
7. Significance of the $\int p dv$ and $-\int v dp$. Numerical	
Unit:- III	(Marks 20)
Second law of thermodynamics :-	

1. Limitation of first law, thermal reservoir, Heat engine, and its efficient, refrigerator and heat pumps	(1 Hr)
2. Statement of first law, : Kelvin plank and clausius statement, and their equivalence PM M2	(1 Hr) (1 Hr)
3. Concept of reversibility and causes of irreversibility	(1 Hr)
4. Carnot cycle and its analysis, Reversed Carnot Cycle	(2 Hr)
5. Carnot theorem, absolute temperature scale, COP of Reversible & heat pump Numerical	(1 Hr)
6. Entropy : two isentropic lines can not intersect each other, definition $\int dq/t$ entropyproperty (non numerical treatment)	(1 Hr)
7. Clausius theorem, Casusius inequality	
Unit :IV	(Marks 20)
Ideal Gas And Processes	
1. Gas laws, Definition of idea Gas, Equation of state, Universal Gas Constant & specific gravity Constant	(2 Hr)
2. (Ideal gas processes, There representation on P-V & T-S Gas diagram, Analysis For work Done, Heat transfer, Change Entropy, Internal Energy & Enthalpy with numerical)	(2 Hr) (1 Hr)
3. Constant Volume & constant pressure	(1 Hr)
4. Constant Temperature process	(2 Hr)
5. Polytropic process	(1 Hr)
6. Properties and gas mixture, Dalton's law of Parrial pressure	
Unit : V	(Marks 20)
1. Pure substance : Phase & phase transformation, sensible heat & Latent Heat of Steam	(1 Hr)
2. F-V, P-V, T-S, H-S diagram	(11 Hr)
3. Terminology : Dry, Superheated Steam & Wet Steam, Saturation Temperature, critical & triple point, Steam Table	(1 Hr)
4. Vapor Process	(2 Hr)
5. Dryness fraction & Its Determination by using Calorimeter	(1 Hr)
6. Numerical	(2 Hr)
Term work:	
The term work shall consists of a record of minimum six study experiments & five assignments are as given below	
List of Experiments :-	
<ol style="list-style-type: none"> 1. Study of Cochran & Lancashire boiler 2. Study of Babcock & Wilcox boiler 3. Study of various boiler mounting 4. Study of boiler accessories 5. Study of air compressor 6. Study of 2 stroke diesel and petrol engine 7. Study of 4 stroke diesel and petrol engine 8. Study of house hold refrigerator and window Air Conditioner 9. Study of water coolers 	
Assignment (Compulsory)	
There should be one assignment on each unit consist of any five problems.	

Text and Reference books:-	
1. Engineering thermodynamics – P.K. NAG, TMH, 3 RD Edition 2. Thermodynamics – Cenzel and boles – TMH, 4 TH Edition 3. Engineering thermodynamics – Jones and Duggan. Prentice Hall of India. 4. Engineering thermodynamics – Moran and Shapiro, John Wiley Inc. 5. Engineering thermodynamics – C. P Arora TMH 6. Applied thermodynamics I - R. Yadhav – central publication Allahabad 7. Engineering Thermodynamics – Prof Dhomkundwar & Others.	
TERM – II	
ENGINEERING GRAPHICS – II	
Teaching Scheme	Examination Scheme
Lecturers :- 1 Hrs / Week Practical:-2 Hrs / Week	Term work:-25 Marks Oral:- 25 Marks
1. Orthographic Projection – To draw Orthographic Projection from a given Pictorial View of and subject, Sectional Orthographic (2 Hr) 2. Interpretation of given views : Reading of given Orthographic Views, To add missing views to convert a view into Sectional Views (2 Hr) 3. Isometric Projection – Isometric Scale, Natural scale, Constructing Isometric View using the given Orthographic Views and given origin (2 Hr) 4. a) Machine elements – study and one Drawing of Machine Elements – Couplings, Knuckle joint cotter joint, Nuts, Bolts, Bearings, Scurvies, Shafts, Keyes and Bushes (2 Hr) (b) Introductions to Limits, First and Tolerances and Applications (1 Hr) (3 Hr) 5. Introduction to Auto CAD (Two – dimensional) use of latest version	
Term Work :	
1. Sheet No 1 : Orthographic projections (2 Problems – one with section) 2. Sheet No 2 : Isometric projections (2 problems – 1 with Isomeric scale and another with natural scale) 3. Sheet No 3 : Drawing of Machine elements (Any 4 to the scale) 4. Assignment : Using Auto CAD to draw simple machine elements	
Note: Oral Examination based on T. W	
Text and Reference Books:	
1. Elementary Drawing by N.D. Bhatt, Charotor Publishing House India. 2. Engineering Graphics by M.L. Dabhade 3. Engineering Drawing by M.B.Shah and B.C.Rana Pearson Education India Limited. 4. Introduction to computer Graphics by Krisnamurty , TMH. 5. Engineering Graphics by Phakatkar	
TERM – II	
WORK SHOP PRACTICE	
Teaching Scheme:	Examination Scheme:
Practical:- 2 Hrs / Week	Paper Duration : - 2 Hrs. Term work :-50 Marks
TIN SMITHY	
One job Including Soldering, Rive ding e.g Letter box, Waste paper Basket, Funnel etc.	(4 Hr)
PLUMBING	
One Job involving operation like Bending, Threading	(4 Hr)
BLACK SMITHY	
One job on black Smithy including Bending and Flattng e.g. S – Hook, S or U or 8 Shape etc	(4 Hr)

MACHINE SHOP

- One Job on lathe involving operations like plane Turning, Step Turning, Taper Turning and Chamfering (4 Hr)
- One job on Shaper for finishing two sides of a job and preparing the slot (4 Hr)
- Grinding, Polishing Corners of a Jobs on Bench Grinder (2 Hr)

Note :-

1. Candidates are required to finish the Job to the following Limits :-
 - a) Machine Shop + 0.5 mm - 0.5 mm
 - b) Black Smithy + 2 mm - 2 mm
2. Work book to be submitted compressing of Job crewing, operation sheet for a given job along with sketches of tools used for processing
3. No separate Journal of file is to be prepared