VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE

[Autonomous Institute affiliated to University of Mumbai]

SYLLABUS

FOR

F.Y. B.TECH.

VEERMATA JIJABAI TECHNOLOGICAL INSTITUTE,

[V.J.T.I.]

MATUNGA, MUMBAI 400 019.

[YEAR 2009-2010]

Scheme of Teaching and Evaluation
F Y B Tech (Semester I)
*(**Group I**: Computer Engineering, Information Technology, Electrical Engineering, Textile Technology)*

Theory Courses

Course Code	Course Name	Hr/Week			Credits	Examination Scheme (Evaluation in % Weightage)				
		L	T	P		TA	IST	ESE	Total	ESE (W) (hrs)
CH0001	Applied Chemistry - I	3	-	-	3	10	30	60	100	3
PH0001	Applied Physics - I	3	-	-	3	10	30	60	100	3
MA0001	Applied Mathematics - I	4	1	-	5	10	30	60	100	3
EE0001	Basic Electrical & Electronics Engineering	3	1	-	4	10	30	60	100	3
CO0001	Computer Programming	2	1	-	3	10	30	60	100	3
	Total	15	3	-	18					

Laboratory Courses

Course Code	Course Name	Hr/Week			Credits	Examination Scheme (Evaluation in % Weightage)				
		L	T	P		TA	ESE (O)	ESE (P)	Total	ESE (P) (hrs)
AS1001	Applied Science - I	-	-	3	1.5	50	50		100	-
EE1001	Basic Electrical & Electronics Engineering	-	-	3	1.5	50	50		100	-
CO1001	Computer Programming	-	-	3	1.5	50	50		100	-
ME1002	Workshop	-	-	3	1.5	50	50		100	-
	Total	-	-	12	6					

Co-curricular Activities

Course Code	Course Name	Hr/Week			Credits					
		L	T	P						
CC4011	Industry-Academia Interaction	-	-	2	A/NA					
CC4012	E-Library/ Internet	-	-	3	-					
	Total	-	-	5	-					

Total for Semester	L	T	P	Total Hours	Credits
	15	3	17	35	24

Abbreviations:
L: Lectures, **T**: Tutorial, **P**: Practical, **TA**: Teacher Assessment, **ESE (P)**: End Semester Practical Examination, **ESE (O)**: End Semester Oral Examination, **IST**: In Semester Test/s, **ESE (W)**: End Semester Written Examination, **ESE (W) (hrs)**: End Semester Written Examination duration, **ESE (O) (hrs)**: End Semester Examination Practical (duration), **A/NA**: Attended/Not Attended

Notes:
TA for Theory and Laboratory courses shall carry 25 marks.
IST: One mid semester test (20 marks of one hour duration) and two surprise Tests/Quizzes (5 marks each). ESE (W) shall be of 100 marks of 3 hours, ESE (P) and ESE (O) shall be decided as per course requirement. ESE (O) and ESE (P) shall together carry 25 marks.

Industry - Academia Interaction: Wednesday afternoon slot will be used. Module or broad subject outline (theme) will be decided by the course coordinator. Lectures as per module in the defined areas of eminent personalities from industry or academia will be arranged. Assessment will be done on the basis of attendance of the students for the modules. (More than 75%: Attended, otherwise: Not Attended.)
E- Library/ Internet: Every course must have at least one assignment or case-study which requires exhaustive internet search/support.

Scheme of Teaching and Evaluation
F Y B Tech (Semester II)
*(**Group I**: Computer Engineering, Information Technology, Electrical Engineering, Textile Technology)*

Theory Courses

Course Code	Course Name	L	T	P	Credits	TA	IST	ESE	Total	ESE (W) (hrs)
CH0002	Applied Chemistry - II	3	-	-	3	10	30	60	100	3
PH0002	Applied Physics - II	3	-	-	3	10	30	60	100	3
MA0002	Applied Mathematics - II	4	1	-	5	10	30	60	100	3
SE0001	Applied Mechanics	3	1	-	4	10	30	60	100	3
ME0001	Engineering Graphics	2	1	-	3	10	30	60	100	3
	Total	15	3	-	18					

The Hr/Week columns are L, T, P. Examination Scheme (Evaluation in % Weightage): TA, IST, ESE, Total, ESE (W) (hrs).

Laboratory Courses

Course Code	Course Name	L	T	P	Credits	TA	ESE (O)	ESE (P)	Total	ESE (P) (hrs)
AS1002	Applied Science - II	-	-	3	1.5	50	50		100	-
SE1001	Applied Mechanics	-	-	3	1.5	50	50		100	-
ME1001	Engineering Graphics	-	-	3	1.5	50	50		100	-
ME1002	Workshop	-	-	3	1.5	50	50		100	-
	Total	-	-	12	6					

The Hr/Week columns are L, T, P. Examination Scheme (Evaluation in % Weightage): TA, ESE (O), ESE (P), Total, ESE (P) (hrs).

Co-curricular Activities

Course Code	Course Name	L	T	P	Credits					
CC4021	Industry-Academia Interaction	-	-	2	A/NA					
CC4022	E-Library/ Internet	-	-	3	-					
	Total	-	-	5	-					

Total for Semester	L	T	P	Total Hours	Credits
	15	3	17	35	24

Abbreviations:
L: Lectures, **T**: Tutorial, **P**: Practical, **TA**: Teacher Assessment, **ESE (P)**: End Semester Practical Examination, **ESE (O)**: End Semester Oral Examination, **IST**: In Semester Test/s, **ESE (W)**: End Semester Written Examination, **ESE (W) (hrs)**: End Semester Written Examination duration, **ESE (O) (hrs)**: End Semester Examination Practical (duration), **A/NA**: Attended/Not Attended

Notes:
TA for Theory and Laboratory courses shall carry 25 marks.
IST: One mid semester test (20 marks of one hour duration) and two surprise Tests/Quizzes (5 marks each). ESE (W) shall be of 100 marks of 3 hours, ESE (P) and ESE (O) shall be decided as per course requirement. ESE (O) and ESE (P) shall together carry 25 marks.

Industry - Academia Interaction: Wednesday afternoon slot will be used. Module or broad subject outline will be decided by the course coordinator. Lectures as per module in the defined areas of eminent personalities from industry or academia will be arranged. Assessment will be done on the attendance of the students for the module. (More than 75%: Attended, otherwise: Not Attended.
E- Library/ Internet: Every course must have at least one assignment or case-study which require exhaustive internet search/support.

Scheme of Teaching and Evaluation
F Y B Tech (Semester I)
*(**Group II**: Civil Engineering, Mechanical Engineering, Electronics Engineering, Production Engineering)*

Theory Courses

Course Code	Course Name	Hr/Week			Credits	Examination Scheme (Evaluation in % Weightage)				
		L	T	P		TA	IST	ESE	Total	ESE (W) (hrs)
CH0001	Applied Chemistry - I	3	-	-	3	10	30	60	100	3
PH0001	Applied Physics - I	3	-	-	3	10	30	60	100	3
MA0001	Applied Mathematics - I	4	1	-	5	10	30	60	100	3
SE0001	Applied Mechanics	3	1	-	4	10	30	60	100	3
ME0001	Engineering Graphics	2	1	-	3	10	30	60	100	3
	Total	15	3	-	18					

Laboratory Courses

Course Code	Course Name	Hr/Week			Credits	Examination Scheme (Evaluation in % Weightage)				
		L	T	P		TA	ESE (O)	ESE (P)	Total	ESE (P) (hrs)
AS1001	Applied Science - I	-	-	3	1.5	50	50		100	-
SE1001	Applied Mechanics	-	-	3	1.5	50	50		100	-
ME1001	Engineering Graphics	-	-	3	1.5	50	50		100	-
ME1002	Workshop	-	-	3	1.5	50	50		100	-
	Total	-	-	12	6					

Co-curricular Activities

Course Code	Course Name	Hr/Week			Credits					
		L	T	P						
CC4011	Industry-Academia Interaction	-	-	2	A/NA					
CC4012	E-Library/ Internet	-	-	3	-					
	Total	-	-	5	-					

Total for Semester	L	T	P	Total Hours	Credits
	15	3	17	35	24

Abbreviations:
L: Lectures, **T**: Tutorial, **P**: Practical, **TA**: Teacher Assessment, **ESE (P)**: End Semester Practical Examination, **ESE (O)**: End Semester Oral Examination, **IST**: In Semester Test/s, **ESE (W)**: End Semester Written Examination, **ESE (W) (hrs)**: End Semester Written Examination duration, **ESE (O) (hrs)**: End Semester Examination Practical (duration), **A/NA**: Attended/Not Attended

Notes:
TA for Theory and Laboratory courses shall carry 25 marks.
IST: One mid semester test (20 marks of one hour duration) and two surprise Tests/Quizzes (5 marks each). ESE (W) shall be of 100 marks of 3 hours, ESE (P) and ESE (O) shall be decided as per course requirement. ESE (O) and ESE (P) shall together carry 25 marks.

Industry - Academia Interaction: Wednesday afternoon slot will be used. Module or broad subject outline will be decided by the course coordinator. Lectures as per module in the defined areas of eminent personalities from industry or academia will be arranged. Assessment will be done on the attendance of the students for the module. (More than 75%: Attended, otherwise: Not Attended.

E- Library/ Internet: Every course must have at least one assignment or case-study which require exhaustive internet search/support.

Scheme of Teaching and Evaluation
F Y B Tech (Semester II)
*(**Group II**: Civil Engineering, Mechanical Engineering, Electronics Engineering, Production Engineering)*

Theory Courses										
Course Code	Course Name	Hr/Week			Credits	Examination Scheme (Evaluation in % Weightage)				
		L	T	P		TA	IST	ESE	Total	ESE (W) (hrs)
CH0002	Applied Chemistry - II	3	-	-	3	10	30	60	100	3
PH0002	Applied Physics - II	3	-	-	3	10	30	60	100	3
MA0002	Applied Mathematics - II	4	1	-	5	10	30	60	100	3
EE0001	Basic Electrical & Electronics Engineering	3	1	-	4	10	30	60	100	3
CO0001	Computer Programming	2	1	-	3	10	30	60	100	3
	Total	15	3	-	18					

Laboratory Courses										
Course Code	Course Name	Hr/Week			Credits	Examination Scheme (Evaluation in % Weightage)				
		L	T	P		TA	ESE (O)	ESE (P)	Total	ESE (P) (hrs)
AS1001	Applied Science-I	-	-	3	1.5	50	50		100	-
EE1001	Basic Electrical & Electronics Engineering	-	-	3	1.5	50	50		100	-
CO1001	Computer Programming	-	-	3	1.5	50	50		100	-
ME1002	Workshop	-	-	3	1.5	50	50		100	-
	Total	-	-	12	6					

Co-curricular Activities										
Course Code	Course Name	Hr/Week			Credits					
		L	T	P						
CC4021	Industry-Academia Interaction	-	-	2	A/NA					
CC4022	E-Library/ Internet	-	-	3	-					
	Total	-	-	5	-					

Total for Semester	L	T	P	Total Hours	Credits
	15	3	17	35	24

Abbreviations:
L: Lectures, **T**: Tutorial, **P**: Practical, **TA**: Teacher Assessment, **ESE (P)**: End Semester Practical Examination, **ESE (O)**: End Semester Oral Examination, **IST**: In Semester Test/s, **ESE (W)**: End Semester Written Examination, **ESE (W) (hrs)**: End Semester Written Examination duration, **ESE (O) (hrs)**: End Semester Examination Practical (duration), **A/NA**: Attended/Not Attended

Notes:
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Industry - Academia Interaction: Wednesday afternoon slot will be used. Module or broad subject outline will be decided by the course coordinator. Lectures as per module in the defined areas of eminent personalities from industry or academia will be arranged. Assessment will be done on the attendance of the students for the module. (More than 75%: Attended, otherwise: Not Attended.

E- Library/ Internet: Every course must have at least one assignment or case-study which require exhaustive internet search/support.

Programme Name	:	F.Y. B. Tech.		SEMESTER – I
Course Code	:	CH0001		
Course Title	:	Applied Chemistry - I		

Teaching Scheme			Examination Scheme						
L	T	P	ESE [W] Hrs	MST Hrs	ESE [W]	TA	MST	ISTs [2]	Credits
03	-	-	03	01	100	25	20	5 + 5	03

Course Contents:-

1. Water

Types of hardness, Units, Determination of hardness by EDTA method, Alkalinity of water and its significance, Numerical problems. Softening methods and Numerical problems based on these methods, Reverse Osmosis, Desalination. Problems with Boiler feed water and its treatments, Specifications for drinking water (BIS and WHO standards), Chlorination of Water.

2. Polymers & Composites

Polymers: Basics of Polymer Chemistry, Molecular weight, Molecular shape, Crystallinity, Glass transition temperature and melting point, Visco-elasticity, Structure-property relationship. Methods of polymerization, Thermoplastics and Thermo-sets, Copolymerization, Elastomers-Structure, Applications, Vulcanization. Advanced polymeric materials: Conducting polymers, Liquid crystal properties.
Fabrication of polymers: Compression molding, Injection molding, Extrusion molding. Synthesis, Properties and Uses of PE, PVC, PMMA, Formaldehyde resins.

Composites: Basics of composites, Composition and Characteristic properties of composites. Types of Composites: Particle, Fibre, Reinforced, Structural, Their applications.

3. Surfactants And Lubricants

Surface active agents, Methods of preparation of soap, Cleaning mechanism, Types and advantages of detergents.

Lubricants: Types of lubricants and Mechanism of lubrication, Physical and Chemical properties of lubricants, Additives of lubricants, Selection of lubricants

4. Biotechnology

Significance and application of Biotechnology, Bio-reactors, Biotechnological processes; Fermentation, Production of Alcohol, Production of Vitamins. Industrial enzymes, Bio-fuels, Biosensors, Bio-fertilizers, Bio-surfactants, Applications of Biochips.

5. Green Chemistry

Introduction, Significance and latest research in this field, Various Industrial applications of green chemistry.

6. Instrumental Techniques

Fundamentals of Spectroscopy, Principles and applications of UV-visible, IR Spectroscopy, Atomic absorption spectroscopy, Flame photometry, Principles and applications of chromatographic techniques including Gas, Column, HPLC.

Text Books:-

1.   A Text Book of Engineering Chemistry   -   Shashi Chawla, Dhanpat Rai & Co. (PVT.) LTD., New Delhi (2004).

Reference Books

1.   Engineering Chemistry   -   S.S.Dara, Chand & Co, New Delhi (2006)

2.   Engineering Chemistry   -   Jain and Jain, Dhanpat Rai & Co , (PVT.) LTD, New Delhi (2006).

Programme Name	:	F.Y. B. Tech.		SEMESTER – I
Course Code	:	PH0001		
Course Title	:	Applied Physics-I		

Teaching Scheme			Examination Scheme						
L	T	P	ESE [W] Hrs	MST Hrs	ESE [W]	TA	MST	ISTs [2]	Credits
03	-	-	03	01	100	25	20	5 + 5	03

Course Contents:-

1. Solid State Physics

I. **Crystal Structure** Classification of solids, Classification of crystals- Ionic crystals, Covalent crystals, Metallic crystals, Inert gas crystals, Hydrogen bonded crystals. Cohesive energy of ionic crystals, space lattice, atomic basis, unit cell, Bravais lattices, Crystal systems- Simple cubic, BCC and FCC and HCP. Diatomic crystals-$CsCl_2$, NaCl, Diamond, ZnS, Barium Titanates, crystallographic planes, Miller Indices and Direction, Interplanar Distance in a cubic crystal, Ligancy 3-12,

II. **Crystal Diffraction:** Braggs law of x-ray diffraction, investigation of crystal structure by Braggs law, Laue's method, Powder method, Rotating cylinder method

2. Semiconductor Physics

I. **The Band theory of solids:** Conductivity, Drift Velocity, Electrical Conduction, Influence of External factors on Conductivity, Energy level splitting, Energy Bands, Energy Gap, Classification of Solids, Energy Band structure of some typical solids, Electron Distribution function, Fermi-Dirac distribution function, Energy band structure of a Conductor, Insulator and Semiconductor.

II. **Semiconductors:** Mechanism of conduction in intrinsic semiconductors, Concentration of charge carriers in intrinsic and extrinsic semiconductors, Drift velocity, mobility and conduction of semiconductors, Hall effect,

3. Modern physics and Wave mechanics

Modern physics: Wave properties of Particles, Wave particle duality, De Broglie Waves, De broglie hypothesis, Davison and Germer experiment, GP Thomson experiment. Inadequacy of classical physics in explaining (I) Black body radiation, Ultraviolet catastrophy, Planks radiation law, (II) Einstiens photoelectric effect, (III) Compton's effect.

4, Dielectric properties of the materials

Introduction, Dielectric Constants, Induced and permanent Dipoles, Non polar and polar dielectrics, Polarization, Types of polarization, Electronic, ionic and orientation polarization, Total polarization, Internal fields in solids, Clausius Mossotti equation, Dielectrics in alternating fields, Frequency dependence of the Dielectric constant, Dielectric loss, Dielectric strength, Ferroelectrics and Piezoelectrics, and their application (Insulating materials, Dielectric medium, piezoelectric materials, Dielectric heating).

5, Magnetic Properties of the materials and Superconductivity

I. **Magnetic Properties:** Permeability & susceptibility, magnetization, Classification of magnetic materials, Magnetostriction, Ferrimagnetism, Antiferromagnetism, Soft and hard magnetic materials, Applications and Materials, magnetic domains and hystresis loop, magnetic materials for application in Transfarmer, Parmanent magnets and motors.

II. **Superconductivity:** General properties of superconductor, Meissnes effect, penetration depth, Type I and II superconductors, Flux quantization, BCS theory, Application of Superconductors

Text Books:-

1. Applied Physics - P.K.Mittal, I. K. International publications, New Delhi.(2006)

2. A textbook of Engineering physics - Avadhanulu & Kshirsagar, S.Chand & Co. New Delhi, (2008)

Reference Books:-

1. Material Science and Engineering V.Raghavan, Prentice Hall of India,New Delhi. (1996)

2. Solid State Physics C. Kittel, New Delhi, (2006)

Programme Name	:	F.Y. B. Tech.		SEMESTER – I
Course Code	:	MA0001		
Course Title	:	Applied Mathematics-I		

Teaching Scheme			Examination Scheme						
L	T	P	ESE [W] Hrs	MST Hrs	ESE [W]	TA	MST	ISTs [2]	Credits
04	01	-	03	01	100	25	20	5 + 5	05

Course Contents:-

1. Module: Complex Numbers

1.1.1 Complex numbers as ordered pairs, Argand;s diagram, Cartesian, Polar and exponential form of Complex numbers

1.1.2 De'moivre's Theorem and it's application to determine powers of complex numbers, Roots of complex numbers and solution of Equations. Expansion of $\cos n\Theta$, $\sin n\Theta$, in terms of powers of $\sin\Theta$ and $\cos\Theta$. Expansion of $\cos^n\Theta$ and $\sin^n\Theta$ in terms of sines and cosines of multiple of Θ.

1.1.3 Hyperbolic and Inverse hyperbolic functions with properties in detail. Relation between circular and Hyperbolic function. Separation of real and imaginary parts of f(z)

1.1.4 Logarithm of a complex number

2. Module: Differential Calculus

1.2.1 Successive differentiation .n^{th} derivative of Standard functions. Use of De'Moivre's theorem.
Lebnitz's rule. Relation between Y_n, Y_{n+1}, and Y_{n+2}, n th derivative at x = 0

1.2.2 Review of continuity and differentiability of a function. Rolle's, Lagrange's and Cauchy's Mean value Theorems with Geometric interpretations.

1.2.3 Infinite series. Tests for its convergence and divergence

1.2.4 Power series expansions of functions. Taylor's and Maclaurian's series, Different methods of expansion with applications

1.2.5 Indeterminate forms . L'Hospital's rule. limit of the indeterminate forms

$$\frac{0}{0} , \frac{\infty}{\infty} \quad 0.\infty, \ \infty\text{-}\infty, \ 1^\infty, \ \infty^0, \ 0^0$$

3. Module: Partial Differentiation

1.3.1 Functions of two or more variables, Limit, Continuity of function of two variable Partial derivatives of first and higher orders. Partial derivatives of Composite and Implicit functions,

1.3.2 Euler's theorem on homogeneous functions with two and three independent variables, related deductions.

1.3.3 Application of partial derivatives: Error and approximations

4. Module: Vector Algebra & Calculus

1.4.1 Vector product of three and four vectors, and its applications

1.4.2 Parameterization of curves and surfaces, Curvature and, Asymptotes Vector functions of one variable with derivatives

1.4.3 Three dimensional Geometry ,Planes, Spheres, Cones and cylinders, Identification of conicoids

Text Books:-

1 Applied Mathematics –I - C V Kumbhojkar, Jamanadas and Co- 2009-5th Edition.

2 Higher Engineering Mathematics - Dr B.S Grewal, Khanna Publication-39th Edition 2005

Reference Books:-

1 Higher Engineering Mathematics - B V Ramana, Tata Mc Grawhill Pub Co. Ltd 2007 1st Edition.

2 Advanced Engineering Mathematics - Erwin Kreyzig

3 Applied Mathematics –I - Dr. U. B. Jungam, K.P Patil & N. Kumtekar- Nandu Publication [1998]

4 A Text book of Applied Mathematics - P. N Wartikar & J. N Wartikar- 1997 2nd Edition

5 Calculus and Analytic Geometry - G. B Thomas & R.L. Finney, Narosa Publishing House N.Delhi- 6th Edition.

Programme Name	:	F.Y. B. Tech.		SEM – I / II
Course Code	:	EE0001		
Course Title	:	Basic Electrical & Electronics Engineering		

Teaching Scheme			Examination Scheme						
L	T	P	ESE [W] Hrs	MST Hrs	ESE [W]	TA	MST	ISTs [2]	Credits
03	01	-	03	01	100	25	20	5 + 5	04

Course Contents:-

1. Introduction

Effect of temperature on resistance, Resistance temperature coefficient, Work, Power energy and relationship between Thermal, mechanical and electrical units.(problems based on above topics)

2, D.C. Networks

Star-delta transformation, series-parallel combination of network, Kirchoff's law, Loop and nodal analysis, Superposition Theorem, Thevenin's & Norton's theorem, maximum power transfer theorem.

3. Magnetic Circuits

BH Curve, expression for eddy current loss, series-parallel magnetic circuits, Inductance, self inductance, mutual inductance and emf induced due to self and mutual inductance, coefficient of coupling energy stores.

4. A.C. Circuits

Sinusoidal voltage and current waveforms, RMS and average value, R-L, R-C, RLC series parallel circuits, phaser diagram, power and power factor, series and parallel resonance.

5. Three Phase Balanced System

Three phase voltage generators and waveform star and delta balanced systems. Relationship between phase and line quantities, phaser diagram, power in a three phase circuit

6. Generation of Electricity

Basic concepts about thermal, hydro and nuclear power stations

7. Single phase transformer

Construction, principle of operation, emf equation

8. Three phase induction motor

Construction, principle of operation

Text Books:-
1. Text Book of Electrical Technology, by B.L. Theraja, 2005 by Chand (S.) & Co Ltd ,India

Reference Books:-
1 Basic Electronics Solid State, by B.L. Theraja, 2007 by Chand (S.) & Co Ltd ,India (first published 2007)
2 Principle of Electrical Engineering by A. Vincent Deltoro, PHI
3 Principles in Electrical Engineering by S. Parker Smith, Oxford university

Programme Name	:	F.Y. B. Tech.		SEM – I / II
Course Code	:	ME0001		
Course Title	:	Engineering Graphics		

Teaching Scheme			Examination Scheme						
L	T	P	ESE [W] Hrs	MST Hrs	ESE [W]	TA	MST	ISTs [2]	Credits
02	01	-	03	01	100	25	20	5 + 5	03

Course Contents:-

1. Introduction to computer Aided sketching

Introduction, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning and free hand practicing. Computer screen, layout of the software, standard tool bar/menus and description of most commonly used tools bars, navigational tools. Co-ordinate system and reference planes. Definitions of HP, VP, RPP & LPP. Creation of 2D/3D environment. Selection of drawing size and scale. Commands and creation of Lines, co-ordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, offset, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity. Dimensioning, line conventions material conventions and lettering

2. Orthographic Projections of Points and Lines

Introduction, Definitions: Planes of projections, reference line and conventions employed, projections of points in all the four quadrants, projections of straight lines inclined to both reference planes (excluding HT & VT), True/Apparent lengths & inclinations

3. Orthographic Projections of Planes

Introduction, Projections of plane surfaces: triangle, square, rectangle, rhombus, pentagon, hexagon and circle, with surface inclined to both reference planes in different positions by change of position method only (excluding holes & composite surfaces)

4. Projections of solids (First angle projection only)

Introduction. Projections of right regular solids: prisms, pyramids, cylinders and cones with their axes inclined to one reference plane & parallel to other in different positions. (Excluding combination of solids).

5. Sections of Solids and Development of Surfaces

Introduction, section planes, sectional views, apparent and true shape of sections of right regular prisms, pyramids, cylinders and cones with base on HP. Development of lateral surfaces of above solids, their frustums and truncations. (Excluding trays & transition pieces).

6. Multi View Orthographic Projections

Multi View Orthographic projections of simple machine parts by first angle method, sectional views (full & half sections only) when isometric view is given

Reading of Orthographic Projections (Missing Views), Reading, understanding, visualizing & drawing of Missing Views of simple machine parts when its two views are given

7. Isomeric Projection

Introduction, Isometric scale, Isometric projections/ Drawings of simple blocks (plane and cylindrical), when two orthographic views are given (excluding spheres and combination of solids.

Note: Only FIRST ANGLE Method of projections must be used throughout the course

Text Books:-

1. Engineering Drawing Vol I & II by N. H. Dubey, Nandu Publishers & Printers

Reference Books:-

2. Engineering Drawing & Machine Drawing by N. D. Bhatt & V.M. Panchal, Charotar publishing house.

Programme Name	:	F.Y. B. Tech.					SEM – I / II	
Course Code	:	SE0001						
Course Title	:	Applied Mechanics						

Teaching Scheme			Examination Scheme						
L	T	P	ESE [W] Hrs	MST Hrs	ESE [W]	TA	MST	ISTs [2]	Credits
03	01	-	03	01	100	25	20	5 + 5	04

Course Contents:-

1. System of Coplanar Forces

Resultant of Concurrent force system, moment of force about any point, Couple, Varignon's theorem, distributed forces in plane, Resultant of Parallel force system and General force system

2. Equilibrium of System of Co-planar Forces

Condition of equilibrium for (a) Concurrent force system, (b) Parallel force system, (c) General force system. Type of supports, Determination of reactions at supports for various types of determinate structures, (without internal hinge), centroid of plane area, center of gravity of wires bent in different shapes, Area Moment of Inertia and mass Moment of Inertia, Analysis of pin jointed plane truss by method of joints and method of sections, introduction to Graphic static's.

3. Friction

Laws of friction, equilibrium of bodies on inclined plane. Application to problems involving wedge and ladders, screws and belt friction – only simple problems involving tension on both sides of pulley to be covered.

4. Principle of Virtual Work and Forces in Space

Principle of Virtual Work – application to link systems with single degree of freedom only, Forces in Space –

(a) resultant and equilibrium of concurrent force system, (b) moment of force about a point and about an axis.

5. Kinematics of particles

Rectilinear motion, uniform acceleration, non-uniform acceleration, displacement time, acceleration time and velocity time curves and their applications. Velocity and acceleration in Cartesian and polar co-ordinate system, motion along a plane curved path, tangential and normal components of acceleration, Projectile motion, Simple harmonic motion, Relative velocity

6. Kinematics of rigid bodies

Translation, pure rotation and plane motion of rigid bodies

Instantaneous center of zero velocity and zero acceleration for bodies in plane motion

7. Kinetics of particles and rigid bodies

D'Alembert principle, equation of dynamic equilibrium in linear and curvilinear motion. Linear momentum, impulse momentum principle, Principle of conservation of momentum. Impact of solid bodies, elastic impact, semi-elastic impact, plastic impact. Work done by force, potential and kinetic energy and work-power energy equation, principle of conservation of energy

Text Books:-

1. Mechanics for Engineers, Statics and Dynamics   -   A K Tayal, Umesh Publication, N. Delhi, 2008

Reference Books:-

1. Mechanics for Engineers   -   R C Hibbeler, Pearson Education
2. Mechanics for Engineers   -   Timoshenko and Young, McGraw Hill
3. Mechanics for Engineers   -   Singer, McGraw Hill
4. Mechanics for Engineers   -   Beer and Johnston, McGraw Hill
5. Mechanics for Engineers   -   Mclean and Nelson, Schaum Outline Series

Programme Name	:	F.Y. B. Tech.		SEM – I / II
Course Code	:	CO0001		
Course Title	:	Computer Programming		

Teaching Scheme			Examination Scheme						
L	T	P	ESE [W] Hrs	MST Hrs	ESE [W]	TA	MST	ISTs [2]	Credits
02	01	-	03	01	100	25	20	5 + 5	03

Course Contents:-

1. Programming paradigms

Programming paradigms, Evaluation of .Programming Paradigms, , Moving from C to C++

2. Programming Fundamentals

Data Types, Operators and Expressions, Control Flow, Arrays and Strings, Functions , Parameter Passing, Structures and Unions, Pointers and their binding Pointers to Pointers Pointers to functions and structures

3. Classes and Objects

Class Specification, Class Members, Member Functions as inline, , Member Functions within the Class
Data hiding, , Object as function parameters Friend Functions and Friend Classes, static data and member functions

4. Object initialization and Cleanup

Constructors, parameterized constructors, destructors, constructor overloading, constructors with default arguments, Dynamic Initialization Through Constructors, copy constructors.

5. Function and Operator Overloading

Function overloading, functions with default arguments, inline functions. Unary operator overloading, binary operator overloading such as arithmetic, Comparison and assignment operators. , Overloading with Friend Functions

6. Inheritance

Forms of Inheritance, Constructors and Destructors in Derived Classes, Overloaded Memory Functions, Abstract Classes, Multilevel, multiple, Hierarchical, Multipath, Hybrid Inheritance

7. Virtual functions and Polymorphism

Polymorphism and its types need for virtual functions, pointer to derived class, object, and pure virtual functions. Abstract classes, Virtual destructors dynamic binding

8. File and Error and Exception Handling

Hierarchy of File Stream Classes, opening and closing files, file modes, Sequential and random Access files``error handling during File Manipulation Exception handling model, list of exceptions

Text Books

1.	Mastering C++		K. R. Venugopal, Rajkumar etl. Tata McGRAW Hill
2.	Object oriented programming with C++,	-	E Balguruswamy, Tata McGraw Hill

Reference Books

1.	Programming with C++,	-	J R Hubbard, Schaum's outline series, McGraw Hill.
2	C++: The Complete Reference	-	Herbert Schildt

Programme Name	:	F.Y. B. Tech.		SEMESTER – I
Course Code	:	AS1001		
Course Title	:	Applied Science-I - [Lab. Course]		

Teaching Scheme			Examination Scheme			
L	T	P	ESE [O / P] Hrs	ESE [O / P]	TA	Credits
-	-	3	-	25	25	1.5

Part – I Applied Chemistry – I
Title of the Experiment:-

1. Total Hardness of Water
2. Carbonate and non carbonate hardness of water sample
3. Alkalinity of water sample
4. Chloride Content in Water
5. Saponification Value of an Oil
6. Acid value of an Oil
7. Viscosity & Viscosity Index by Redwood Viscometer
8. Flash Point By Abel's Apparatus
9. Flash Point by Pensky-Marten's Apparatus
10. Viscosity of polymer using Ostwald's viscometer.
11. Study of production of Alcohol by Fermentation.
12. Demonstration of TLC / Paper chromatography.

Part – II Applied Physics – I
Title of the Experiment

1. Study of Crystal Structure I Unit Dell
2. Study of Crystal Structure II Miller Indices
3. Band gap in Semi-conductor
4. Hystersis by Magnetometer
5. Ultrasonic Interferometer
6. Study of Hall Effect in Semiconductors

Programme Name	:	F.Y. B. Tech.		SEM – I / II
Course Code	:	EE1001		
Course Title	:	Basic Electrical & Electronics Engineering [Lab. Course]		

Teaching Scheme			Examination Scheme			
L	T	P	ESE [O / P] Hrs	ESE [O / P]	TA	Credits
-	-	03	-	25	25	1.5

Title of the Experiment

1. Verification of Kirchoff's Current and Voltage Law
2. Verification of Superposition theorem
3. Verification of Thevenin's Theorem and Norton's Theorem
4. Study of Single Phase series and parallel circuits
5. Verification of voltage and current relationship of Balanced Star and Delta networks
6. Study of series Resonance

Programme Name	:	F.Y. B. Tech.		SEM – I / II
Course Code	:	ME1001		
Course Title	:	Engineering Graphics [Lab. Course]		

Teaching Scheme			Examination Scheme			
L	T	P	ESE [O / P] Hrs	ESE [O / P]	TA	Credits
-	-	03	-	25	25	1.5

TA for above laboratory course must consists of at least 10 assignments on different topics with minimum 2 problems on each assignment as per the following pattern.

Title of the Assignment:

1. Projections of Lines
2. Projections of Planes
3. Projections of Solids
4. Sections of Solids
5. Development of surfaces
6. Orthographic Projections
7. Sectional Orthographic Projections
8. Reading of Orthographic Projections (Missing Views)-I
9. Reading of Orthographic Projections (Missing Views)-II
10. Isometric Views

Programme Name	:	F.Y. B. Tech.		SEM – I/II
Course Code	:	ME1002		
Course Title	:	Workshop [Lab. Course]		

Teaching Scheme			Examination Scheme			
L	T	P	ESE [O / P] Hrs	ESE [O / P]	TA	Credits
-	-	03	-	25	25	1.5

Title of the Experiment :-

1. Fitting

Use and setting of fitting tools for marking, center punching, chipping, cutting, filing, drilling, tapping
Term work to include one simple job involving above mentioned operations

2. Carpentry

Use and setting of hand tools like hack saw, jack plane, chisels and gauges for construction of various joints
Term work to include one simple job involving a joint
Demonstration for wood turning and report writing

3. Forging (smithy)

At least one job for change of cross sectional area like round into rectangular or making a ring from a round bar

4. Welding

Edge preparation
Term work to include one simple job having lap or butt welding of plates or fillet welding

5. Plain turning

Operations: simple turning, step turning, taper turning
Term work to include one simple job involving above mentioned operations

6. Sheet metal and brazing

Use of sheet metal working hand tools, cutting, bending and spot welding

Programme Name	:	F.Y. B. Tech.	SEM – I/II
Course Code	:	SE0001	
Course Title	:	Applied Mechanics [Lab. Course]	

Teaching Scheme			Examination Scheme			
L	T	P	ESE [O / P] Hrs	ESE [O / P]	TA	Credits
-	-	03	-	25	25	1.5

Title of the Experiment :-

1. Simple Roof Truss
2. Bell Crank Lever
3. Simple Beam
4. Simple Jib Crane
5. Link Chain
6. Screw Jack (Friction)
7. Shear Leg Apparatus
8. 'g' by falling weight method
9. Plane motion of bodies
10. M.I. of fly wheel
11. Compound pendulum
12. Torsional pendulum
13. Principle of conservation of energy (connected bodies with flywheel)
14. Stiffness of spring

Programme Name	:	F.Y. B. Tech.	SEM – I / II
Course Code	:	CO1001	
Course Title	:	Computer Programming [Lab. Course]	

Teaching Scheme			Examination Scheme			
L	T	P	ESE [O / P] Hrs	ESE [O / P]	TA	Credits
-	-	03	-	25	25	1.5

Title of the Experiment :-

1. Program to input & Output data
2. Programs using user defined data types, operators and expressions
3. Programs for the comparison of Control flow working
4. Programs on parameter passing methods
5. Programs on unions and structures
6. Programs on pointers
7. Programs to create objects of class, Programs on member functions and friend functions
8. Array of objects & static data members
9. Programs to define a class using constructors & destructors
10. Programs to overload unary & binary operators, Programs using function overloading
11. Programs to implement single level & multilevel inheritance, Multilevel, multiple, Hierarchical, Multipath, Hybrid Inheritance
12. Programs using runtime polymorphism (virtual functions)
13. Programs for file processing
14. Programs on exception handling
15. Case study : One mini project of 500 lines involving concepts of inheritance, polymorphism , file handling and exception handling

Programme Name	:	F.Y. B. Tech.		SEMESTER – II
Course Code	:	CH0002		
Course Title	:	Applied Chemistry - II		

Teaching Scheme			Examination Scheme						
L	T	P	ESE [W] Hrs	MST Hrs	ESE [W]	TA	MST	ISTs [2]	Credits
03	-	-	03	01	100	25	20	5 + 5	03

Course Contents:-

1. Electrochemistry

Conductance, Cell constant and its determination, Single electrode potentials, Electrolytic and Galvanic cells, EMF series, Nernst equation, Cell emf measurement, Reversible and irreversible cells

2. Corrosion

Definition and scope of corrosion, Direct chemical corrosion, Electrochemical corrosion and its mechanisms, Types of electrochemical corrosion, (differential aeration, galvanic, concentration cell), Typical Electrochemical corrosion like Pitting, Intergranular, Soil, Waterline. Factors affecting corrosion, Protection of corrosion, Applications with few practical problems of corrosion.

3. Energy Sciences

Fuels [Conventional] - Types of fuels, Calorific value, Determination of Calorific value, Numerical problems based on it. Analysis of coal, Refining of Petroleum, Liquid fuels, Fuels for IC engines, Knocking and anti knock agents, Octane and Cetane values, Cracking of oils.

Alternative sources of Energy - Limitations of fossil fuels, Non-conventional sources of energy- Solar, Wind, Geo, Hydro power. Its advantages and disadvantages. Nuclear Energy production from nuclear reactions, Nuclear reactor, Nuclear waste disposal.

Battery technology - Fundamentals of primary cells, Rechargeable batteries, Ni-Cd, Ni-metal hydride, Li-ion batteries. Fuel cells- principle, applications, advantages and disadvantages

4. Nanomaterials

Introduction, Fullerenes, Carbon nanotubes, Nanowires, Electronic and mechanical properties, Synthesis of nanomaterials, Applications of nanomaterials - Catalysis, Electronics & Telecommunication, Medicines, Energy sciences.

5, Environmental Chemistry

Air pollution, Water pollution, Determination and Significance of COD and BOD; Numerical problems, Solid waste treatment, Green house effect and Global warming, e-Waste and Radioactive pollution.

6. Metals & Alloys

Metals and Alloys: Phase Rule, Iron-Carbon phase equilibrium diagram, Types of Alloys: ferrous and nonferrous alloys, Carbon steel, Alloy steel, Alloys of Cu, Al and Pb.

Text Books:-

1. A Text Book of Engineering Chemistry - Shashi Chawla, , Dhanpat Rai & Co. (PVT.) LTD., New Delhi (2004).

Reference Books

1. Engineering Chemistry - S.S.Dara, Chand & Co, New Delhi (2006)
2. Engineering Chemistry - Jain and Jain, Dhanpat Rai & Co (PVT.) LTD, New Delhi (2006).

Programme Name	:	F.Y. B. Tech.		SEMESTER –II
Course Code	:	PH0002		
Course Title	:	Applied Physics-II		

Teaching Scheme			Examination Scheme						
L	T	P	ESE [W] Hrs	MST Hrs	ESE [W]	TA	MST	ISTs [2]	Credits
03	-	-	03	01	100	25	20	5 + 5	03

Course Contents:-

1. Optics

    I.   **Interference:** Interference at parallel thin film, reflected and transmitted light rays, antireflection coating, highly reflective coating, interference at wedge shaped film,- reflected and transmitted rays, Newton's rings, Application of interference

    II.   **Diffraction**: Fraunhoffer and Fresnel diffraction, Fraunhofer diffraction-at single slit, double slit and multiple slit, diffraction grating, characteristics of diffraction grating and its application

    III   **Polarization**: Introduction, Polarization by reflection, Polarization by double refraction, Scattering of light, Circular and elliptical polarization, Optical activity

2. Special Theory of Relativity

    I.   Introduction, Frame of Reference (Inertial and Non-inertial), Galileo Principle of Relativity, Galilean Transformations, Failure of Galilean Transformations, Einstein principle of Relativity, The Lorentz Transformations (Co-ordinate and velocity) and conclusion, Michelson –Morley Experiment, Consequences of special Relativity, Simultaneity of Events, Length Contraction, Time Dilation, The Relativistic mass, Momentum, Relation between momentum and energy.

3. Wave mechanics

    I.   Phase and Group velocities, Wave equation, Plane waves, Particle Diffraction, Particle in a box, Uncertainty Principle I and II, Applying the Uncertainty principle and its applications.

4. Thermodynamics

    Concept of temperature, reversible and irreversible processes, first law of thermodynamics and its application, Carnot's cycle, Second law of thermodynamics, Clausius-clapeyrons equation, rankine cycle, Thermodynamical function, Entropy, Third law of thermodynamics,

Text Books:-

1.   Applied Physics   -   P.K.Mittal I.K.International, New Delhi.(2006)

2.   A textbook of Engineering physics   -   Avadhanulu & Kshirsagar, S.Chand & Co. New Delhi, (2008)

Reference Books:-

1.   Thermodynamics:An Engineering Approach   -   Cengel & Boles,Tata McGraw-Hill,New Delhi ,Vth Edition (2007)

2.   Engineering thermodynamics   -   P.K. Nag, CRC press,2nd edition (2004)

3.   Optics   -   Brijlal & Subramaniam, S.Chand & Co. (2008)

4.   Relativity   -   A.Einstein, Walker & Co publisher.

5.   Concepts of Modern Physics   -   Arthur Beiser, McGraw-Hill-Science, edition no.6,(2002-03)

Programme Name	:	F.Y. B. Tech.		SEMESTER – II
Course Code	:	MA0002		
Course Title	:	Applied Mathematics - II		

Teaching Scheme			Examination Scheme						
L	T	P	ESE [W] Hrs	MST Hrs	ESE [W]	TA	MST	ISTs [2]	Credits
04	01	-	03	01	100	25	20	5 + 5	05

Course Contents:-

1. Module : Integral Calculus

2.1.1 Improper Integrals, Beta & Gamma functions, properties, relation between Beta & Gamma function. Reduction and Duplication formulae.

2.1.2 Error function with properties

2.1.3 Evaluation of Integrals using the rule of Differentiation under integral sign, Differentiation of integrals with constant limits of Integration and with variable limits depending on parameter (Leibnitz rule)

2. Module: Multiple Integrals

2.2.1 Curve Tracing and rectification of plane curves in Cartesian, parametric and polar Co-ordinates.

2.2.2 Double integral over the region in Cartesian and Polar co-ordinates, Change of order of Integration Introduction to Jacobian & it's use in evaluating integrals with transformation.

2.2.3 Triple integrals in Cartesian, Cylindrical and Spherical polar co-ordinates,

2.2.4 Applications : Area, Mass & Volume

3. Module: Ordinary Differential Equations

2.3.1 Differential equations of first order and first degree, Exact Differential equation, Integrating factors (I.F). Linear and Bernoulli's equations and equations reducible to these forms.

2.3.2 Linear Differential equation of higher order with constant coefficient, Complimentary functions & particular integrals. Method of Inverse differential operator. Short methods for finding P.I. for equation of type f(D) y= X where X= e^{ax}, Sin(ax+b), Cos(ax+b), X^m, $e^{ax}V$, Xv where V is a function of x only. Method of variation of parameters. Method of undetermined coefficients.

2.3.3 Cauchy's homogeneous linear equation. Legendre's differential equation. Simple Applications

4. Module : Partial Differential Equations

2.4.1 Formation of partial differential equation, Existence and uniqueness of the solutions. Methods of solving the first order partial differential equations of the type:
F(p ,q) = 0, F(p ,q ,z) = 0, F1(x ,p) = F2(y ,q)

2.4.2 Lagrange's form P p + Q q = R, Transformations of variables, Method of multipliers, Method of grouping.

2.4.3 Homogeneous linear equations,. Short methods to find P.I , (1/F(D,D') ($e^{ax + by}$)),
(1/F(D2,DD',D'2), Cos or Sin (a x + by), (1/F(D,D') (xr yr), Non homogeneous linear equation. simple problems

2.4.4 Method of separation of variables

Text Books:-

1	Engineering Mathematics-	-	G. V. Kumbhojkar- C. Jamnadas & Co 2009- Edition 5th
2	Applied Mathematics	-	P.N. Wartikar & J.N. Wartikar- PVG Prakashan, 5th Edition Poona 1994.

References Books:-

1	Higher Engineering Mathematics	-	Dr. B S Grewal, Khanna Publications-39th Edition 2005.
2	Applied Mathematics	-	Dr. U. B. Jungam, K.P Patil & N. Kumtekar- Nandu Publi.1998-1st Edition
3	Advanced Engineering Mathematics	-	H K Dass, S Chand & Co. 3rd edition

Programme Name	:	F.Y. B. Tech.	SEMESTER –II
Course Code	:	AS1002	
Course Title	:	Applied Science - II [Lab. Course]	

Teaching Scheme			Examination Scheme			
L	T	P	ESE [O / P] Hrs	ESE [O / P]	TA	Credits
-	-	3	-	25	25	1.5

Part – I Applied Chemistry – II

Title of the Experiment

1. Determination of Iron by colorimetric method.
2. To determine Iron in the plain carbon steel sample.
3. To determine Zinc in the brass sample.
4. To estimate Nickel in the alloy steel sample.
5. To estimate Copper in Brass
6. To estimate Tin in Stannous Chloride
7. Determination of the percentage of Nitrogen in the given coal sample.
8. To detect fuel adulteration in transport fuels
9. Determination of the percentage of Sulphur in the given coal sample.
10. Determination of chemical oxygen demand (COD) in a waste water sample.
11. Lime in Cement

Part – II Applied Physics – II

Title of the Experiment

1. Study of Spectrum.
2. Plank's constant determination
3. Newton's Ring Experiments.
4. Wedge shape experiment
5. Laser diffraction