

S Y L L A B U S

BACHELOR OF TECHNOLOGY

FOUR YEAR INTERGRATED COURSE

B. Tech. First Year Examination, 2010

(Common for all branches)



JODHPUR NATIONAL UNIVERSITY
JODHPUR

JODHPUR UNIVERSITY, JODHPUR
Plan and Scheme of Examination for B.Tech. 1 Year (Semester I & II)
COMMON FOR ALL BRANCHES

I Semester- Theory Courses

Sub Code	Subject	No. of Teaching Hours Per Week			Exam. Hours	Marks Allocation				Total
		L	T	P		Theory Univ. Exam.	Term test	Sessional	Practical Univ. Exam.	
101	English- I	3	1	-	2	80	20			100
102	Engineering Mathematics-I	4	1	-	3	80	20			100
103	Physics-I	2	1	-	3	80	20			100
104	Environmental Engg	3	-	-	3	80	20			100
105	Fundamental of Electrical Engineering	3	-	-	3	80	20			100
106	Fundamental of Computer Programme.	2	-	-	3	80	20			100
107	Fundamentals of Computer Applications	2	-	-	3	80	20			100
Total		19	3	-		560	140			700

Practical- Courses

Sub Code	Subject	No. of Teaching Hours Per Week			Exam. Hours	Marks Allocation				Total
		L	T	P		Theory Univ. Exam.	Term test	Sessional	Practical Univ. Exam.	
111	Physics Lab –I	-	-	2	3			30	20	50
112	Environmental Engg. Lab	-	-	2	3			30	20	50
113	Computer Applications Lab	-	-	2	3			30	20	50
114	Electrical Engineering Lab.	-	-	2	3			30	20	50
115	Mechanical Workshop	-	-	2	3			30	20	50
116	Practical Geometry	-	-	3	3			30	20	50
Total		19	3	13				180	120	350
Contact Hours per week				35					Grand Total	1000

II Semester- Theory Courses

Sub Code	Subject	No. of Teaching Hours Per Week			Exam. Hours	Marks Allocation				Total
		L	T	P		Theory Univ. Exam.	Term test	Sessional	Practical Univ. Exam.	
201	English Communication Techniques	3	-	-	3	80	20			100
202	Engineering Mathematics-II	4	1	-	3	80	20			100
203	Physics-II	2	1	-	3	80	20			100
204	Engineering Chemistry	3	-	-	3	80	20			100
205	Fundamental of Electronics Engineering	3	-	-	3	80	20			100
206	Fundamental of Mechanical Engg.	2	-	-	3	80	20			100
207	Fundamental of Computer Programme.	3	-	-	3	80	20			100
Total		20	02	-		560	140			700

Practical- Courses

Sub Code	Subject	No. of Teaching Hours Per Week			Exam. Hours	Marks Allocation				Total
		L	T	P		Theory Univ. Exam.	Term test	Sessional	Practical Univ. Exam.	
211	English Language Lab.	-	-	2	3			30	20	50
212	Physics Lab –II	-	-	2	3			30	20	50
213	Engineering Chemistry Lab.	-	-	2	3			30	20	50
214	Fundamentals of Computer Programming	-	-	2	3			30	20	50
215	Mechanical Engineering Lab.	-	-	2	3			30	20	50
216	Machine Drawing	-	-	3	3			30	20	50
Total		20	2	13				180	120	350
Contact Hours per week				35					Grand Total	1000

Teaching Hrs.

Exam. Hrs. – 3 Hrs

L-3 T-1 P-0

Marks Theory Exam – 80 Term Test – 20 Total 100

CONTENTS OF SYLLABUS

Units:	Topics	
I	Text Book for detailed study Tongue R.K. and Shiv. K. Kumar- An English Miscellany (Oxford University Publication)	Lectures Req-6
	<ul style="list-style-type: none"> • Two Lessons from prose and two lessons from Poetry • Question Answer from the text book • Comprehension Passages- Seen and unseen. 	
II:	Grammar	Lectures Req-9
	<ul style="list-style-type: none"> • Nouns, Pronouns • Tenses, Sequence of tenses • Subject verb Agreement • Modal verbs 	
III	Grammar	Lectures Req-9
	<ul style="list-style-type: none"> • Adjectives • Articles and determiners • The Infinitive, Participle & Gerund • The passive 	
IV	<ul style="list-style-type: none"> • Application writing • C.V. writing • Letter writing formal & informal 	Lectures Req- 9
V	<ul style="list-style-type: none"> • Essay writing • Paragraph writing • Review writing 	Lectures Req-9
		Total Lectures Req- 42

Books for Reference

- High School English Grammar & Composition
P.C. Wren & Martin, S.Chand & Co., New Delhi
- Murphy’s English Grammar, 3rd Edition
Raymond Murphy, Cambridge University Press
- An Intermediate English Practice Book
S. Pit Corder, Orient Long Man
- A Remedial English Grammar for foreign Students
F.T. Wood, Macmillan Publishers
- A University Grammar of English
Quirk & Green Baum, Orient Longman
- A Practical English Grammar
Thomson & Martinet , Oxford University Press
- Written Communication in English
Sarah Freeman, Orient Longman

Teaching Hrs.
Hrs.
L-4 T-1 P-0
100

Exam Hrs. – 3

Marks Theory Exam.-80 Term test-20 Total

CONTENTS OF SYLLABUS

Units	Topics	
I	Differential Calculus :	Asymptotes (Cartesian Coordinates Only),Curvature ,Concavity, Convexity and Point of inflexion (Cartesian Coordinates Only),Curve Tracing (Cartesian and Standard Polar Curves-Cardioids, Lemniscates of Bernoulli Limacine, Equiangular Spiral) Lectures Req : 10
II	Differential Calculus :	Partial Differentiation, Euler's Theorem on Homogeneous Functions, Approximate Calculations, Maxima & Minima of Two and More Independent Variables, Lagrange's Method of Multipliers Lectures Req : 10
III	Integral Calculus :	Applications in Finding the Length of Simple Curves, Surface and Volumes of Solids of Revolution, Double Integral, Areas & Volumes by Double Integration, Change of Order of Integration, Beta Function and Gamma Function (Simple Properties) Lectures Req : 10
IV	Differential Equations :	Differential Equations of First Order and First Degree - Variable Separable, Homogeneous Forms, Reducible to Homogeneous Form, Linear Form, Exact Form, Reducible to Exact Form, Linear Differential Equations of Higher Order with Constant Coefficients Only Lectures Req : 12
V	Differential Equations :	Second Order Ordinary Differential Equations with Variables Coefficients, Homogeneous and Exact Forms, Change of Dependent Variable, Change of independent Variable. Normal Forms, Method of Variation of Parameter Lectures Req : 12
		Total Lectures Req : 54

Reference Books:

- Jain. R.K. and Iyengar, S.R.K., Advanced Engineering Mathematics, Narosa Publishing House, New Delhi.
- Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi.
- Bali, N.P., A Text Book on Engineering Mathematics, Luxmi Publications, New Delhi.
- Kreyszing, E., Advanced Engineering Mathematics, John Wiley.
- Mehta D.M, Sharma Engineering Mathematics I, Vardan Publisher.
- Ray Wylie, C., Advanced Engineering Mathematics. 6th ed., McGraw Hill.

Teaching Hrs.
L-2 T-1 P-0Exam Hrs.- 3 Hrs
Marks Theory Exam.-80 Term test-20 Total 100

CONTENTS OF SYLLABUS

Unit	Topics	Details of coverage	
1	Magnetic Materials and Electrostatics		Lectures required: 06
	<ul style="list-style-type: none"> • Classification of magnetic material • Types of magnetism • Magnetic domains • Ferrites • Charge distribution • Integral/Differential approach to Gauss's Law • Poisson and Laplace equation • Boundary conditions and Uniqueness theorem • Solution of Laplace's equation in rectangular coordinates. 	<ul style="list-style-type: none"> • Brief Explanation • Dia, Para, Ferro etc. • Explanation • Brief description and their applications. • Explanation • Derivation • No derivation • Explanation and brief derivation • Derivation, No numerical 	
2	Physical Optics		Lectures required: 06
	<ul style="list-style-type: none"> • Interference, • Interference from parallel thin films, • Newton rings, • Michelson interferometer 	<ul style="list-style-type: none"> • Definition & brief introduction, Condition of Interference • Explanation and derivation • Determination of wavelength, refractive index, formation by two curved surfaces and Newton's ring with white light. • Types of fringes, determination of wavelength of monochromatic light, difference in wavelength between two neighbouring spectral lines and its uses. 	
3	Diffraction		Lectures required: 06
	<ul style="list-style-type: none"> • Diffraction, • Fraunhofer diffraction • Plane Transmission Grating, • Resolving power 	<ul style="list-style-type: none"> • Definition, difference between Fresnel's and Fraunhofer Class • Single Slit (Intensity distribution by calculus method), N slits (derivation for intensity distribution) • Theory, width of Principal Maxima, absent spectra, maximum number of orders available, dispersive power, formation of multiple spectra. • Brief introduction, Rayleigh's criterion and resolving power of grating. 	
4	Theory of Relativity		Lectures required: 08
	<ul style="list-style-type: none"> • Concept of ether; • Michelson Morley experiment; • Einstein's postulates, • Lorentz transformation equations, • Length contraction and Time dilation • Addition of velocity, • Variation of mass with velocity, • Mass-energy relation, • Energy momentum relation. 	<ul style="list-style-type: none"> • Introduction • Explanation with derivation • Statement • Derivation of equations. • Explanation with derivation • Derivation. • Derivation. • Derivation. • Derivation 	
5	Electromagnetics		Lectures required: 06
	<ul style="list-style-type: none"> • Amperes Circuital law • Displacement Current • Maxwell's Equations (Differential) • Electromagnetic Wave Propagation in Free Space • Poynting Theorem 	<ul style="list-style-type: none"> • Derivation • Brief description • Derivation • Derivation • Derivation 	

Total No. of Periods: 32**Reference Books:**

1. A. Ghatak, "Optics"
2. N. Subrahmanyam and Brij Lal, "Optics"
3. R.L. Singhal "Solid State Physics"
4. D.S.Mathur "Mechanics"
5. R K Gaur and S L Gupta "Engg. Physics"
6. J.C. Upadhaya, "Mechanics"
7. K.K. Tiwari, "Electromagnetic & Electronics"
8. B.B. Laud, "Electro magnetic"

104 ENGINEERING CHEMISTRY -I

Teaching Hrs.

Exam. Hrs. – 3 Hrs

L-3 T-0 P-0

Marks Theory Exam – 80 Term Test – 20 Total 100

CONTENTS OF SYLLABUS

Units : Topics

- I Water and boiler troubles:** **Lectures Req: 8**
Sources of water, Impurities in water, Hardness of water, Units of hardness, Inter relationship between various units, Degree of hardness, Determination of hardness by Clark's test and Complexometric (EDTA) method, (Related numerical problems), Determination of Alkalinity, Chloride, Sulphate, Fluoride and pH, Dissolved oxygen and Carbon dioxide,
Boiler troubles: Carry over, Priming and Foaming, Boiler Corrosion and its prevention, Scale and Sludge formation (composition, properties and methods of preventions), Caustic embitterment, Effect of oil and silica on boilers and their removal methods.
- II Water and its treatment:** **Lectures Req: 9**
Requisites of drinking water, Purification of water, Coagulation, Sedimentation, Filtration and Disinfection, Break point chlorination, Water for steam making, Softening of water by lime soda, Zeolite and Ion-exchange process, Mixed bed demineralization, feed water conditioning, internal treatment, blow down, desalination, Reverse osmosis and Electrodialysis, Numerical problems related to lime soda method.
- III Environmental pollution and control:** **Lectures Req: 8**
Air Pollution: Sources of air pollution, Classification and effect of air pollutants, Acid rain, Green house effect, Depletion of ozone layer, General methods for air pollution control
Water Pollution: Sources of water pollution, Classification of water pollutants, Sewage water characteristics, B.O.D., C.O.D., Pollution due to radioactive material, Primary and secondary treatment of waste water.
- IV Corrosion and its prevention:** **Lectures Req: 9**
Definition and its significance, Theories of corrosion, Galvanic and Concentration cell corrosion, Pitting corrosion, Water line corrosion, Differential aeration corrosion, Stress corrosion, Factors affecting rate of corrosion, Protection against corrosion, Protective metal coating.
Abrasives:
Abrasive power, Natural and artificial abrasives, General properties and uses.
- V Phase rule:** **Lectures Req: 8**
Statement: Definition and meaning of the terms involved, Derivation of Gibb's phase rule equation, Application to One component system (Water system and Sulphur system), Study of Two component system (Pb-Ag system).
Explosives:
Introduction, Classification, Requisites of explosives, Preparation of explosives: Plastic explosives, Blasting fuses, Application of explosives.

Total Lectures Req. 42

Reference Books:

1. Chemical Process Industries By R. Norris Shreve & Joseph A. Brink, Tata McGraw Hill Publishing Co. New Delhi
2. Shreve's Chemical Process Industries By George T. Austin. McGraw Hill Book Co.
3. Polymer Science and Technology By Joel R. Fried. Prentice Hall Publications.
4. Environmental Chemistry By Anil Kumar De, New Age International (P) Limited. New Delhi.
5. Industries Chemistry By B.K Sharma, Krishna Prakashan Mandir, Meerut.
6. Engineering Chemistry By P.C. Jain and Monica Jain. Dhanpat Rai Publishing Company (P) Ltd. New Delhi.
7. Engineering Chemistry By S.K. Jain and K.D. Gupta, Jaipur Publishing House, Jaipur
8. Chemistry in Engineering and Technology (Vol I & II) (Latest ed.), By J.C. Kuriacase and J. Rajaram.
9. Environmental Chemistry and Pollution Control (Latest ed.), By S.S. Dara.

105 Fundamentals of Electrical Engineering

Teaching Hrs.
L-3, T-0, P-0

Exam. Hrs. : 3 Hrs.
Exam Marks: 100 {Internal (20) & University (80)}

CONTENTS OF SYLLABUS

Units	Topics	Details of Coverage	Lectures required: 10
I	Elementary Concepts		
	<ul style="list-style-type: none">Electrical CircuitVarious circuits and parametersEnergy sourcesBasic lawsAC waveforms	<ul style="list-style-type: none">: Various types of elements, Basic electrical quantities: Introduction to linear & nonlinear circuits, RLC parameters, Lumped & distributed networks. self inductance & mutual inductance: Voltage & current sources, series & parallel connections of sources, Source conversion techniques.: Ohm's law, KCL, KVL, Nodal and Mesh analysis: Introduction to waveforms such as square, triangular, saw-tooth, concept of R.M.S. & average values, elementary method of obtaining average value & R.M.S, value Various connections & theorem's : Y to Δ & Δ to Y connections, superposition theorem, Thevenin Theorem.	
II	Single Phase & Three Phase A.C. Circuits		Lectures required: 8
	<ul style="list-style-type: none">Single Phase AC CircuitCircuit detailsThree Phase AC Circuit	<ul style="list-style-type: none">: Generation of single phase a.c. voltage, E.M.F. equation, average, R.M.S. & effective values.: R.L.C. series, parallel & series parallel circuits, complex representation of impedances, phasor diagram, power & power factor: Generation of three phase a.c. voltage, line & phase quantities, three phase balanced circuits, phasor diagrams, measurement of power in three phase balanced circuits.	
III	D.C. Machines		Lectures required: 5
	<ul style="list-style-type: none">D.C. GeneratorD.C. Motor	<ul style="list-style-type: none">: Concept of E.M.F. generation, excitation system, series, shunt & compound generators, Characteristics.: Series, Shunt & compound types, Characteristics and their Uses	
IV	A.C. Machines		Lectures required: 9
	<ul style="list-style-type: none">TransformerThree Phase inductions motorSynchronous Machine	<ul style="list-style-type: none">: Principle of transformer, ideal transformer, basic construction, equivalent circuit & its phasor diagrams (No Load and On Load): Concept of rotating magnetic field, three phase induction motor, principle of operation, equivalent circuit as a rotating transformer & phasor diagram.: Synchronous machine: Principle of operation of generator & motor, comparison with induction machine.	
V	Electrical Measuring Instruments		Lectures required: 8
	<ul style="list-style-type: none">Measuring Instruments	<ul style="list-style-type: none">: Introduction, types of measuring instruments, Deflection, controlling & damping torque, Galvanometer, moving coil instruments, shunts & multipliers, moving iron ammeter & voltmeter. Dynamometer wattmeter, Energy meter.	

Reference Books:

- S.K. Sahdev : Electrical & Electronics Engineering
- B.L. Theroya : Fundament of Electrical Engineering
- K.R. Niaza : Electrical & Electronics Engineering
- J.B. Gupta : Electrical & Electronics Engineering

106 FUNDAMENTALS OF MANUFACTURING PROCESSES

Teaching Hrs.
L-2 T-0 P-0

Exam Hrs. – 3 Hrs.
Marks Theory Exam.-80 Term Test – 20 Total 100

CONTENTS OF SYLLABUS		
Unit	Topics	Details of Coverage
I	Engineering Materials	Classification of Engineering Materials: Plain Carbon Steel, Types of cast irons, composition, properties & applications. Properties & application of aluminum, copper, types of brasses, their composition & applications. Definition of mechanical properties like elasticity, toughness, resilience tensile strength, ductility, malleability, brittleness & hardness
II	Fabrication Processes	Introduction to wood working, types of wood, advantages of timber, qualities of good timber, seasoning of wood, defect in timber, wooden joints, ply wood, ply board. Gas welding, Arc welding tools & equipment, Introduction to soldering and brazing, Introduction to bench working operations.
III	Manufacturing Processes	Forgeability and forging temperatures, Forging operations, forging hand tools and their applications, hand forging operations: like upsetting, drawing, punching & drifting etc. Definitions and functions of pattern, pattern making, types of pattern, molding tools, molding boxes, molding sands, compositions and sand preparation.
IV	Metal Machining Processes	Machine tools: Classifications Specifications Working and operations of Centre lathe, Shaper and Drilling Machines
V	Power Transmission in Machine Tools	Power Transmission: Classification And Applications of Various Drives Belt, Chain, Gear (Excluding Epicyclic Gear Train) And Their Velocity Ratios. Introduction to Clutches, Couplings, Pulleys and their applications.

Total Lectures Required: 29

Reference Books:

1. Elements of Workshop Technology Vol-I &II by S K Hazara Choudhury, S K Bose A K Hazra Choudhury Nirjhar Roy ; Media Promoters & Publishers Pvt. Ltd.
2. A Course in Workshop Technology Vol I & II by B S Raghuvanshi ; Dhanpat Rai & co.
3. Manufacturing Technology by P N Rao; Tata Mcgraw-Hill Publishing Co. Ltd.
4. Theory of Machines by S S Ratan;Tata McGraw Hill Publishing Co. Ltd.
5. Automation, Production Systems, and Computer-Integrated Manufacturing Prentice Hall, Mikell P. Groover, ISBN-13: 9780130889782.

107 FUNDAMENTALS OF COMPUTER APPLICATIONS

Teaching Hrs.
L-2 T-0 P-0

Exam Hrs. – 3 Hrs.
Marks Theory Exam.-80 Term Test – 20 Total 100

OBJECTIVE: Familiarity with the Computer, Software, Networks & their uses.

CONTENTS OF SYLLABUS

Units	Topics	Details of Coverage	Lectures Req:
I	Getting Acquainted with Computer.		10
	<ul style="list-style-type: none"> • Types & Generation of Computers. • Computer Architecture & Building Blocks. • Memory & I/O devices. • Specification of Personal Computer. 	<p>Explanation of evolution of Computers. Explanation with Block Diagram Basic Concepts & Examples</p> <p>Various Configurations of Branded & Assembled PC's.</p>	
II	Data Processing and Office Use		03
	<ul style="list-style-type: none"> • MS-WORD • MS-POWERPOINT • MS-EXCEL • MS-ACCESS 	Explanation of Application of MS-OFFICE for use in Project Report formation.	
III	Data Modeling & Information Technology		06
	<ul style="list-style-type: none"> • Flow Charts • Control Flow Diagram, Data Flow Diagram, Entity Relationship Diagram • Data & Information, Quality of Information, Information system • Character & Graphical User Interface • Important Data types: Text, Graphics & Animation, Audio, Video. 	<p>Introduction & its Symbols Explanation with Examples</p> <p>Basic Idea.</p> <p>Basic explanation & Difference. Basic idea about the daily use.</p>	
IV	Networks		08
	<ul style="list-style-type: none"> • LAN, MAN, WAN. • Intranet. • Internet: WWW, Web Browser, Search Engine, Email, Cryptography, Digital Signature, Smart Card Technology, Upload & Download. 	<p>Basic Components & Differences Introduction & Uses.</p> <p>Brief Introduction of each, based on day to day uses.</p>	
V	Threats & Security for Computer		05
	<ul style="list-style-type: none"> • Virus & Antivirus. • Ethics (Do's & Don'ts). • Trouble Shooting. • S/W Licenses & Open Source Technology. 	<p>Introduction and its types. Security, Concepts, Cyber Laws Solution to PC related Common Problems Brief Introduction.</p>	
			Total Lectures Req: 32

111 PHYSICS LAB-I

Teaching Hrs.
L-0 T-0 P-2

Exam Hrs.- 3 Hrs
Marks Sessional -30 Practical-20 Total 50

S. No. List of Experiments

OPTICS

- I. To determine the wave length of Sodium light by Newton's rings.
- II. To determine the specific rotation of Glucose (Sugar) solution using a Polarimeter.
- III. To determine the wave length of Sodium light by Michelson's Interferometer.
- IV. To determine the dispersive power of material of prism for violet and yellow colors of mercury light with the help of a spectrometer.
- V. To verify the expression for the resolving power of a telescope

ELECTRONICS / ELECTRICAL

- VI. To convert a galvanometer into an Ammeter of range 1.5 Amps and calibrate it.
- VII. To study the variation of semiconductor resistance with temperature and hence determine the band gap of semiconductor in the form of reverse biased P-N junction diode.
- VIII. To determine the high resistance by the method of leakage, using a Ballistic Galvanometer.
- IX. To determine dielectric constant of a liquid using moving coil Ballistic Galvanometer with standard parallel plate condenser.

112 ENGINEERING CHEMISTRY LAB.

Teaching Hrs.

L-0 T-0 P-2

Exam. Hrs. – 3 Hrs

Marks Sessional – 30 Practical – 20 Total - 50

S. No. List of Experiments:

- I. Determination of Hardness of Water by different methods.
- II. Determination of Sodium Hydroxide and Sodium Carbonate in an alkali mixture.
- III. Determination of available chlorine in water.
- IV. Measurement of residual chlorine in water.
- V. Measurement of dissolved oxygen in water.
- VI. Measurement of nitrate in water.
- VII. Measurement of fluoride in water.
- VIII. Measurement of chlorides in water.
- IX. Determination of Barium as Barium Sulphate.
- X. Determination of Silver as Silver Chloride.
- XI. Determination of pH by pH Meter and measurement of strength of acid and base pH metrically.
- XII. Measurement of conductivity of aqueous solution of salts and measurement of strength of acid and base by conductometric method.
- XIII. Measurement of total solids, settleable solids and dissolved solids in sewage.
- XIV. Spectrophotometer (UV-Vis) analysis / characterization.
- XV. Determination of Sodium and Potassium by Flame Photometer.

Reference Books:

1. A Text Book on Experiment and Calculation in Engineering Chemistry By S.S. Dara.
2. Laboratory Manual on Engineering Chemistry By S.K. Bhasin and Sudha Rani.
3. Vogel Text book of Quantitative Chemical Analysis By G.H. Jeffery, J. Bassett, J. Mendham & R.C. Denney.
4. Instrumental Methods of Chemical Analysis By B.K. Sharma.
5. Practical Engineering Chemistry By Sanjay Sharma.
6. Environmental Engineering Laboratory Manual By Vivek Pandey and Sama Jain.

113 COMPUTER APPLICATIONS LAB

Teaching Hrs.
L-0 T-0 P-2

Exam Hrs. – 3 Hrs.
Marks Sessional - 30 Practical – 20 Total 50

OBJECTIVE: To make the user system friendly & to get hands on computer experience.

S. No	List Of Experiments	
I	Assignment 1st	
	<ul style="list-style-type: none">• MS-WORD• MS-POWERPOINT	(3 Labs)
II	Assignment 2nd	
	<ul style="list-style-type: none">• MS -ACCESS• MS -EXCELL Spread Sheet, Graphs, Database Management, Formulations	(3 Labs)
III	Assignment 3rd	
	<ul style="list-style-type: none">• INTERNET APPLICATIONS: Email, Search Engine, Download & Upload, Community Groups	(3 Labs)
IV	Assignment 4th	
	<ul style="list-style-type: none">• PDF Formats, JPG Formats, Photo Editor, Picture Formats	(2 Labs)
V	Assignment 5th	
	<ul style="list-style-type: none">• THREATS & SECURITIES Virus, Ethics, DOS, Formatting ,Trouble Shooting	(5 Labs)
		Total Labs Req: 16

Teaching Hrs.
L-0, T-0, P-02

Exam Hrs. : 3 Hrs.
Exam Marks: 50 {Internal (30) & University

CONTENTS OF SYLLABUS

S. No.	List of Experiments	Details of Coverage	Labs required: 17
1.	Graphical Symbols and Electrical components	Study of graphical symbols used to indicate Electrical components in single line diagrams. Functional study of various Electrical components viz. fuse, MCB, Relays, switches etc.	
2.	Earthing- study and types.	Study of the necessity of earthing, Advantages and types of earthing-plate earthing and pipe earthing.	
3.	Electrical Ceiling Fan	Study of parts of ceiling fan, Its working, connection and testing.	
4.	Types of House Wiring	Study of different types of house wiring, materials required casing, capping etc. Making the connection of house wiring including energy meter, MCB, ceiling fan, lamp and three pin socket. Staircase wiring- controlling a lamp from two different positions.	
5.	Electrical Iron	Study of electric iron, its parts and testing.	
6.	Fluorescent Tube Light	Study, working and circuit connection.	
7.	Introduction of various active and passive components.	Identification, testing and application of resistors, inductors, capacitors, PN-diode, Zener diode, LED, LCD, UJT, BJT, FET, SCR, Photo diode and Photo Transistor.	
8.	Electronic instruments.	Functional study of CRO, analog and digital multimeters and Function generator.	
9.	Electronic Hardware	Study of soldering-desoldering, bread board, printed circuit boards(PCBs) and to learn mounting of components on PCB.	
10.	Rectifier circuits	Study of single phase half-wave rectifier and full-wave rectifiers. Make the connections on bread board and observe the effect of filters on CRO.	

115 MECHANICAL WORKSHOP

Teaching Hrs.
L-0 T-0 P-2

Exam Hrs. – 3 Hrs.
Marks Sessional-30 Practical – 20 Total 50

S. No. List of Experiments

I Carpentry Shop

- To prepare a dovetail joint.

II Foundry Shop

- To prepare Mould of given pattern and casting in aluminum.

III Welding Shop

- Demonstration & practice in gas welding on mild steel flat.
- Demonstration & practice in arc welding on mild steel flat.
- To prepare a Lap-joint by arc welding.

IV Machine Shop

- To prepare a job on lathe machine involving various operations like facing, step turning, chamfering & knurling etc.
- To prepare a job on shaper involving angular cutting.

V Fitting Shop

- Demonstration for use of bench working tools.
- To prepare a job involving various fitting operations, like filling, sawing, drilling & tapping etc.

VI Sheet Metal Shop

- Demonstration & practice in Brazing on thin sheet.
- To prepare a funnel from a sheet metal & soldering the joint

116 PRACTICAL GEOMETRY

Teaching Hrs.
L-0 T-0 P-3

Exam Hrs. – 3 Hrs.
Marks Sessional-30 Practical – 20 Total 50

Unit	Details of Coverage	
I	<ul style="list-style-type: none">• Lines and Dimensioning.• Scales: Representative factor; Plain scales; Diagonal scales; Comparative scale; Scale of chords.	(2 Labs)
II	<ul style="list-style-type: none">• Conic Sections: Construction of ellipse, parabola and hyperbola by different methods; Normal and Tangents.• Special Curves: Roulettes; Cycloid; Epicycloid; Hypo-cycloid; Involute; Archimedean; Logarithmic spirals.	(4 Labs)
III	<ul style="list-style-type: none">• Projections: Types of projections; Orthographic projection; First angle and third angle projection.• Projections of points and lines: True inclinations; True length of straight lines; Traces of straight lines; Auxiliary planes.• Projections of planes and solids: Projections of planes; Projections of polyhedra and solids of revolution.	(4 Labs)
IV	<ul style="list-style-type: none">• Section of Solids: Section of right solids by normal and inclined planes.• Development of Surfaces: Parallel line and radial line method for right solids.	(2 Labs)
V	<ul style="list-style-type: none">• Isometric Projections: Isometric Scale; Isometric axes; Isometric projections of planes and solids.	(3 Labs)

Total Labs Required : 15

Reference Books:

1. Engineering Drawing by N.D.Bhatt, V.M.Panchal; Charotar Publishing House.
2. Engineering Graphics by P. S. Gill; K. Kataria & Sons
3. A text book of Engineering Drawing by R. K. Dhawan; S. Chand & Company Ltd.
4. Engineering Drawing & Auto Cad by T. Jeyapoovan; Vikas Publishing House

201 ENGLISH COMMUNICATION TECHNIQUES

Teaching Hrs.

Exam. Hrs. – 3 Hrs

L-3 T-1 P-0

Marks Theory Exam – 80 Term Test – 20 Total 100

CONTENTS OF SYLLABUS

Units	Topics	
I	Grammar <ul style="list-style-type: none"> • Adverbs • Prepositions • Verbs with preposition • Conjunctions & Connectors 	Lectures Req- 9
II	Grammar <ul style="list-style-type: none"> • Reported speech • Conditionals • Relative clauses 	Lectures Req- 9
III	<ul style="list-style-type: none"> • Word formation and vocabulary building • One word substitutes • Synonyms & Antonyms 	Lectures Req- 9
IV	<ul style="list-style-type: none"> • Idioms and phrases • Words commonly confused (mispronounced and mis-spelt) • Affixes. 	Lectures Req- 9
V	<ul style="list-style-type: none"> • Report writing • Précis writing 	Lectures Req- 6

Total Lectures Required- 42

Books for Reference

- High School English Grammar & Composition
P.C. Wren & Martin, S.Chand & Co., New Delhi
- Murphy's English Grammar, 3rd Edition
Raymond Murphy, Cambridge University Press
- An Intermediate English Practice Book
S. Pit Corder, Orient Long Man
- A Remedial English Grammar for foreign Students
F.T. Wood, Macmillan Publishers
- A University Grammar of English
Quirk & Green Baum, Orient Long Man
- A Practical English Grammar
Thomson & Martinet, Oxford University Press
- Written Communication in English
Sarah Freeman, Orient Longman

202 ENGINEERING MATHEMATICS-II

Teaching Hrs.
Hrs.
L-4 T-1 P-0
100

Exam Hrs. – 3

Marks Theory Exam.-80 Term test-20 Total

CONTENTS OF SYLLABUS

Units	Topics	
I	Coordinate Geometry of Three Dimensions	Equation of a sphere, Intersection of a sphere and a plane, tangent plane normal Lines, Right circular cone, Right circular cylinder Lectures Req : 10
II	Matrices :	Linear dependence of vectors Rank of a matrix, inverse of a matrix by elementary transformations, Solution of simultaneous linear equations, Eigen values and Eigen vectors, Cayley-Hamilton theorem (without proof), Diagonalization of matrix Lectures Req : 10
III	Vector Calculus :	Scalar and vector field, differentiation & integration of vector functions, Gradient, Divergence, Curl and Differential Operator, Line, Surface and volume integrals, Green's Theorem in a plane, Gauss' and Stoke's Theorem without proof) and their Applications Lectures Req : 12
VI	Dynamics:	Angular Motion, Radial and transverse Velocity and Accelerations, Rectilinear Motion Motion in Resisting Medium. Lectures Req : 10
V	Differential Equations :	Series Solutions of Second Order Linear Differential Equations with Variable Coefficients (Complementary Function only), Partial Differential Equations of First Order, Lagrange's Form, Standard Forms, Charpit's Method Lectures Req : 12

Total Lectures Req : 54

- Jain. R.K. and Iyengar, S.R.K., Advanced Engineering Mathematics, Narosa Publishing House, New Delhi.
- Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi.
- Bali, N.P., A Text Book on Engineering Mathematics, Luxmi Publications, New Delhi.
- Kreyszing, E., Advanced Engineering Mathematics, John Wiley.
- Mehta D.M, Sharma Engineering Mathematics I, Vardan Publisher.
- Ray Wylie, C., Advanced Engineering Mathematics. 6th ed., McGraw Hill.

203 PHYSICS-II

Teaching Hrs.
L-2 T-1 P-0

Exam Hrs.- 3 Hrs
Marks Theory Exam.-80 Term test-20 Total 100

CONTENTS OF SYLLABUS

Unit	Topics	Details of coverage	
1	LASER <ul style="list-style-type: none"> • Principle and production, • Einstein's coefficients, • Requisites of a Laser system, • Condition for Laser action, • Principle, construction and working of Ruby, He-Ne, & Semiconductor Laser 	<ul style="list-style-type: none"> • Stimulated and spontaneous emission and induced absorption. • Expression for energy density and ratio of Spontaneous to stimulated emission. • Active medium and pumping system and resonant cavity. • Explanation. • Explanation with suitable diagrams & Principle and working of any type of P-N junction semiconductor. Applications of Laser 	Lectures required: 06
2	Holography and Modern Physics <ul style="list-style-type: none"> • Holography • Photo-electric effect • Unability of wave theory of light to explain Photo-electric effect • Einstein's Photo-electric • Compton effect and quantum nature of light 	<ul style="list-style-type: none"> • Basic principles and its applications, Construction and Reconstruction (No derivation) • Introduction and experimental results • Explanation. • Explanation. • Brief introduction and derivation of Compton shift. 	Lectures required: 05
3	Polarization <ul style="list-style-type: none"> • Polarization, • Double refraction, • Quarter and Half wave plates, • Optical activity. 	<ul style="list-style-type: none"> • Representation of various lights, Polarization by reflection, Brewster's and Malus laws, • Huygen's theory, Polaroid's, • Production and analysis of plane elliptical and circularly polarized light. • Fresnel's theory of optical rotation, Specific rotation, Biquartz and Laurent half-shade polarimeters. 	Lectures required: 06
4	Fibre Optics and Nuclear detectors <ul style="list-style-type: none"> • Optical Fibres • Angle of acceptance • Numerical aperture • Applications of Optical fibre. • Nuclear detectors • Ionization chamber, Proportional Counter, G M Counter, Scintillation Counter 	<ul style="list-style-type: none"> • Introduction and basic theory. • Expression • Expression with diagram, No numericals. • Brief idea • Introduction • Construction, working and properties 	Lectures required: 06
5	Quantum Physics <ul style="list-style-type: none"> • Wave function • Schrödinger's Equation • Eigen values and eigen functions • Application of Schrödinger's Equation • Density of energy states, Fermi energy level 	<ul style="list-style-type: none"> • Complex wave function, Physical significance and normalization (explanation). • Setting up of 1D and 3D time dependent and independent equations. • Explanation. • Derivation of equation for particle trapped in one dimensional potential well of infinite height. • Explanation. 	Lectures required: 06

Total No. of Periods : **29**

Reference Books:

1. A. Ghatak, "Optics"
2. N. Subrahmanyam and Brij Lal, "Optics"
3. Jenkins and White, "Fundamentals of Optics"
4. R.L. Singhal "Solid State Physics"
5. D.S.Mathur "Mechanics"
7. K. Thyagarajan and A.K.Ghatak "LASERS"
6. R K Gaur and S L Gupta "Engg. Physics"
7. S.N Ghoshal "Atomic and Nuclear Physics Vol.1 & 2"

204 ENGINEERING CHEMISTRY -II

Teaching Hrs.

Exam. Hrs. – 3 Hrs

L-3 T-0 P-0

Marks Theory Exam – 80 Term Test – 20 Total 100

CONTENTS OF SYLLABUS

Units : Topics

- I Chemical Fuel (Part I):** **Lectures Req: 9**
Origin and classification of fuels
Solid fuels: Coal, Its origin and classification, Proximate and Ultimate analysis of coal, Significance of the constituents, Gross and Net calorific values, Determination of calorific value by Bomb Calorimeter (Related numerical problems), Soft and Metallurgical coke, Carbonization process, Manufacture of coke-Beehive Coke ovens and Byproduct Coke ovens.
Liquid Fuels: Merits and demerits, Petroleum and Refining of petroleum, Synthetic petrol, Refining and Reforming of gasoline, Cracking, Knocking, Octane number, Cetane number and their significance, Antiknocking agents.
- II Chemical Fuel (Part II):** **Lectures Req: 9**
Gaseous Fuels: Advantages, Manufacture, Composition and calorific value of coal gas and oil gas, CNG, LPG, Determination of calorific value by Juckner's calorimeter and related numerical problems, Flue gas analysis by Orsat apparatus.
Nuclear Fuels: Nuclear binding energy, Nuclear fission and Nuclear fusion, Elementary idea about reactor concepts, Nuclear power reactor and Breeder reactor.
- III Polymers:** **Lectures Req: 8**
Basic concepts and Terminology such as Functionality, Degree of polymerization, Different definitions of weight viz. Mw, Mn, Mv (numerical based on them), Thermoplastic, Thermosets Linear, Branched and Cross- linked polymers, Tacticity of polymers, Homo and Copolymers (classification based on repeat unit), Addition, Condensation and Ionic polymerization, Constituents of plastics and their uses, Preparation, Properties and uses of Polyethylene, PVC, Teflon, Bakelite, Terylene and Nylon, Natural rubber, Vulcanization, Synthetic rubber Viz. Buna-S, Buna-N, Butyl, Neoprene, Thiokol, Polyurethane and Silicones rubber.
- IV Lubricants:** **Lectures Req: 8**
Classification, Mechanism of lubrication (Thick film or Hydrodynamic lubrication, Thin film or Boundary lubrication and Extreme pressure lubrication), Properties and uses, Viscosity and Viscosity index, Flash point and Fire point, Cloud and Pour point, Emulsification.
New Engineering Materials:
Brief idea of following: Super conductor, Organic electronic materials, Fullerenes and Optical fibers.
- V Cement:** Manufacture of Portland cement, Vertical shaft kiln technology, Chemistry of setting and hardening **Lectures Req: 8**
Refractories: Definition, Properties, Classification, Properties of silica and fire clay refractories.
Glass: Preparation, Varieties and uses.

Total Lectures Req. 42

Reference Books :

1. Chemical Process Industries By R. Norris Shreve & Joseph A. Brink, Tata McGraw Hill Publishing Co. New Delhi
2. Shreve's Chemical Process Industries By George T. Austin. McGraw Hill Book Co.
3. Polymer Science and Technology By Joel R. Fried. Prentice Hall Publications.
4. Environmental Chemistry By Anil Kumar De, New Age International (P) Limited. New Delhi.
5. Industries Chemistry By B.K Sharma, Krishna Prakashan Mandir, Meerut.
6. Engineering Chemistry By P.C. Jain and Monica Jain. Dhanpat Rai Publishing Company (P) Ltd. New Delhi.
7. Engineering Chemistry By S.K. Jain and K.D. Gupta, Jaipur Publishing House, Jaipur
8. Chemistry in Engineering and Technology (Vol I & II) (Latest ed.), By J.C. Kuriacase and J. Rajaram.
9. Environmental Chemistry and Pollution Control (Latest ed.), By S.S. Dara.

205 FUNDAMENTALS OF ELECTRONICS ENGG.

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. – 3 Hrs.
Marks Theory Exam -80 Test – 20 Total 100

**CONTENTS OF SYLLABUS
Details of Coverage**

Unit	Topics	
I	<ul style="list-style-type: none"> • Resistors: • Capacitors: 	<p align="right">Lectures Required : 06</p> <p>Concepts of fixed & variable resistors, metal film resistors. Construction, power rating. Tolerance. colour code. Standard values. Wire wound resistors. Fixed & variable. Construction. Power rating & tolerance. different types.</p> <p>Construction of mica and ceramic capacitors (disc & tubular). Colour code. Electrolytic (Teflon) capacitors. Typical range of values and voltage ratings of different types of capacitors.</p>
II	<p>Semi Conductor Devices:</p> <ul style="list-style-type: none"> • Diode: • Rectifiers & Power supply: 	<p align="right">Lectures Required : 08</p> <p>PN junction diodes, typical doping concentration. Formation of barrier potential. Forward and reverse biasing. V-I characteristics. Dynamic & static resistance. Principle of working and V-I characteristics of Zener diode. Principle of Photo diode. Solar cell & LED</p> <p>Block diagram description of a dc power supply. Rectifying action of diodes. Circuit diagram & working of half-wave & full wave (including bridge) rectifier. Final equations of Vrms. Vde ripple factor & peak inverse voltage in each case. Principle of working of series inductor and shunt capacitor filters. Need of voltage regulator. Working of simple zener voltage regulator.</p>
III	<p>Semi Conductor Devices:</p> <ul style="list-style-type: none"> • Bipolar junction transistors: • Thyraster: 	<p align="right">Lectures Required: 08</p> <p>NPN & PNP transistors. Structure. Typical doping. Working of NPN transistor, concepts of common base, common emitter & common collector configurations. Current gain, input & output characteristics of all configuration concepts of Input & output resistances. Comparison of three configurations with reference to voltage & current gain. Input & output resistances. Operation. Construction & characteristics of 4 Layer Devices... (UJT,SCR, DIAC,TRAIAC & their application as voltage & current controller.</p>
IV	<p>Digital Electronics:</p> <ul style="list-style-type: none"> • Binary Systems: • Boolean Algebra: • Logic Gates: 	<p align="right">Lectures Required : 06</p> <p>Digital Computers and Digital Systems, Binary Numbers, Number Base Conversion. Octal and Hexadecimal Numbers. Complements. Binary Codes, Binary Logic Integrated Circuits</p> <p>Basic Definitions Axiomatic Definition of Boolean Algebra Basic Theorems and Properties of Boolean Algebra Boolean Function Digital Logic Gates Truth table and symbol of AND, OR,NOT,NAND,NOR and EXOR gates. Half and Full Address.</p>
V	<p>Communication System</p> <ul style="list-style-type: none"> • Type of Signals: • Communication Systems: • Modulation: • Amplitude Modulation: • Frequency and Phase Modulation: • Bandwidth Requirements: • Television: • Elementary concept of : 	<p align="right">Lecture Required: 08</p> <p>Analog and Digital Signals.</p> <p>Information, Transmitter, Channel, Noise & Receiver. General Concept of modulation, Need for modulation. Defination. Modulation Index. Frequency spectrum of the AM wave. Representation of AM wave. Power content in AM wave. Concept of Angle modulation Defination of FM & PM. Frequency deviation. Mathematical representation of FM.</p> <p>Sinewave and Fourier series review. Frequency spectra of non-sinusoidal waves. Like AM, FM and their bandwidth requirements</p> <p>Introduction to television. Block diagram. Television systems and standards. Block Diagram, Approach only with explanation of each block of Superheterodyne Receiver. Optical Fiber Communication System, Satellite Communications and Mobile Communications.</p>

Total Lectures Required : 36

206 FUNDAMENTALS OF MECHANICAL ENGINEERING

Teaching Hrs.
L-2 T-0 P-0

Exam Hrs. – 3 Hrs.
Marks Theory-80 Term Test – 20 Total 100

Unit	Topics	CONTENTS OF SYLLABUS Details of Coverage
I	<ul style="list-style-type: none">• Basic Concepts• Working Fluids	<p>Thermodynamic systems; Properties; Work and heat; Zeroth Law of thermodynamics.</p> <p>Ideal Gas Laws; Calculation of properties of ideal gases for various thermodynamic cyclic and non-cyclic processes.</p>
II	<ul style="list-style-type: none">• First Law of Thermodynamics• Second Law of Thermodynamics	<p>First Law of thermodynamics; Non-flow and flow energy equations; Numerical problems based on ideal gases.</p> <p>Statements of Second Law of Thermodynamics; Reversible process; Entropy; Carnot cycle (Descriptive Only).</p>
III	<ul style="list-style-type: none">• Internal Combustion Engines	<p>Otto and Diesel cycle; Air standard efficiency. (Descriptive Only).</p> <p>Classification; Two and four stroke engines; Construction and working of petrol and diesel engines; Comparison of petrol and diesel engines; Comparison of 4 - stroke and 2 - stroke engines; Principle and working of simple carburetor.</p>
IV	<ul style="list-style-type: none">• Properties of Steam• Steam Power Plants	<p>Generation of steam; Quality and properties of steam; Use of steam table; Mollier chart and T-s diagram for steam properties and various.</p> <p>Classification of steam generators; Construction and working of Babcock and Wilcox boiler and Cochran boiler.</p>
V	Refrigeration and Air-conditioning Gas Compressors	<p>Elementary concepts of refrigeration and air-conditioning; Vapour compression cycle; Working, principle and schematic diagrams of refrigerators, window air conditioners and ice plants.</p> <p>Classification; Working of reciprocating compressor, rotary compressor, centrifugal compressor and axial flow compressor; Comparison; Applications.</p>

Reference Books:

1. Engineering Thermodynamics by P.K. Nag; Tata McGraw-Hill Publishing Co. Ltd.
2. Thermal Engineering Vol-I and Vol-II by M.L. Mathur and F.S. Mehta; Jain Brothers
3. Applied Thermodynamics by Onkar Singh; New Age International Publishers.
4. Thermal Science and Engineering by D.S. Kumar; S.K. Katariya & Sons.

207 FUNDAMENTALS OF COMPUTER PROGRAMMING

Teaching Hrs.
L-3 T-0 P-0

Exam Hrs. – 3 Hrs.
Marks Theory Exam.-80 Term Test – 20 Total 100

OBJECTIVE: To learn theoretical aspects of programming language.

CONTENTS OF SYLLABUS		
Units	Topics	Contents
I	Number systems	Lectures Req: 08
		<ul style="list-style-type: none"> • Binary, Octal, Decimal & Hexadecimal representation of nos. • Integers & Floating point numbers • Representation of characters, ASCII & EBCDIC codes. • Binary arithmetic : Addition, Subtraction, Compliments
II	Classification of Computer Languages	Lectures Req: 03
		<ul style="list-style-type: none"> • Introduction & Examples of Machine, Assembly and High Level Languages • Introduction & Types of Operating System • Assembler, Compiler and Interpreter
III	Programming in ‘C’-- I	Lectures Req: 08
		<ul style="list-style-type: none"> • Need of Programming Languages, Defining Problems • Flowcharts and Algorithm Development • Data Types, Constants, Variables, Operators and Expressions • Input and Output Statements, Conditional and Control Statements, Arrays
IV	Programming in ‘C’-- II	Lectures Req: 08
		<ul style="list-style-type: none"> • Structures and Unions • Pointers •
V	Programming in ‘C’-- III	Lectures Req: 03
		<ul style="list-style-type: none"> • File Handling • Macro
		Total Lectures Req: 30

211 ENGLISH LANGUAGE LAB

Teaching Hrs.

Exam. Hrs. – 3 Hrs

L-0 T-0 P-2

Marks Sessional – 20 Practical – 30 Total 50

CONTENTS

- Phonetic symbols & Transcription
- Communication & Aspects of Communication
- Presentations (seminar)
- Extempore Speaking
- Group discussions
- Interview Preparations
- Viva- Voce

212 PHYSICS LAB-II

Teaching Hrs.
L-0 T-0 P-2

Exam Hrs.- 3 Hrs
Marks Sessional -30 Practical-20 Total 50

S. No. List of Experiments

OPTICS

- I. To determine the wave length of monochromatic light with the help of Fresnel's Biprism.
- II. To determine the wavelength of prominent lines of mercury by plane diffraction grating with the Help of a spectrometer.
- III. To determine the height of water tank with the help of a sextant.
- IV. To determine the transmission coefficient of transparent glass plate by Lummer-Brodhum photometer.

ELECTRONICS / ELECTRICAL

- V. To convert a galvanometer into a Voltmeter of range 1.5 Volts and calibrate it.
- VI. To determine the specific resistance of the material of a wire by Carey-Foster's bridge.
- VII. To study the variation of thermo emf of Iron-Copper thermo couple with temperature.
- VIII. To study the charge & discharge of a condenser and hence determine time constant.
- IX. To study the variation of magnetic field along the axis of a current carrying coil & to estimate the radius of the coil.

213 ENGINEERING CHEMISTRY LAB

Teaching Hrs.

Exam. Hrs. – 3 Hrs

L-0 T-0 P-2

Marks Sessional – 30 Practical – 20 Total - 50

S. No. List of Experiments

- I. Determination of Copper Sulphate Iodometrically
- II. Determination of Potassium Dichromate Iodometrically.
- III. Determine Potassium Dichromate by titrating it against Ferrous Ammonium Sulphate (using external and internal indicator).
- IV. Determination of Ferrous Ammonium Sulphate.
- V. Estimation of Copper in Brass.
- VI. Estimation of Iron in Plain Carbon Steel
- VII. Determination of Viscosity of lubricating oil by Redwood Viscometer.
- VIII. Determination of Flash and Fire Point of lubricating oil by Pensky-Marten apparatus.
- IX. Determination of Cloud and Pour Point of lubricating oil.
- X. To study kinetics of Acetone Iodine reaction.
- XI. To study Hydrolysis of Ester.
- XII. Determination of Calorific Value of a solid fuel by Bomb Calorimeter.
- XIII. Determination of Proximate analysis of Coal.
- XIV. Determination of percentage of CO, CO₂ and O₂ in given sample by Orsat Gas apparatus.
- XV. Preparation of Phenol Formaldehyde and Urea Formaldehyde resin.

Reference Books:

1. A text book on experiment and calculation in engineering chemistry By S.S. Dara.
2. Laboratory manual on engineering chemistry By S.K. Bhasin and Sudha Rani.
3. Vogel Text book of Quantitative Chemical Analysis By G.H. Jeffery, J. Bassett, J. Mendham & R.C. Denney
4. Instrumental methods of Chemical Analysis By B.K. Sharma.
5. Practical Engineering Chemistry By Sanjay Sharma.
6. Environmental Engineering laboratory manual By Vivek Pandey and Sama Jain.

214 FUNDAMENTALS OF COMPUTER PROGRAMMING

Teaching Hrs.
L-0 T-0 P-2

Exam Hrs. – 3 Hrs.
Marks Sessional - 30 Practical – 20 Total 50

OBJECTIVE: Inculcating the programming habits in practical.

S. No	List Of Experiments	
I	Assignment 1st <ul style="list-style-type: none">• Simple input output program integer, real, character and string (Formatted & Unformatted)	(3 Labs)
II	Assignment 2nd <ul style="list-style-type: none">• Condition statement programs (if, if-else-if, switch-case)	(2 Labs)
III	Assignment 3rd <ul style="list-style-type: none">• Looping program (for, while, do-while)	(2 Labs)
IV	Assignment 4th <ul style="list-style-type: none">• Program based on array (one, two, three dimensions)	(2 Labs)
V	Assignment 5th <ul style="list-style-type: none">• Program using Structure and Union	(2 Labs)
VI	Assignment 6th <ul style="list-style-type: none">• Program using Functions(with or without recursion)	(2 Labs)
VII	Assignment 7th <ul style="list-style-type: none">• Program using Pointers(with Functions)	(3 Labs)
VIII	Assignment 8th <ul style="list-style-type: none">• Program using File Handling.	(2 Labs)
		Total Labs Req: 18

215 MECHANICAL ENGINEERING LAB

Teaching Hrs.
L-0 T-0 P-2

Exam Hrs. – 3 Hrs.
Marks Sessional-30 Practical – 20 Total 50

S. No.	List of Experiments
I	Study of 2-stroke Petrol Engine.
II	Study of 2-stroke Diesel Engine.
III	Study of 4-stroke Petrol Engine.
IV	Study of 4-stroke Diesel Engine.
V	Study of various types of Low Pressure Steam Generators.
VI	Study a Window type Air Conditioner
VII	Study a vapour absorption type Refrigerator.
VIII	Study of Reciprocating Compressor.
IX	To establish the relation between saturation temperature and pressure for steam and to compare the results with standard values.
X	To study various mechanical drives (Belt, Chain and Gear).
XI	To study various Shaft Couplings.

Teaching Hrs.
L-0 T-0 P-3

Exam Hrs. – 3 Hrs.
Marks Sessional-30 Practical – 20 Total 50

CONTENTS OF SYLLABUS
Details of Coverage

S. No.

- I
 - Introduction to machine drawing.
 - Orthographic projections: First and third angle methods; Free hand sketching.
 - Dimensioning: Locations and placing.
- II
 - Orthographic Projections (Sheet).
 - Sectional Views (Sheet).
- III
 - Riveted joints; Screw fasteners; Different types of threads, thread profiles, nuts and bolts; Locking devices; Set screws; Foundation bolts (Sheet).
- IV
 - Bearing: foot step bearing (Sheet).
- V
 - Introduction to Auto CAD.

List of free hand sketches

- Different type of lines.
- Conventional representation of materials.
- Riveted joints; Lap joints; Butt joints; Chain riveting; Zig-zag riveting.
- Conventional representation of threads (without section and with section).
- Coupling: Flange and pin type flexible coupling.
- Welded joints.
- Pulleys.

Total Labs Required: 14

Reference Books:

1. Machine Drawing by N.D.Bhatt; Charotar Publishing House.
2. Machine Drawing by P. S. Gill; K. Kataria & Sons
3. A text book of Machine Drawing by Lakshminarayanan Mathur; S. Chand & Company Ltd.
4. Machine drawing by K.R. Gopal Krishna; Subhas Publications.