Proposed Program Structure for First Year Bachelor of Technology (AY 2022-23)

	Course Code	Course Name	Pg #	*Course Component	Contact Hours			Credits			Semester in which Course is offered for a specific Branch					
					Th	Pr	Tu	Th	Pr	Tu	AE	CE	ECS	EXTC	IT	ME
I	FY 101	Engineering Mathematics I		TL	3	2	-	3	1		1	1	1	1	1	1
II	FY 102	Engineering Mathematics II		TL	3	2	-	3	1		2	2	2	2	2	2
I	FY 103	Engineering Physics I		TL	2	1		2	0.5		1	1	1	1	1	1
II	FY 104	Engineering Physics II		TL	2	1		2	0.5		2	2	2	2	2	2
I	FY 105	Engineering Chemistry I		TL	2	1		2	0.5		1	1	1	1	1	1
II	FY 106	Engineering Chemistry II		TL	2	1		2	0.5		2	2	2	2	2	2
I / II	FY 107	Basic Electrical Engineering		TL	3	2		3	1		1	2	1	1	2	1
I / II	FY 108	Engineering Mechanics and Graphics		TL	2	4		2	2		-	1	2	2	1	-
	FY 109	Engineering Mechanics		TL	3	2		3	1		1	-	-	-	-	1
	FY 110	Engineering Drawing		TL	2	4		2	2		2	-	-	-	-	2
I	FY 111	C Programing		TLP	3	2		3	1		-	1	1	1	1	-
II	FY 112	Python Programing		TLP	3	2		3	1		2		2	2		2
II	FY 113	Java Programing		TLP	3	2		3	1			2			2	
	FY 114	Professional Communication and Ethics I		TLC	2	2		2	1		2	2	2	2	2	2
I	FY 115	Engineering Workshop -I		L		3			1.5		1					1
II	FY 116	Engineering Workshop -II		L		3			1.5		2					2
I	FY117	Basic Workshop Practice-I		L		2			1			1	1	1	1	
II	FY118	Basic Workshop Practice-II		L		2			1			2	2	2	2	

***T- Theory , L- Lab , P-Programming, C- Communication, ** AE & MECH is in one group. Pr: 3/2, means M&AE is 3 hr/week while other discipline is allocated 2hr/week.**

FY Total number of credits MECH/AUTO

Course Code	Course Name	Credits
FY101	Engineering Mathematics I	3+1

Course Code	Course Name	Theory	Practical	Tutorial	Total contact hours	Theory	Practical/ Oral	Tutorial	Total credits
FY101	Engineering Mathematics - I	3	2	-	05	3	1	-	04

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Avg.					
FY101	Engineering Mathematics- I	40	40	40	60	25	-	-	125

Course Objectives:

1. To develop the basic Mathematical skills of engineering students that are imperative for effective understanding of complex numbers in engineering subjects.
2. To acquaint students with the hyperbolic, inverse hyperbolic and logarithmic functions.
3. To understand differentiation and expansions of functions. which will serve as basic tools for specialized studies in many fields of engineering and technology.
4. To learn the partial differentiation techniques and its applications used in engineering problems.
5. To learn the applications of Matrices useful in engineering.
6. To provide hands-on experience using SCILAB software to handle Mathematical modeling.

Course Outcomes:

On successful completion of course learner/student will be able to:

1. Apply the basic concept of complex numbers and use it to solve problems in engineering.

2. Apply the basic concept of Hyperbolic, Inverse Hyperbolic, and logarithmic functions in engineering problems.
3. Apply the concept of expansion of functions and successive differentiation in optimization problems.
4. Use the basic concepts of partial differentiation in finding the Maxima and Minima required in engineering problems.
5. Use the concept of matrices in solving the system of equations used in many areas of research.
6. Apply the concept of numerical Methods for solving the engineering problems with the help of SCILAB software.

Syllabus :

Module	Detailed Contents	Hrs.
1	**Complex Numbers** **Pre-requisite:** Review of Complex Numbers-Algebra of Complex Number. Cartesian, polar and exponential form of complex number. 1.1. De Moivre's Theorem.(Without Proof) 1.2. Expansion of sinnθ, cosnθ in terms of powers of sinθ, cosθ and Expansion of sin^nθ, cos^nθ in terms of sines and cosines of multiples of θ. 1.3. Powers and Roots of complex number.	6
2	**Hyperbolic , Inverse Hyperbolic and Logarithmic functions** 2.1 Introduction to Hyperbolic functions, Inverse Hyperbolic Functions. 2.2 Logarithmic functions, Separation of real and Imaginary parts.	6
3	**Successive Differentiation and Expansion of Function** **Pre-requisite :-** Derivative of standard functions and Rules of derivative. 3.1 Successive differentiation: nth derivative of standard functions. Leibnitz's Theorem (without proof) and problems 3.2 Taylor's Theorem (Statement only) and Taylor's series, Maclaurin's series (Statement only). Expansion of □^ (□), sin(x), cos(x), tan(x), sinh(x), cosh(x), tanh(x),log(1+x), sin−1(□), cos−1 (□),tan−1 (□).	5
4	**Partial Differentiation and Applications of Partial Differentiation.** 4.1 Partial Differentiation: Function of several variables, Partial derivatives of first and higher order. Differentiation of composite function. 4.2.Euler's Theorem on Homogeneous functions with two independent variables (without proof). Deductions from Euler's Theorem. 4.3 Maxima and Minima of a function of two independent variables, Lagrange's method of undetermined multipliers with one constraint. Jacobian of two independent variables.	7

5	**Matrices :-** **Pre-requisite:** Inverse of a matrix, addition, multiplication and transpose of a matrix ,Elementary row and column transformation 5.1. Symmetric, Skew- Symmetric, Hermitian, Skew Hermitian,Unitary, Orthogonal Matrices and properties of Matrices (Without Proof). 5.2 Rank of a Matrix using Echelon forms, reduction to normal form and PAQ form. 5.3.System of homogeneous and non –homogeneous equations, their consistency and solutions.	6
6	**Numerical Methods** 6.1 **Solution of system of linear algebraic equations**, (1) Gauss Elimination, (2)Gauss Jacobi Iteration Method (3) Gauss Seidel Iteration Method, 6.2 **Solutions of Transcendental equations** (1) Bisection Method (2) Secant Method (3) Newton Raphson Method.	6

Assessment

I. Internal Assessment Test:

Assessment consists of two class tests of 40 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and the second class test when an additional 35% syllabus is completed. Duration of each test shall be 90 minutes.

II. End Semester Theory Examination:

1. Question paper will comprise of a total 05 questions, each carrying 20 marks.
2. Total 03 questions need to be solved.
3. Question No: 01 will be compulsory and based on the entire syllabus wherein 4sub-questions of 5 marks each will be asked.
4. Remaining questions will be randomly selected from all the modules.
5. Weightage of each module will be proportional to number of respective lecture mentioned in the syllabus.

References:

1. Higher Engineering Mathematics, Dr.B.S.Grewal, Khanna Publication
2. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley EasternLimited, 9thEd.
3. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Narosa publication,
4. Matrices, Shanti Narayan, S. Chand publication.
5. Applied Numerical Methods with MATLAB for Engineers and Scientists by Steven Chapra, McGraw Hill .

Engineering Mathematics I Laboratory

General Instructions: Each student has to perform at least 4 SCILAB /MATLAB practical's and at least 6 assignments on the entire syllabus.

List of Scilab Programing

1. Gauss Elimination
2. Gauss Seidel Iteration method
3. Gauss Jacobi Iteration Method
4. Bisection method
5. Secant Method
6. Newton Raphson
7. Matrices
8. Maxima and Minima

Term Work:

The distribution of Term Work marks–

1. Attendance (Theory, Practicals) : 05 marks
2. Assignments on entire syllabus : 10 marks
3. SCILAB Practicals : 10 marks

Course Code	Course Name	Credits
FY102	Engineering Mathematics II	3+1

Course Code	Course Name	Theory	Practical	Tutorial	Total contact hours	Theory	Practical/ Oral	Tutorial	Total credits
FY102	Engineering Mathematics - II	3	2	-	05	3	1	-	04

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
FY102	Engineering Mathematics- II	40	40	40	60	25	-	-	125

Course Objectives:

1. To develop the basic mathematical skills of differential equations of engineering students.
2. To understand the linear differential equation with constant coefficients used in mathematical modeling.
3. To acquaint the students with the Beta and Gamma functions
4. To learn different techniques to solve double integrations.
5. To learn the applications of integration in solving complex engineering problems.
6. To provide knowledge of numerical techniques using SCILAB software to handle Mathematical modeling.

Course Outcomes:-

On successful completion of course learner/student will be able to:

1. Apply the basic concept of linear differential equations to solve problems in engineering.
2. Apply the basic concept of applications of LDE with constant coefficient in mathematical modeling to solve real life problems.

3. Apply the basic concepts of beta and gamma functions to solve engineering problems.
4. Apply the concept of double integration in solving problems of engineering and technology.
5. Apply the concept of double integrations to find areas.
6. Apply the concept of differentiation and integration numerically for solving the engineering problems with the help of SCILAB software.

Syllabus:

Module	Detailed Contents	Hrs.
1	**Differential Equations of First Order and First Degree:** 1.1 Exact Differential Equations, Equations reducible to exact form by using integrating factors. 1.2 Linear differential equations, Equations reducible to linear form.	6
2	**Linear Differential Equations With Constant Coefficients and Variable coefficients of higher order:** 2.1. Linear Differential Equation with constant coefficient-complementary function, particular integrals of differential equation of the type f(D)y = X where X is e ^ax , sin($ax + b$) , cos ($ax + b$), x^n, e ^axV, xV.	8
3	**Beta and Gamma Function,** 3.1 Gamma Functions and its properties. 3.2 Beta Functions and its properties.	4
4	**Double Integration:** **Prerequisite**: Tracing of curves 4.1. Double integration- Evaluation of Double Integrals.(Cartesian & Polar),Change of order of Integration and evaluation 4.2. Evaluation of integrals over the given region.(Cartesian & Polar) 4.3. Evaluation of double integrals by changing to polar coordinates.	8
5	**Applications of integration** :- 5.1. Application of double integrals to compute Area 5.2. Triple integration**:** Evaluation only (Cartesian, cylindrical and spherical polar coordinates)	4
6	**Numerical Techniques:-** 6.1. **Numerical solution of ordinary differential equation** (a) Euler's method (b) Modified Euler method, (c)Runge-Kutta fourth order method 6.2. **Numerical integration-** (a) Trapezoidal (b) Simpson's 1/3rd (c) Simpson's 3/8th rule	6

Assessment

I. Internal Assessment Test:

Assessment consists of two class tests of 40 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and the second class test when an additional 35% syllabus is completed. Duration of each test shall be 90 minutes.

II. End Semester Theory Examination:

1. Question paper will comprise of a total 05 questions, each carrying 20 marks.
2. Total 03 questions need to be solved.
3. Question No: 01 will be compulsory and based on the entire syllabus wherein 4sub-questions of 5 marks each will be asked.
4. Remaining questions will be randomly selected from all the modules.
5. Weightage of each module will be proportional to number of respective lecture mentioned in the syllabus.

References:

1. Higher Engineering Mathematics, Dr.B.S.Grewal, Khanna Publication
2. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley EasternLimited, 9thEd.
3. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Narosa publication,
4. Applied Numerical Methods with MATLAB for Engineers and Scientists by Steven Chapra, McGraw Hill .

Engineering Mathematics II Laboratory

General Instructions: Each student has to perform at least 4 SCILAB /MATLAB practical's and at least 6 assignments on the entire syllabus.

List of Scilab Programing

1. Euler's Method
2. Euler's Modified Method
3. Runge Kutta Fourth Order
4. Trapezoidal Rule
5. Simpson's 1/3rd Rule
6. Simpson's 3/8th Rule
7. Differential Equations
8. Integration.

Term Work:

The distribution of Term Work marks–

1. Attendance (Theory, Practicals) : 05 marks
2. Assignments on entire syllabus : 10 marks
3. SCILAB Practicals : 10 marks

Course Code	Course Name	Credits
FY103	Engineering Physics-I	**2 + 0.5**

Course Code	Course Name	Theory	Practical	Tutorial	Total contact hours	Theory	Practical/ Oral	Tutorial	Total credits
FY103	Engineering Physics-I	2	1	-	03	2	1	-	2.5

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
FY103	Engineering Physics-I	30	30	30	45	25	-	-	100

Course Objectives:

1. To impart knowledge of basic concepts in applied physics and founding principles of technology..
2. To provide the knowledge and methodology necessary for solving problems in the field of engineering.
3. To develop scientific temperament for scientific observations, recording, and inference drawing essential for technology studies.

Course Outcomes:

Upon successful completion of this course, the learner will be able to:

1. Explain the functioning of lasers and their various applications.
2. Explain the working principle of optical fibres and their applications especially in the field of communication.
3. Understand fundamental concepts of classical optics to study Interference of light in thin films
4. Apply the knowledge of Interference of light in various applications.

5. Explain the limits of Classical Physics and apply the fundamentals of quantum mechanics to study the one dimensional motion of microscopic particles.
6. Apply the knowledge of superconductivity to SQUID and Magnetic levitation.

Syllabus:

Module	Details	Hours.
1.	**Lasers**: 1.1 Basic Definitions and explanation of terms: Spontaneous emission and stimulated emission; metastable state, population inversion, types of pumping, resonant cavity, Einstein's Coefficients and their derivation. 1.2. 3-level and 4-level lasing system and need for at least a 3-level system for lasing action. 1.3. Helium Neon laser: Construction, working and Energy level Diagram. 1.4. Nd: YAG laser: Construction, working and Energy level Diagram. 1.5. Application of Lasers: Holography.	4
2.	**Optical Fibres**: 2.1. Working Principle and Structure 2.2. Derivation of expression for Numerical Aperture for step index fibre. Expression for Critical angle; angle of acceptance for a step Index Fibre. 2.3. Classification of optical fibres. 2.4. Expression for V-number and modes of propagation for a step index fibre. 2.5. Applications : Fibre optic communication system	**3**
3.	**Interference in Thin Films:** 3. Interference in Thin Films 3.1. Interference by division of amplitude and by division of wave front. 3.2.Interference in thin films of constant thickness due to reflected light: Conditions for maxima and minima 3.3.Interference in thin films of constant thickness due to transmitted light: Conditions for maxima and minima 3.4.Interference in Wedge shaped film: Conditions for maxima and minima 3.5.Newton's Rings: Diameter of dark and bright rings	4
4.	**Applications of Interference of light:** 4.1: Thin Films of constant thickness: Origin of colours and estimation of absent colours in interference pattern, Conditions for refractive index and thickness for Highly reflecting and Anti-reflecting thin films on glass. 4.2: Wedge Shaped Thin Film: Relation between fringe width and wedge angle, Estimation of film thickness of a thin foil or wire. 4.3: Newton's Rings: Estimation of ring diameter for a particular wavelength and estimation of refractive index of gap medium.	**3**

5.	**Quantum Mechanics**: 5.1. De Broglie wave hypothesis, properties of matter waves: wave packet, Derivation of expressions for phase velocity and group velocity and their relationship. 5.2. Wave Function, its physical interpretation and salient features. 5.3. Heisenberg's Uncertainty principle statements and their interpretation: momentum and position/energy time forms. 5.4. Derivation of Schrodinger's Time Dependent Wave equation and Schrodinger's Time Independent Wave Equation 5.5.Energy Levels and distribution of probabilities of a charged particle bounded in an infinite potential well	**7**
6.	**Superconductivity**: 6.1. Critical temperature, critical magnetic field of a superconductor. 6.2. Meissner Effect, Type I and Type II and high Tc superconductors 6.3. BCS Theory (concept of Cooper pair) 6.4. Applications of superconductors: MAGLEV and qualitative discussion of Josephson effect and SQUID.	**3**

Assessment

I. Internal Assessment Test

Assessment consists of two class tests of 30 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and the second class test when an additional 35% syllabus is completed. Duration of each test shall be one hour.

II.End Semester Examination

In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

1. Question paper will comprises of 3 questions, each carrying 15 marks.
2. Question number 1 will be compulsory and based on maximum contents of the syllabus
3. Remaining questions will be mixed in nature (for example, if Q.2 has part (a) from module 3 then part (b) will be from other than module (3)
4. Total three questions need to be solved.

References:

1. A text book of Engineering Physics-Avadhanulu & Kshirsagar, S. Chand
2. A textbook of Optics - N. Subramanyam and Brijlal, S.Chand
3. Fundamentals of optics by Jenkins and White, McGrawHill
4. Modern Engineering Physics – Vasudeva, S.Chand
5. Concepts of Modern Physics- Arther Beiser, Tata McGraw Hill
6. A TextBook of Engineering Physics, S. O. Pillai, New Age International Publishers.
7. Optics - Ajay Ghatak, Tata McGraw Hill8. Introduction to Electrodynamics- D. J. Griffiths, Pearson publication .
8. Physics for Engineers, M.R. Srinivasan, New Age International Publishers.

Engineering Physics-I Laboratory

List of Experiments:

1. Determination of angular divergence of laser beam.
2. Determination of wavelength of laser light using Diffraction grating. (Laser source)
3. Determination of Numerical Aperture of an optical fibre.
4. Study of a Fibre Optic Communication system (Demonstration only)
5. Determination of Thickness of thin paper sheet using Wedge Shaped film
6. Determination of wavelength of monochromatic source using Newton's Rings
7. Determination of Planck's constant 'h' using LEDs of different colours .

Term work:

Term Work shall consist of a minimum six experiments. The distribution of marks rubric for term work shall be as follows:

Laboratory work (Experiments and Journal): 10/20 marks

Group Project **or** Topic Presentation (Optional): 10 marks

Attendance (Theory and Practical): 05 marks

Note: Individual teachers may follow a different rubric for distribution of marks for term work.

The final certification and acceptance of Term Work ensures the satisfactory performance of laboratory work and minimum passing in the Term Work.

Course Code	Course Name	Credits
FY104	**Engineering Physics-II**	**2+0.5**

Course Code	Course Name	Theory	Practical	Tutorial	Total contact hours	Theory	Practical/ Oral	Tutorial	Total credits
FY104	Engineering Physics-II	2	1	-	03	2	1	-	2.5

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
FY104	Engineering Physics-II	30	30	30	45	25	-	-	100

Course Objectives:

1. To impart knowledge of basic concepts in applied physics and founding principles of technology.
2. To provide the knowledge and methodology necessary for solving problems in the field of engineering.
3. To develop scientific temperament for scientific observations, recording, and inference drawing essential for technology studies.

Course Outcomes:

Upon successful completion of this course, the learner will be able to:

1. Comprehend the basic concepts of semiconductor physics and apply the same to electronic devices.
2. Apply the concepts of electromagnetism in focusing systems and CRO.
3. Interpret and explore basic sensing techniques for physical measurements in modern instrumentations.
4. Comprehend the concepts of electrodynamics and Maxwell's equations and their use in telecommunication systems.

5. Comprehend the various material characterisation techniques.
6. Comprehend the knowledge of Piezoelectric and Magnetostriction effect for production of ultrasonic waves and its application in various fields.

Syllabus:

Module	Details	Hours.
1.	**1.Semiconductors**: 1.1 Relation between Conductivity, Mobility, Current density; relation between conductivity, charge concentration, and mobility for metals and semiconductors 1.2 Splitting of energy levels for band formation in semiconductors; classification of semiconductors(doping): Intrinsic and Extrinsic; classification of semiconductors(band gap): Direct and Indirect band gap, Classification of semiconductors (composition):elemental and compound 1.3 Fermi Dirac distribution function: Calculation of energy from probability of occupancy, Fermi level in intrinsic and extrinsic semiconductors; Qualitative discussion on effect of temperature and charge concentration on the fermi levels of n-type and p-type semiconductors, Proof of position of Fermi level in midway of bandgap for an intrinsic semiconductors. 1.4 Energy level diagrams for unbiased and biased P-N junction. 1.5 Hall Effect: Derivation of expression for Hall Voltage and Hall coefficient. 1.6 Semiconductor Devices: I-V curves and mechanism for Solar Cell, LED and Zener Diode	7
2.	**Electron Optics and CRO**: 2.1. Bethe's law 2.2 Electrostatic and Magnetic focussing 2.3 Cathode Ray Tube and its applications. 2.4. Block diagram of a CRO: CRT, Sawtooth Sweep Generator, Synchronisation and power supply 2.5. Applications of CRO: Measurement of : DC and AC voltages, frequency value and phase difference	**4**
3.	**Physics of Sensors**: 3.1.Temperature Sensor 3.2.Pressure Transducer: Capacitive and Inductive types 3.3.Photodiode: IV characteristics and use in measurement of light intensity 3.4.Moisture sensor	4
4.	**Electrodynamics:** 4.1.Scalar and Vector fields, gradient, curl and divergence 4.2.Determination of Maxwell's equations for static and varying fields 4.3.Significance of Maxwell's equations and their application in Antenna design and waveguide. 4.4.Numerical Problems	**5**

5.	**Material Characterisation Techniques** 5.1 X-Ray Diffraction: Bragg's law and its application in measuring crystal lattice parameter. 5.2 STM and AFM, SEM and TEM: Principle of operation and working using schematic diagram.	**3**
6.	**Ultrasonics** : 6.1. Ultrasonic Wave generation; Magnetostriction Oscillator; Piezoelectric Oscillator; 6.2. Applications of ultrasonic: Echo sounding; NDT; ultrasonic cleaning(cavitation); ultrasonic sensors; 6.3.Industrial applications of ultrasonic(soldering, welding, cutting, drilling)	**2**

Assessment

I.Internal Assessment Test

Assessment consists of two class tests of 30 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and the second class test when an additional 35% syllabus is completed. Duration of each test shall be one hour.

II.End Semester Examination

In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

1. Question paper will comprises of 3 questions, each carrying 15 marks.
2. Question number 1 will be compulsory and based on maximum contents of the syllabus
3. Remaining questions will be mixed in nature (for example, if Q.2 has part (a) from module 3 then part (b) will be from other than module (3)
4. Total three questions need to be solved.

References:

1. A text book of Engineering Physics-Avadhanulu & Kshirsagar, S. Chand
2. A textbook of Optics - N. Subramanyam and Brijlal, S.Chand
3. Fundamentals of optics by Jenkins and White, McGrawHill
4. Modern Engineering Physics – Vasudeva, S.Chand
5. Concepts of Modern Physics- Arther Beiser, Tata McGraw Hill
6. A TextBook of Engineering Physics, S. O. Pillai, New Age International Publishers.
7. Optics - Ajay Ghatak, Tata McGraw Hill8. Introduction to Electrodynamics- D. J. Griffiths, Pearson publication .
8. Physics for Engineers, M.R. Srinivasan, New Age International Publishers.

Engineering Physics-II Laboratory

List of Experiments:

1. I-V characteristics of a solar cell and calculation of efficiency.
2. I-V characteristics of a Zener diode and its use as a voltage regulator
3. Demonstration of Hall Apparatus.
4. Use of CRO to determine: DC voltage, frequency and amplitude of AC signals.

5. I-V curves of a photodiode at various light intensities and verification of Inverse Square Law for Light Intensity.
6. Voltage vs. Temperature characteristics of a Temperature Sensor.
7. Use of Ultrasonic distance meter for determination of distance.

Term work:

Term Work shall consist of a minimum six experiments.

Overall Rubric for the distribution of term work marks:
Laboratory work (Experiments and Journal) : 10/20 marks

Group Project **or** Topic Presentation (Optional) : 10 marks

Attendance (Theory and Practical) : 05 marks

Note: Individual teachers may follow a different rubric for distribution of marks for term work.

The final certification and acceptance of Term Work ensures the satisfactory performance of laboratory work and minimum passing in the Term Work.

Course Code	Course Name	Credits
FY105	Engineering Chemistry I	2+0.5

Course Code	Course Name	Theory	Practical	Tutorial	Total contact hours	Theory	Practical/ Oral	Tutorial	Total credits
FY105	Engineering Chemistry I	2	1	-	03	2	1	-	2.5

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
FY105	Engineering Chemistry I	30	30	30	45	25	-	-	100

Course objectives

1. To appreciate the need and importance of engineering chemistry in the industry and Engineering field.
2. To include the importance of water in industrial usage.
3. To provide the knowledge of lubrication aspects of machine components.
4. To enable the students to understand the role of engineering materials such as polymers.
5. To introduce composite materials and their applications.
6. To provide an understanding of the fundamental chemical processes that cause environmental problems.

Course outcomes:

Students will be able to:

1. To analyze the quality of water for application in industries and to suggest methods to improve water quality.
2. To acquire knowledge on physical / chemical / biological characteristics of water and the treatment technique for sewage.
3. To select various lubricants for different industrial applications.

4. To identify various polymeric materials and their applications in engineering.
5. To identify, describe and evaluate the properties of different types of composite materials.
6. To develop an understanding of the environmental challenges and suggest methods for their minimisation based on green chemistry principles.

Syllabus:

Module	Detailed Contents	Hrs.
1	**Module 1 - Hardness of water** **Pre - requisites** : Knowledge of sources of water, Possible impurities in water, Characteristics imparted by impurities in water. Hardness in water – Types & its units, Determination of hardness by EDTA method, numerical problems. Effects of Hard water in Industries - Boiler corrosion, Priming and Foaming, Scales and Sludges,, caustic embrittlement, (Causes, methods of prevention), Langlier Index Softening of water- Ion exchange process.	3
2	**Module 2 - Water Treatment** Domestic water treatment : Steps involved in domestic water treatment - screening, sedimentation, filtration, disinfection - chlorination ,treatment with ozone. Desalination of brackish water- Reverse Osmosis, Electrodialysis, Ultrafiltration Sewage water treatment **:** BOD and COD, determination and numerical problems, Steps involved in sewage water treatment- primary, secondary (activated sludge process)	3
3	**Module 3 - Lubricants** **Pre - requisites** : Definition of Lubricants and Lubrication, functions of lubricants. Functions of lubricants, Mechanisms of lubrication – Thick film, Thin film and Extreme pressure Classification of lubricants - Solid (MoS_2, graphite), Semi solid (greases), Liquid (animal/vegetable oils, mineral oils, Blended oils) Lubricants for special applications Properties of lubricants and their significance - Viscosity and Viscosity Index, Flash and Fire Points, Cloud and Pour Points, Acid Number, Saponification Number, and related numerical problems.	4
4	**Module 4 - Polymeric materials** **Pre - requisite** : Polymer, Monomer, Polymerization, Degree of polymerisation, Classification of polymers, Mechanism of polymerisation. Molecular weight of polymers: Average molecular weight (weight average and number average) of a polymer, Polydispersity Index, Numerical problems. Polymer crystallinity - glass transition temperature and factors affecting Tg, Viscoelasticity Additives in polymers Commercially important polymers - Polyethylene, Polyvinyl acetate, Polydimethyl Siloxane , Epoxy resins , Polylactic acid (PLA) Conducting polymers - Mechanism of conduction in polymers, Examples and applications.	6

5	**Module 5: Polymer Composites** **Prerequisite** :Definition and basic understanding of composite materials. Constitution of composite materials- Matrix and Dispersed phase Classification of composite materials - Particle reinforced composites, Fibre reinforced composites, structural composites . Advantages and Applications of composite materials	4
6	**Module 6 - Environmental Chemistry** **Pre- requisites:** Definition of Environment and Primary concept of environmental pollution**.** Industrial Pollution- Causes, Effects and solutions, a case study on industrial pollution E-pollution- Causes, concerns and management , Carbon credit Concept of 12 principles of Green chemistry, discussion with examples (synthesis of indigo, adipic acid), numericals on atom economy.	4

Assessment

I.Internal Assessment Test

Assessment consists of two class tests of 30 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 35% syllabus is completed. Duration of each test shall be 75 minutes.

II.End Semester Examination

In the question paper, the weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

1. Question paper will comprise 4 questions, each carrying 15 marks.
2. Question number 1 will be compulsory and based on maximum contents of the syllabus
3. Remaining questions will be random in nature (for example, if Q.2 has part (a) from module 3, then part (b) will be from other than module)
4. Total three questions need to be solved.

References:

1. Engineering Chemistry – P.C.Jain and Monika Jain, Dhanpat Rai Publications
2. A Textbook of Engineering Chemistry, - Shashi Chawla (DhanpatRai publications)
3. A textbook of Engineering Chemistry - S.S. Dara, S. Chand Publishing House
4. Environmental Pollution Control Engineering - C.S.Rao (New Age International)
5. Environmental Chemistry – A.K.De, New Age International

Engineering Chemistry-I Laboratory

List of Experiments:

1. Determination of Hardness in water.
2. Determination of Chloride content in water.
3. Acid value of lubricating oil.
4. Viscosity Index by Redwood viscometer.
5. Determination of Dissolved oxygen in water.
6. Determination of COD.
7. Viscoelasticity of Silly putty.

8. Synthesis of conducting polyaniline from aniline by chemical oxidative polymerization

Term work:

Each student has to perform a minimum of five experiments and four assignments based on the entire syllabus.

The distribution of marks for term work shall be as follows:
Laboratory work (Experiments and Journal) : 10 marks
Assignments and Viva on modules : 10 marks
Attendance (Theory and Practical) : 05 marks

The final certification and acceptance of TW ensures the satisfactory performance of laboratory work and minimum passing in the TW

Course Code	Course Name	Credits
FY106	**Engineering Chemistry II**	**2+0.5**

Course Code	Course Name	Theory	Practical	Tutorial	Total contact hours	Theory	Practical/ Oral	Tutorial	Total credits
FY106	Engineering Chemistry II	2	1	-	03	2	1	-	2.5

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
FY106	Engineering Chemistry II	30	30	30	45	25	-	-	100

Course objectives:

1. To familiarize the students with the basic concepts of chemistry in the industry and Engineering field.
2. To understand the chemistry of various fuels and their combustion mechanism.
3. To acquire knowledge of electrochemical energy systems.
4. To introduce the underlying science of corrosion and the significance of corrosion control to protect the structures.
5. To educate the theory and applications of spectroscopic techniques.
6. To provide an introduction to and an overview over nanomaterials.

Course outcomes

Students will be able to:

1. To understand and analyze the combustion mechanisms of various fuels and be able to characterize the fuels.
2. To develop knowledge on electrochemical energy systems considering the operation.
3. To acquire knowledge of the different battery technologies and understanding the basic mechanisms allowing electrochemical energy storage in batteries
4. To become familiarized with corrosion forms and their effects and to recognize and use the method of corrosion protection.

5. To describe the theoretical background of spectroscopic techniques such as NMR, IR, spectroscopy to apply them for the various fields.
6. To acquire basic knowledge of types of nanomaterials and their synthesis and applications.

Syllabus:

Module	Detailed Contents	Hrs.
1	**Module -1 - Fuels and combustion** **Pre- requisites** : What are fuels, Types of fuels, Characteristics of fuels. Calorific value of a fuel - HCV and LCV, Units of Calorific value, Theoretical determination of calorific value of fuel by Dulong's formula, Numerical problems Solid fuels : Coal (Definition and Ranking) Analysis of coal - Proximate and Ultimate analysis, Numerical problems Liquid fuels: Petroleum -Composition, classification (Mining, Refining - Various fractions , their boiling points, composition and uses), Fuels for Internal Combustion Engines - Knocking, Octane number, Anti Knocking agents,Cetane number. Gaseous Fuels: Natural gas, CNG and LNG, (Composition, Properties and uses) Combustion of fuels – Numerical problems for calculating the amount of air needed for the complete combustion of solid and gaseous fuels. Green fuels - Biodiesel	6
2	**Module 2- Engineering Electrochemistry** **Pre -requisite :** redox reaction, cell reaction, electrode and its type, salt bridge Electrode potential, electrode reaction, derivation of Nernst equation for single electrode potential, numerical problems. Electrochemical cells, Concentration cells. Reference electrodes -Types of reference electrodes, Construction, working of SHE, Calomel electrode	3
3	**Module 3- Battery Technology** Battery- classification – primary, secondary and reserve batteries. Characteristics – Capacity, Electricity storage density, energy efficiency, cycle life and shelf life. Construction, working, applications and limitations of Lead acid storage battery, Modern Batteries - Lithium and Lithium ion batteries Fuel Cells: Introduction, classification of fuel cells, limitations & advantages of fuel cells, Construction of Hydrogen oxygen alkaline fuel cells.	3

4	**Module -4- Corrosion and its Control** **Pre- requisites** : corrosion , corrosion product, corrosive and non corrosive metals. Galvanic series and electrochemical series. Mechanism of corrosion - Chemical and Electrochemical corrosion. Types of corrosion : Galvanic corrosion, Differential aeration corrosion, Pitting corrosion, Intergranular corrosion, Waterline corrosion, Stress corrosion. Factors Affecting Corrosion Rate : - (i) Nature of metal, (ii) Nature of environment. Methods of Corrosion Control : Material selection, Design, Cathodic protection Protective Coatings: Metallic coatings - anodic coating (galvanizing) and cathodic coating (Tinning) Methods of Applying Metallic Coatings - Hot dipping, Metal Spraying, Electroplating and Diffusion coating Organic coatings – Paints	6
5	**Module 5- Spectroscopic techniques** **Pre-requisites :** Electromagnetic radiation, characteristics of electromagnetic radiation, electromagnetic spectrum. Spectroscopy - Principle, Interaction of radiation with matter, Selection rules. Classification of spectroscopy - Based on atomic or molecular level, absorption or emission, electronic or magnetic level Types of spectroscopy - IR and NMR Spectroscopy Fluorescence and its applications	3
6	**Module 6 -Nanomaterials** **Prerequisites:** Concept of nano scale, definition of nanoparticles Types of nanomaterials - Fullerenes, Carbon Nanotubes, Properties of nanomaterials – Optical properties, magnetic properties, electrical properties Preparation of Nanomaterials - Top down and Bottom up approach Synthesis of Nanomaterials -Chemical vapour deposition (CVD) method and Laser Ablation Method Applications of nano materials	3

Assessment

I.Internal Assessment Test

Assessment consists of two class tests of 30 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 35% syllabus is completed. Duration of each test shall be 75 minutes.

II.End Semester Examination

In the question paper, the weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

1. Question paper will comprise 4 questions, each carrying 15 marks.
2. Question number 1 will be compulsory and based on maximum contents of the syllabus
3. Remaining questions will be random in nature (for example, if Q.2 has part (a) from module 3, then part (b) will be from other than module)
4. Total three questions need to be solved

References:

1. Engineering Chemistry – P.C.Jain and Monika Jain, Dhanpat Rai Publications

2. A Textbook of Engineering Chemistry, - Shashi Chawla (DhanpatRai publications)
3. A textbook of Engineering Chemistry - S.S. Dara, S. Chand Publishing House
4. Instrumental methods of Chemical Analysis - B.K.Sharma, Goel Publishing House
5. Fundamentals of Molecular Spectroscopy - C.N. Banwell, Tata Mc Graw Hill.

Engineering Chemistry-II Laboratory

List of Experiments:

1. Determination of moisture content and ash value in coal sample.
2. Preparation of bio- diesel.
3. Preparation of Fe2O3 nanoparticles.
4. Cu-Zn electrochemical cell- Effect of conc.on cell potential.
5. Determination of thinner content in paint.
6. Determination of strength of a strong acid by pH meter
7. Determination of strength of a strong acid by conductivity meter
8. EMF measurement

Term work:

Each student has to perform a minimum of five experiments and four assignments based on the entire syllabus.

The distribution of marks for term work shall be as follows:
Laboratory work (Experiments and Journal) : 10 marks
Assignments and Viva on modules : 10 marks
Attendance (Theory and Practical) : 05 marks

The final certification and acceptance of TW ensures the satisfactory performance of laboratory work and

minimum passing in the TW.

Course Code	Course Name	Credits
FY107	**Basic Electrical Engineering**	4

Course Code	Course Name	Theory	Practical	Tutorial	Total contact hours	Theory	Practical/ Oral	Tutorial	Total credits
FY107	Basic Electrical Engineering	3	2	-	5	3	1	-	4

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
FY107	Basic Electrical Engineering	40	40	40	60	25	-	25	150

Prerequisite: Resistance, inductance, capacitance, series and parallel connection of resistance, concept of voltage, current, power and energy and its units.

Course Objectives:

1. To provide knowledge on fundamentals of D.C. circuits.
2. To provide knowledge of D.C network theorems and its applications.
3. To impart knowledge on fundamentals of A.C. circuits
4. To impart knowledge on fundamentals of single phase A.C circuits and its applications.
5. To impart knowledge on fundamentals of 3-Φ A.C. circuits and its applications.
6. To impart knowledge on basic operation and applications of electrical machines.

Course Outcomes:

On successful completion of course learner/student will be able to

1. Apply basic concepts to analyse D.C circuits.
2. Apply various D.C network theorems to determine the circuit response/ behavior.

3. Apply basic concepts to analyse A.C waveforms.
4. Evaluate and analyse single phase A.C circuits.
5. Evaluate and analyse three phase A.C circuits.
6. Understand the constructional features and operation of electrical machines.

Syllabus

Module	Detailed Contents	Hrs.
1	**DC Circuits** Series and Parallel circuits, Concept of short and open circuits, Star-delta transformation, Ideal and practical voltage and current source, Kirchhoff's laws, Mesh and Nodal analysis (super node and super mesh included), Source transformation.	6
2	**DC Theorems** Linear and Nonlinear Circuit, Active and passive network, Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, (Source transformation not allowed for Superposition theorem).	8
3	**AC fundamentals** Generation of alternating voltages, A.C terminology, RMS and Average value, form factor, crest factor, Phasor representation of alternating quantities, addition and subtraction of alternating quantities using phasors.	3
4	**Single Phase AC Circuits** AC through pure resistor, inductor and capacitor. AC through R-L , R-C and R-L-C series and parallel circuits, phasor diagrams, power and power factor, series and parallel resonance, Q-factor**.**	1
5	**Three Phase AC Circuits** Three phase voltage and current generation, star and delta connections (balanced load only), relationship between phase and line currents and voltages, Phasor diagrams, Basic principle of wattmeter, measurement of power by two wattmeter method .	6
6	**Electrical Machines** Working principle of single-phase transformer, EMF equation of a transformer, Transformation Ratio, Transformer Rating. Losses in transformer.	3

Assessment:

I. Internal Assessment Test:

Two Internal assessments will be conducted for 40 marks each with average marks of both assessments as final score.

II. End Semester Examination:

1. Question paper will consist of 5 questions, each carrying 20 marks.
2. Total 3 questions need to be solved.
3. Q.1 will be compulsory, based on the entire syllabus.
4. Remaining questions will be randomly selected from all the modules.
5. Weightage of marks should be proportional to number of hours assigned to each module

References:

1. "Basic Electrical Engineering", by Prof. B. R. Patil, Oxford Higher Education
2. "Basic Electrical Engineering (BEE)", by Prof.Ravish Singh", McGraw Hill Education
3. B.L.Theraja "Electrical Technology" Vol-I and II, S. Chand Publications, 23 rd ed. 2003.
4. Joseph A Edminister, "Schaum"s outline of theory and problems of electric circuits" Tata McGraw Hill, 2 nd edition
5. D P Kothari and I J Nagrath "Theory and Problems of Basic Electrical Engineering", PHI 13th edition 2011.

Basic Electrical Engineering Laboratory

Hardware Requirements: Hardware Kits, Three phase power supply.

List of Experiments:

1. Mesh and Nodal analysis.
2. Verification of Superposition Theorem.
3. Verification Thevenin's Theorem.
4. Study of R-L series and R-C series circuit.
5. R-L-C series resonance circuit
6. R-L-C parallel resonance circuit
7. Relationship between phase and line currents and voltages in three phase system (star & delta)
8. Power and phase measurement in three phase system by one wattmeter method.
9. Power and phase measurement in three phase system by two wattmeter method

Lab Assessment:

I.Term work Assessment:

Term work consists of performing minimum 06 practical's. Final certification and acceptance of the term work ensures satisfactory performance of laboratory work.

The distribution of Term Work marks will be as follows:

Attendance (Theory, Practicals) : 5 marks

Assignment on entire syllabus : 10 marks

Practicals : 10 marks

II. Oral/Viva Assessment:

The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work. Practical and Oral exam will be based on the entire syllabus

Course Code	Course Name	Credits
FY108	**Engineering Mechanics and Graphics**	**2+2**

Course Code	Course Name	Theory	Practical	Tutorial	Total Contact Hours	Theory	Practical/ Oral	Tutorial	Total Credit
FY108	Engineering Mechanics and Graphics	2	4	-	6	2	2	-	04

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Avg. of 2 Tests					
FY108	Engineering Mechanics and Graphics	40	40	40	60	25	50	-	175

Course Objectives:

The course is aimed

1. To develop the capacity to predict the effects of force and motion and to acquaint the concept of static and dynamic equilibrium.
2. Ability to visualize physical configurations in terms of actual systems and its constraints, and able to formulate the mathematical function of the system.
3. To study, analyze and formulate the motion of moving particles/bodies.
4. To impart and inculcate proper understanding of the theory of projection.
5. To impart the knowledge of reading a drawing and to improve the visualization skill.
6. To teach basic utility of computer aided drafting (CAD) tools.

Course Outcomes:

On successful completion of course learner/student will be able to:

1. Illustrate the concept of force, moment and apply the same along with the concept of equilibrium in two and three dimensional systems with the help of FBD.
2. Illustrate different types of motions and establish Kinematic relations for a particle & rigid body.
3. Analyze particles in motion using force-acceleration, work-energy and impulse momentum principles.
4. Apply the basic principles of projections in reading and converting 3D view to 2D drawing.
5. Visualize an object from the given two views and convert 2D view to 3D drawing.
6. Create, Annotate, Edit and Plot drawings using basic AutoCAD commands and features.

Syllabus:

Module	Detailed Contents	Hrs.
1	**Coplanar and Non-Coplanar Force System and Resultant:** **1.1 System of Coplanar Forces:** Classification of force systems, Principle of transmissibility, composition and resolution of forces. **1.2 Resultant:** Resultant of coplanar and non-coplanar force system (Concurrent forces, parallel forces and non-concurrent non-parallel system of forces). Moment of force about a point, Couples, Varignon's Theorem. Force couple system. Distributed Forces in plane.	**06**
2	**2.1 Equilibrium of System of Coplanar Forces:** Conditions of equilibrium for concurrent forces, parallel forces and non-concurrent non- parallel general forces and Couples. Equilibrium of rigid bodies' free body diagrams. **2.2 Equilibrium of Beams:** Types of beams, simple and compound beams, type of supports and reaction. Determination of reactions at supports for various types of loads on beams. (Excluding problems on internal hinges)	**06**
3	**Kinematics of Particle and Rigid Body:** **3.1 Kinematics of Particles:** Motion of particles with variable acceleration. General curvilinear motion. Tangential and Normal component of acceleration, Motion curves (a-t, v-t, s-t curves). **3.2 Kinematics of Rigid Body:** Translation, Rotation & General Plane motion of Rigid body. The concept of Instantaneous center of rotation (ICR). Location of ICR of mechanism. Velocity analysis of rigid bodies using ICR.	**06**
4	**Kinetics of a Particle:** **4.1 Force and Acceleration: -** Introduction to basic concepts, D'Alemberts Principle, concept of Inertia force, Equations of dynamic equilibrium, Newton's second law of motion. (Analysis limited to simple systems only.) **4.2 Work and Energy:** Work Energy principle for a particle in motion. Application of Work–Energy principle to a system consists of connected masses and Springs. **4.3 Impulse and Momentum:** Principle of linear impulse and momentum. Impact and collision: Law of conservation of momentum, Coefficient of Restitution. Direct Central Impact and Oblique Central Impact. Loss of Kinetic Energy in collision of inelastic bodies.	**06**
5	**5.1 *Introduction to Engineering Graphics** Principles of Engineering Graphics and their significance, usage of Drawing instruments, Types of Lines, Dimensioning Systems as per IS conventions. Introduction to plain and diagonal scales. **5.2 @Introduction to Auto CAD:-** Basic Drawing and Editing Commands. Knowledge of setting up layers, Dimensioning, Hatching, plotting and Printing. **5.3 *Orthographic and Sectional Orthographic Projections: -** Fundamentals of orthographic projections. Different views of a simple machine part as per	**06**

	the first angle projection method recommended by I.S. Full or Half Sectional views of the Simple Machine parts. **5.4 @Drawing of orthographic projections using Autocad.**	
6	**6.1 *Isometric Projection:** Principles of Isometric projection – Isometric Scale, Isometric Views, Conversion of Orthographic Views to Isometric Views (Excluding Sphere). **6.2 @ Drawing of Isometric projections using Autocad.**	**06**

*Will be covered during practical hours. @ Will be covered during Autocad practical hours.

Assessment:

I.Internal Assessment Test (Entirely on Engineering Mechanics):
Assessment consists of two class tests of 40 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and the second class test when an additional 35% syllabus is completed. Duration of each test shall be 90 minutes.

II.End Semester Theory Examination (Entirely on Engineering Mechanics):

1. Question paper will comprise of a total 05 questions, each carrying 20 marks.
2. Total 03 questions need to be solved.
3. Question No: 01 will be compulsory and based on the entire syllabus **(Module 1-4)** wherein 4 sub-questions of 5 marks each will be asked.
4. Remaining questions will be randomly selected from all the modules **(Module 1-4)**.
5. Weightage of each module will be proportional to the number of respective lectures mentioned in the syllabus.

References:

1. Engineering Mechanics by Beer &Johnston, Tata McGrawHill
2. Engineering Mechanics (Statics) by Meriam and Kraige, Wiley Books
3. Engineering Mechanics (Dynamics) by Meriam and Kraige, Wiley Books
4. Engineering Mechanics by F. L. Singer, Harper& Raw Publication
5. Engineering Mechanics by Shaum Series
6. N.D. Bhatt, "Engineering Drawing (Plane and solid geometry)", Charotar Publishing HousePvt. Ltd.
7. N.D. Bhatt & V.M. Panchal, "Machine Drawing", Charotar Publishing House Pvt. Ltd.
8. M.B Shah & B.C Rana, “Engineering Drawing”, Pearson Publications.
9. P.J. Shah, “Engineering Graphics”, S Chand Publications.
10. Dhananjay A Jolhe, “Engineering Drawing” Tata McGraw Hill.
11. Prof. Sham Tickoo (Purdue University) & Gaurav Verma, “(CAD Soft Technologies) : AutoCAD 2012 (For engineers and Designers)”, Dreamtech Press NewDelhi.

Engineering Mechanics & Graphics Laboratory

Term Work:

Component-1 Engineering Mechanics Practical (Any Four)

1. Verification of Polygon law of coplanar forces
2. Verification of Principle of Moments (Bell crank lever)
3. Determination of support reactions of a Simply Supported Beam

4. Kinematics of particles. (Collision of bodies)
5. Kinematics of particles. (Projectile motion)

Component -2 Engineering Graphics Practical
One A-3 size sketch book consisting of:-

1. Simple Orthographic Projections.(4 problems)
2. Sectional Orthographic Projections. (4 problems)
3. Isometric projections. (4 problems)

Component-3 AutoCAD Practical
Printouts of each from:

1. Orthographic Projections with Section – 3 problems.
2. Isometric projections – 4 problems.
3. Reading of Orthographic Projections – 1 problem.

Note:- 2 hrs /week Auto CAD Practical is essential for completing the Auto CAD Drawings and taking required printouts.

Note: Satisfactory submission of all 3 components is mandatory to fulfill the Term.

End Semester Practical Examination (Auto CAD) (2 hours/ 50 Marks.)

1. Isometric drawing. (1 problem) (20 Marks)
2. Orthographic Projection (With Section) (1 problem). (30 Marks)

Course Code	Course Name	Credits
FY109	**Engineering Mechanics**	**3+1**

Course Code	Course Name	Theory	Practical	Tutorial	Total Contact Hours	Theory	Practical / Oral	Tutorial	Total Credit
FY109	Engineering Mechanics	3	2	-	5	3	1	-	04

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Avg. of 2 Tests					
FY109	Engineering Mechanics	40	40	40	60	25	-	25	150

Course Objectives:

The course is aimed

1. To develop the capacity to predict the effects of force and motion and to acquaint the concept of static and dynamic equilibrium.
2. Ability to visualize physical configurations in terms of actual systems and its constraints, and able to formulate the mathematical function of the system.
3. To study, analyze and formulate the motion of moving particles/bodies.

Course Outcomes:

On successful completion of course learner/student will be able to

1. Illustrate the concept of force, moment and apply the same along with the concept of equilibrium in two- and three-dimensional systems with the help of FBD.
2. Determine the centroid and MI of plane lamina.
3. Correlate real life application to specific type of friction and estimate required force to overcome friction.
4. Establish relation between velocity and acceleration of a particle and analyze the motion by plotting the relation.
5. Illustrate different types of motions and establish Kinematic relations for a rigid body.
6. Analyze particles in motion using force and acceleration, work-energy and impulse momentum principles.

Syllabus:

Module	Details	Hours.
1	**Coplanar Force System and Resultant:** **1.1 System of Coplanar Forces:** Classification of force systems, Principle of transmissibility, composition and resolution of forces. **1.2 Resultant:** Resultant of coplanar force system (Concurrent forces, parallel forces and non-concurrent non-parallel system of forces). Moment of force about a point, Couples, Varignon's Theorem. Force couple system. Distributed Forces in plane. **1.3 Equilibrium of the System of Coplanar Forces and Beams:** Conditions of equilibrium for concurrent forces, parallel forces and non-concurrent non- parallel forces and Couples. Equilibrium of rigid bodies' Free body diagrams. Types of beams, simple and compound beams, type of supports and reaction. Determination of reactions at supports for various types of loads on beams.	08
2	**Centroid and MI:** **2.1** First moment of Area, Centroid of composite plane Laminas **2.2** Second moment of Area, MI of composite plane Laminas	05
3	**Forces in Space:** **3.1** System of Non-Coplanar Force System **3.2** Resultant of Non-Coplanar Force System	05
4	**Friction:** **4.1 Static and Dynamic Friction:** Systems of Statics and Dynamic/ Kinetic Friction, Coefficient of Friction, Angle of Friction, Laws of friction. Concept of Cone of friction. **4.2 Wedge Friction:** Equilibrium of bodies on inclined plane. Application to problems involving wedges and ladders.	06
5	**Kinematics of Particle and Rigid Body:** **5.1 Kinematics of Particles:** Motion of particles with variable acceleration. General curvilinear motion. Tangential & Normal component of acceleration, Motion curves (a-t, v-t, s-t curves). **5.2 Kinematics of Rigid Body:** Translation, Rotation and General Plane motion of Rigid body. The concept of Instantaneous center of rotation (ICR) for the velocity. Location of ICR of mechanism. Velocity analysis of rigid body using ICR	06
6	**Kinetics of a Particle:** **6.1 Force and Acceleration:** - D'Alemberts Principle, concept of Inertia force, Equations of dynamic equilibrium, Newton's second law of motion. (Analysis limited to simple systems only.) **6.2 Work and Energy:** Work Energy principle for a particle in motion. Application of Work – Energy principle to a system consists of connected masses and springs.	06

	6.3 Impulse and Momentum: Principle of linear impulse and momentum. Impact and collision: Law of conservation of momentum, Coefficient of Restitution. Direct Central Impact and Oblique Central Impact. Loss of Kinetic Energy in collision of inelastic bodies.	

Assessment:

I.Internal Assessment Test:
Assessment consists of two class tests of 40 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 35% syllabus is completed. Duration of each test shall be 90 minutes.

II.End Semester Theory Examination:
1. Question paper will comprise of a total 05 questions, each carrying 20 marks.
2. Total 03 questions need to be solved.
3. Question No. 01 will be compulsory and based on the entire syllabus wherein sub- questions of 5 marks will be asked.
4. Remaining questions will be mixed in nature. (e.g. Suppose Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
5. In question paper weightage of each module will be proportional to the number of respective lecture hrs. as mentioned in the syllabus.

III.End Semester Oral Examination:
Pair of Internal and External Examiners should conduct an Oral examination of 25 marks based on the entire syllabus.

References:

1. Engineering Mechanics by Beer &Johnston, Tata McGrawHill
2. Engineering Mechanics (Statics) by Meriam and Kraige, WileyBools
3. Engineering Mechanics (Dynamics) by Meriam and Kraige, WileyBools
4. Engineering Mechanics by F. L. Singer, Harper& Raw Publication
5. Engineering Mechanics by ShaumSeries

Engineering Mechanics Laboratory

List of Experiments:

Minimum six experiments from the following list of which at least one should be from dynamics.

1. Verification of Polygon law of coplanar forces
2. Verification of Principle of Moments (Bell crank lever.)
3. Determination of support reactions of a Simply Supported Beam.
4. Determination of coefficient of friction using inclined plane
5. Collision of elastic bodies (Law of conservation of momentum).
6. Kinematics of particles. (Uniform motion of a particle, Projectile motion, motion under gravity)
7. Kinetics of particles. (collision of bodies)

Term Work:

It comprises Laboratory Experiments and Assignments. The distribution of marks for term work shall be as follows:

Practical Work and Journal	: 10 marks
Assignments	: 10 marks
Attendance	: 05 Marks

The final certification and acceptance of TW ensures the satisfactory performance of laboratory work and minimum passing in the TW.

Course Code	Course Name	Credits
FY110	**Engineering Drawing**	**2+2**

Course Code	Course Name	Theory	Practical	Tutorial	Total Contact Hours	Theory	Practical / Oral	Tutorial	Total Credit
FY110	Engineering Drawing	2	4	-	06	2	2	-	04

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Avg. of 2 Tests					
FY110	Engineering Drawing	40	40	40	60	25	50	-	175

Course Objectives:

The course is aimed

1. To develop graphic skills for communication of concepts, ideas and design of engineering products.
2. To impart and inculcate proper understanding of the theory of projection.
3. To impart the knowledge of reading a drawing
4. To improve the visualization skill.
5. To teach basic utility of Computer Aided drafting (CAD) tools.

Course Outcomes:

On successful completion of course learner/student will be able to

1. Apply the basic principles of projections in Projection of Lines and Planes
2. Apply the basic principles of projections in Projection of Solids.
3. Apply the basic principles of sectional views in Section of solids and development of surfaces.
4. Apply the basic principles of projections in converting 3D view to 2D drawing.
5. Read a given drawing and visualize an object from the given two views.
6. Create, Annotate, Edit and Plot drawings using basic AutoCAD commands and features.

Syllabus:

Module	Details	Hours
1	**1.1 Introduction to Engineering Graphics** Principles of Engineering Graphics and their significance, usage of Drawing instruments, Types of Lines, Dimensioning Systems as per IS conventions. Introduction to plain and diagonal scales. **1.2 Engineering Curves** Basic construction of Cycloid, Involutes and Helix (of cylinder) only.	3
2	**2.1 Projection of Points and Lines** Lines inclined to both the Reference Planes (Excluding Traces of lines) and simple application-based problems on Projection of lines. **2.2 Projection of Planes** Triangular, Square, Rectangular, Pentagonal, Hexagonal and Circular planes inclined to either HP or VP only. (Exclude composite planes).	4
3	**Projection of Solids** (Prism, Pyramid, Cylinder, Cone only) Solid projection with the axis inclined to HP and VP. (Exclude Spheres, Composite, Hollow solids and frustum of solids). Use change of position or Auxiliary plane method	5
4	**4.1 Section of Solids** Section of Prism, Pyramid, Cylinder, & Cone cut by plane perpendicular to at least one reference plane (Exclude Curved Section Plane). Use change of position or Auxiliary plane method. **4.2 Development of Lateral Surfaces** Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids, cylinders and cones.	4
5	**5.1 Orthographic and Sectional Orthographic Projections: -** Fundamentals of orthographic projections. Different views of a simple machine part as per the first angle projection method recommended by I.S. Full or Half Sectional views of the Simple Machine parts. **5.2 Missing Views:** The identification of missing views from the given views. Create the third view from the two available views so that all the details of the object are obtained.	5
6	**6.1 Isometric Views: -** Principles of Isometric projection – Isometric Scale, Isometric Views, Conversion of Orthographic Views to Isometric Views (Excluding Sphere).	3

Assessment:

I.Internal Assessment Test:

Assessment consists of two class tests of 40 marks each. Among the two tests one is Conventional (manual drawing) and Second using CAD Software.

II.End Semester Theory Examination:

1. Question paper will comprise of a total 06 questions, each carrying 15 marks.
2. Any 4 questions need to be solved. There won't be any compulsory Question
3. Total 04 questions need to be solved.

4. Questions will be mixed in nature.(e.g. Suppose Q.2 has part (a) from module3 then part (b) will be from any module other than module 3).
5. In question paper weightage of each module will be proportional to the number of respective lecture hrs. as mentioned in the syllabus.

References:

1. N.D. Bhatt, "Engineering Drawing (Plane and solid geometry)", Charotar Publishing House Pvt. Ltd.
2. N.D. Bhatt & V.M. Panchal, "Machine Drawing", Charotar Publishing House Pvt. Ltd.
3. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publisher.
4. Prof. Sham Tickoo (Purdue University) &Gaurav Verma, "(CAD Soft Technologies) : Auto CAD 2012 (For engineers and Designers)", Dreamtech Press NewDelhi.
5. Dhananjay A Jolhe, "Engineering Drawing" Tata McGraw Hill.

Engineering Drawing Laboratory

Laboratory Syllabus:

Component-1 (Use half Imperial Drawing Sheet)

Sr. No.	Activities to be completed in the Drawing Laboratory.	Hours
1	One Practice sheet on projection of solids (Minimum 2 problems)	4
2	Sheet 1: Projection of Solids (3 Problems).	4
3	One Practice sheet on the Section of Solids. (Minimum 2 problems) # Term Sheet 2: Section of solids. (3 problems).	6
4	One practice sheet on Orthographic projection. (Minimum 1 problem) # Term Sheet 3: Orthographic Projection (With section 1 problem, without section 1 problem).	6
5	One practice sheet on Isometric drawing. (Minimum 2 problems) # Term Sheet 4: Isometric Projection. (3 problems).	4

Component-2

Self-study problems/ Assignment: (In A3 size Sketch book, to be submitted as part of Term Work)

1. Engineering Curves. (2 problems)
2. Projection of Lines (2 problems)
3. Projection of planes (2 problems)
4. Projection of solids. (2 problems)
5. Section of solids (2 problems)
6. Orthographic Projection. (With section 1 problem, without section 1 problem).
7. Missing views. (1 problem)
8. Isometric Drawing. (2 problems)

Component-3

Computer Graphics: Engineering Graphics Software - Orthographic Projections, Isometric Projections, Co-ordinate Systems, Multi-view Projection.

	To be Taught in laboratory.	Hours
PART - A	**Overview of Computer Graphics Covering:** Listing the computer technologies that impact on graphical communication, demonstrating knowledge of the theory of CAD software such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.	3
	Customization & CAD Drawing: Consisting of set up of the drawing page and the printer including scale settings, Setting up of units and drawing limits, ISO and ANSI standards for coordinate dimensioning.	3
	Annotations, layering & other Functions Covering: Applying dimensions to objects, applying annotations to drawings, Setting up and use of layers, layers to create drawings, Create, edit and use customized layers, Changing line lengths through modifying existing lines (extend/lengthen), Printing documents to paper using the print command, orthographic projection techniques, Drawing sectional views of objects (simple machine parts).	4
PART -B	**Activities to be completed in the CAD Laboratory. (All printouts to be part of Term Work.**	
	1. Orthographic Projections (without section)- 1 problem	4
	2. Orthographic Projection (with section)- 1 problem	4
	3. Orthographic Reading – 1 problem	2
	4. Isometric Drawing – 3 problems.	4

Term Work:

Component-1	:	7Marks
Component-2	:	6 Marks
Component-3	:	7 Marks
Attendance	:	5 Marks
Total Marks	:	25 Marks

Note: Satisfactory submission of all 3 components is mandatory to fulfill the Term.

End Semester Practical Examination: (Auto CAD) (2 hours/ 50 Marks)

1. Isometric drawing (1 problem) (20 Marks)
2. Orthographic Projection (With Section) (1 problem). (30 Marks)

Course Code	Course Name	Credits
FY 111	**C Programming**	**2+2**

Course Code	Course Name	Scheme	Theory	Practical	Tutorial	Total
FY 111	C Programming	Contact Hours	2	2	-	4
		Credits	2	1	-	3

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal Assessment			End Sem Exam				
		IA 1	IA 2	Average					
FY 111	C Programming	40	40	40	60	25	25	-	150

Course Objectives:

The course is aimed to:

1. To provide exposure to problem-solving by developing algorithms and designing flowchart.
2. Implement the logic to solve real world problems using the C programming language.
3. To develop solutions using different programming concepts.
4. To decompose solutions into smaller units using functions.
5. To create different types of data-structure using structure and arrays.
6. Describe the dynamics of memory using a pointer.

Course Outcomes:

On successful completion of course learner/student will be able to:

1. Understand the basic terminology used in computer programming.

2. Use different data types, operators and keywords to write programs
3. Able to logically code using control statements and loops.
4. Design programs involving functions and recursive function.
5. Use the concepts of arrays, strings and Structures to structure complex programs
6. Use of pointers to access different user defined data types like arrays, Strings and Structures

Syllabus:

Module	Module	Detailed Content	Hrs.
1	Fundamentals of C Programming	History of C programming language and its features 1.1 Algorithm & Flowchart : Three construct of Algorithm and flowchart: Sequence, Decision (Selection) and Repetition 1.2 Character Set, Identifiers and keywords, Data types, Constants, Variables. 1.3 Operators-Arithmetic, Relational and logical, Assignment, Unary, Conditional, Bitwise, Comma, other operators. Expression, statements, Preprocessor, Structure of basic C program.	5
2	Control Flow Statements	2.1 Decision making statements- if statement, if-else statement , if-else-if ladder, nested if-else, switch statement 2.2 Looping – while , do-while, for 2.3 Jump Statements- break, continue, goto, return, exit	10
3	Functions	3.1 Introduction to Functions, declaring and defining function, calling function, passing arguments to a function, recursion and its application. 3.2 Library functions – getchar( ), putchar( ), gets( ), puts( ), Math function, Ctype functions 3.3 Storage classes in C-auto, extern, static, register.	5
4	Arrays and Strings	4.1 Array Introduction, Declaration, Initialization, Accessing array element, One and Two-dimensional array. 4.2 Strings Introduction, String using char array, String handling functions	7
5	Structures	5.1 Structure Introduction, Declaration, Initialization, operations on structure. 5.2 Nested structure, Array of Structure.	3

6	Pointers	6.1 Pointer :Introduction, Definition, Pointer Variables, Referencing and Dereferencing operator, Pointer Arithmetic, Pointers to Pointers, void Pointer, 6.2 Pointers to Array and Strings, Passing Arrays to Function, Accessing structure using pointers, Array of Pointers, call by value and call by reference. 6.3 Dynamic Memory Allocation using malloc, calloc, realloc, free	6

Assessment:

I.Internal Assessment :

Two class tests of 40 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and the second class test when an additional 35% syllabus is completed. Duration of each test shall be one and half hour.

II.End Semester Theory Examination:

In question, paper weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

1. Question paper will consist of 3 questions, each carrying 20 marks.
2. Question number 1 will be compulsory and based on maximum contents of the syllabus
3. Remaining questions will be mixed in nature (for example, if Q.2 has part (a) from module 3 then part (b) will be from other than module 3)
4. Total three questions need to be solved.

References:

1. "Programming in ANSI C", by E. Balaguruswamy, Tata McGraw-Hill Education
2. "A Computer Science –Structure Programming Approaches using C ", by BehrouzForouzan , Cengage Learning
3. "Let Us C", by Yashwant Kanetkar, BPB Publication
4. "MASTERING C" by K.R.Venugopal and SudeepR.Prasad , Tata McGraw-Hill Publications.
5. "Programming Techniques through C", by M. G. Venkateshmurthy, Pearson Publication.
6. "Programming in C", by Pradeep Dey and Manas Gosh, Oxford University Press.
7. Schaum's outlines "Programming with C", by Byron S. Gottfried, Tata McGraw-Hill Publications.
8. "Basics of Computer Science", by BehrouzForouzan , Cengage Learning .

C Programming-Laboratory

List of Experiments:

1.Write algorithm and draw flowchart to find roots of quadratic equation
2.Write a program to swap two integers with and without using temporary variables.
3.Write a program to calculate the volume of a cone. Accept radius & height from the user.
4.Write a program to find the greatest among three integers using ternary operator & if-else.
5.An electric power distribution company charges its domestic customer as follows :

Consumption Units	Rate of charge
0 - 200	0.50 per unit
201 - 400	Rs. 100 plus 0.65 per unit excess of 200 units
401 - 600	Rs. 230 plus 0.85 per unit excess of 400 units
601 above	Rs. 390 plus 1.00 per unit excess of 600 units.

Program should read units consumed for a customer and calculate the total bill.

6. Write a program to take input for a character and print the month names starting with that character using a switch case. (Ex: I/P = 'A', O/P = April, August).
7. Write a program to find the result of the series:
   1 - 2^2/3 + 3^2/5……+ n^2/(2n-1)
8. Write a program to print the following pattern : (Take input for the no. of lines 'N').
   *
   * *
   * * *
   * * * *
9. Write a program to print the following pattern : (Take input for the no. of lines 'N').
   1
   12A
   123BA
   1234CBA
10. Write a program to find if the given number is a palindrome number or not.
11. Write a program for the sum of natural numbers using a recursive function.
12. Write a program to illustrate different ways of passing parameters to a function to demonstrate increment/decrement operators.
13. Write a program to cyclically rotate elements of the integer array in the right direction.
14. Write a program to find transpose using the same matrix.
15. Write a program to find the reverse of a string using another string (Define a user defined function to find the length of the string).
16. Write a program using Structure to accept employee name, emp_id, date_of_joining and salary. Display the result in descending order of salary. Store data for N Employees.
17. Write a program to dynamically allocate memory for the user entered size 'N' of an array, accept 'N' integers from the user and find the average of these integers using function and pointer (Pass array to the function using pointer).

Practical Assessment:

A Practical / Oral exam will be held based on the above syllabus. The final certification and acceptance of TW ensures the satisfactory performance of laboratory work and minimum passing in the TW.

A. Term Work: Term Work shall consist of practical's based on the above list. Also, Term work Journal must include at least 2 assignments based on the topics mentioned in the syllabus.

B. Term Work Marks: 25 Marks (Total marks) = 15 Marks (Experiments) + 5 Marks (Assignments) + 5 Marks (Attendance)

Course Code	Course Name	Credits
FY 112	**Python Programming**	**3+1**

Course Code	Course Name	Scheme	Theory	Practical	Tutorial	Total
FY 112	Python Programming	Contact Hours	3	2	-	5
		Credits	3	1	-	4

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal Assessment			End Sem Exam				
		IA 1	IA 2	Average					
FY 112	Python Programming	40	40	40	60	25	25	-	150

Course Objectives:

1. Basics of python including data types, operator, conditional statements, looping statements, input andoutput functions in Python.
2. List, tuple, set, dictionary, string, array and functions
3. Object Oriented Programming concepts in python
4. Concepts of modules, packages, multithreading and exception handling
5. File handling

Course Outcomes:

Upon completion of the course students will be able

1. To understand the structure, syntax of the Python language.
2. To interpret varied data types in python.
3. To implement arrays and functions.

4. To illustrate the concepts of object-oriented programming as used in Python.
5. To create Python applications using modules, packages, multithreading and exception handling.
6. To gain proficiency in writing File Handling programs.

Syllabus:

	Module	Description	hrs
	Prerequisite	Python IDE installation and environment setup.	
	Basics of Python	Introduction, Features, Python building blocks – Identifiers, Keywords, Indention, Variables and Comments, Basic data types (Numeric, Boolean, Compound) Operators: Arithmetic, comparison, relational, assignment, logical, bitwise, membership, identity operators, operator precedence Control flow statements: Conditional statements (if, if…else, nested if) Looping in Python (while loop, for loop, nested loops) Loop manipulation using continue, pass, break. Input/output Functions, Decorators, Iterators and Generators.	06

	Advanced data types & Functions	Lists: a) Defining lists, accessing values in list, deleting values in list, updating lists b) Basic list operations c) Built-in list functions Tuples: a) Accessing values in Tuples, deleting values in Tuples, and updating Tuples b) Basic Tuple operations c) Built-in Tuple functions Dictionaries: a) Accessing values in Dictionary, deleting values in Dictionary, and updating Dictionary b) Basic Dictionary operations c) Built-in Dictionary functions Sets: a) Accessing values in Set, deleting values in Set, updating Sets b) Basic Set operations, c) Built-in Set functions Strings: a) String initialization, Indexing, Slicing, Concatenation, Membership & Immutability b) Built-in String functions.	
	Array and Functions	Arrays: a) Working with Single dimensional Arrays: Creating, importing, Indexing, Slicing, copying and processing array arrays. b) Working with Multi-dimensional Arrays using NumPy: Mathematical operations, Matrix operations, aggregate and other Built-in functions Functions: a) Built-in functions in python b) Defining function, calling function, returning values, passing parameters c) Nested and Recursive functions d) Anonymous Functions (Lambda, Map, Reduce, Filter)	

	Object Oriented Programming	Overview of Object-oriented programming, Creating Classes and Objects, Self-Variable, Constructors, Inner class, Static method. Inheritance: Types of Inheritance (Single, Multiple, Multi-level, Hierarchical), super() method, Constructors in inheritance, Method overloading, Method overriding, Abstract class, Abstract method	
	Modules and Packages	Modules: Writing modules, importing objects from modules, Pythonbuilt-in modules (e.g. Numeric and Mathematical module, Functional Programming module, Regular Expression module), Namespace and Scoping. Packages: creating user defined packages and importing packages. Multi-threading: process vs thread, use of threads, types of threads, creating threads in python, thread synchronization, deadlock of threads. Exception handling: Compile time errors, Runtime errors, exceptions, types of exception, try statement, except block, raise statement, Assert statement, User-Defined Exceptions.	
	File handling	File Handling: Opening file in different modes, closing a file, Writing to a file, accessing file contents using standard library functions , Reading from a file – read( ), readline( ), readlines(), Renaming and Deleting a file, File Exceptions, Pickle in Python.	

Assessment:

I.Internal Assessment Test:

Assessment consists of two class tests of 40 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and the second class test when an additional 35% syllabus is completed.

II.End Semester Theory Examination:

1. Question paper will comprise of total 05 questions, each carrying 20 marks.
2. Total 03 questions need to be solved.
3. Question No: 01 will be compulsory and based on the entire syllabus wherein 4/5 sub-questions of 5/4 marks each will be asked.
4. Remaining questions will be randomly selected from all the modules.
5. Weightage of each module will be proportional to the number of respective lectures mentioned in the syllabus.

References:

1. Dr. R. Nageswara Rao, "Core Python Programming" , Dreamtech Press, Wiley Publication
2. M. T. Savaliya , R. K. Maurya, "Programming through Python", StarEdu Solutions.
3. E Balagurusamy, "Introduction to computing and problem solving using python", McGraw Hill Publication.
4. Zed A. Shaw, "Learn Python 3 the Hard Way", Zed Shaw's Hard Way Series.
5. Martin C. Brown," Python: The Complete Reference", McGraw-Hill Publication.
6. Paul Barry," Head First Python", 2nd Edition, O'Reilly Media, Inc.

Web resources:

1. https://docs.scipy.org/doc/numpy/user/quickstart.html
2. https://matplotlib.org/tutorials/
3. https://pandas.pydata.org/docs/getting_started/

4. https://www.geeksforgeeks.org/python-build-a-rest-api-using-flask/ Back to Scheme

Python Programming Laboratory

Minimum Hardware Requirements	Software Requirements	Other Requirements
PC With following Configuration 1. Intel Dual core Processor or higher 2. Minimum 2 GB RAM 3. Minimum 40 GB Hard disk 4. Network interface card	1. Windows or Linux Desktop OS 2. Python 3.6 or higher 3. Notepad ++ 4. Python IDEs like IDLE, Pycharm, Pydev, Netbeans or Eclipse 5. Mysql	1.Internet Connection for installing additional packages

List of suggested Experiments:

1. Write python programs to understand
   a) Basic data types, Operators, expressions and Input Output Statements
   b) Control flow statements: Conditional statements (if, if…else, nested if)
   c) Looping in Python (while loop, for loop, nested loops)
2. Write python programs to understand
   a) Different List and Tuple operations using Built-in functions
   b) Built-in Set and String functions
3. Write python programs to understand
   c) Basic Array operations on 1-D and Multidimensional arrays
   d) Implementing User defined and Anonymous Functions
4. Write python programs to understand
   a) Classes, Objects, Constructors and Static method
   b) Different types of Inheritance
   c) Method overloading, Method overriding, Abstract class and Abstract method
5. Write python programs to understand
   a) Creating User-defined modules/packages and import them in a program
   b) Creating user-defined multithreaded application to demonstrate simultaneous execution of multiple threads
   c) Creating a menu driven applications which should cover the built-in exceptions in python
6. Write python programs to understand
   a) Different File Handling operations in Python

Lab Assessments:

1. Term work Assessment:

The Term work shall consist of at least 15 practical's based on the above list. The term work Journal must include at least 2 Programming assignments. The Programming assignments should be based on real world applications which cover concepts from more than one module of syllabus.

Term Work Marks: 25 Marks (Total marks) = 15 Marks (Experiment) + 5 Marks (Assignments/tutorial/write up) + 5 Marks (Attendance)

2. Oral/Viva Assessment:

An Oral & Practical exam will be held based on the above syllabus.

Course Code	Course Name	Credits
FY 113	**Java Programming**	**3**

Course Code	Course Name	Scheme	Theory	Practical	Tutorial	Total
FY 113	Java Programming	Contact Hours	2	2	-	4
		Credits	2	1	-	3

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal Assessment			End Sem Exam				
		IA 1	IA 2	Average					
FY 113	Java Programming	30	30	30	45	25	25	-	125

Course Objectives:

The course is aimed to:

1. To learn the basic concepts of object-oriented programming
2. To understand the importance of Classes & objects along with constructors
3. To study and understand Arrays, Strings and vectors
4. To study various concepts of JAVA programming like multithreading, exception Handling, packages, etc.
5. To explain components of GUI based programming.

Course Outcomes:

On successful completion of course learner/student will be able to:

1. To apply fundamental programming constructs
2. To illustrate the concept of packages, classes and objects.
3. To elaborate the concept of strings, arrays and vectors
4. To implement the concept of inheritance and interfaces
5. To implement the concept of exception handling and multithreading
6. To develop GUI based applications.

Syllabus:

Prerequisite: Basics of Computer Programming

Module No	Module	Detailed Contents of Module	Hrs.

1	Introduction to Object Oriented Programming	**Overview of procedure and object oriented Programming, Introduction to the principles of object oriented programming**: Classes, Objects, Abstraction, Encapsulation, Inheritance, Polymorphism, Message passing Features of Java Language , JDK, JRE , keywords, Data types, Variables, Operators, Expressions, Types of variables and methods. **Control Statements**: If Statement, If-else, Nested if, switch Statement, break, continue. **Iteration Statements:** for loop, while loop, and do- while loop	08
2	Class, Object, Packages and Input/output	**Classes & Objects:** Reference Variables, Passing parameters to Methods and Returning parameters from the methods, Static members, Non-Static members, Method overloading, Recursive method **Constructors:** Types of Constructors, chaining of constructor, finalize() Method, Constructors Overloading. **Packages** in java, types, user defined packages Defining packages, creating packages and Importing and accessing packages **Input and output functions** in Java, Command Line Arguments, Scanner class	08
3	Array, String and Vector	Array, Strings, String Buffer class, Wrapper classes, Vectors	03
4	Inheritance, Abstract Class and Interfaces	**Inheritance:** Inheritance Basics, Types of Inheritance in Java, member access, using Super- to call superclass Constructor, to access member of super class(variables and methods), creating multilevel hierarchy, Constructors in inheritance, method overriding, **Abstract classes** and methods, using final, Dynamic Method Dispatch **Interfaces:** Defining, implementing and extending interfaces, variables in interfaces, Default Method in Interface, Static Method in interface, Abstract Classes vs Interfaces.	08
5	Exception handling and Multithreading	**Exception Handling:** Exception Handling Fundamentals, Exception Types, Exception class Hierarchy, Using try and catch, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Java's Built-in Exceptions, Creating Your Own Exception Subclasses **Multithreaded Programming:** The Java Thread Model and Thread Life Cycle, Thread Priorities, creating a Thread, Implementing Runnable, Extending Thread, Creating Multiple Threads, Synchronization: Using Synchronized Methods, The synchronized Statement	05
6	GUI programming in JAVA	**Designing Graphical User Interfaces in Java:** Components and Containers, Basics of Components, Using Containers, Layout Managers, AWT Components **Event-Driven Programming in Java:** Event-Handling Process, Event-Handling Mechanism, Event Listeners **Introducing Swing:** AWT vs Swings, Components and Containers, Swing Packages, A Simple Swing Application, Painting in Swing, Designing Swing GUI Application using	08

		Buttons, JLabels, Checkboxes, Radio Buttons, JScrollPane, JList, JComboBox, etc. **Introduction to JDBC**: Introduction to JDBC, JDBC-ODBC connectivity, JDBC architecture.	

Assessment:

I.Internal Assessment :

Two class tests of 30 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and the second class test when an additional 35% syllabus is completed. Duration of each test shall be one hour.

II.End Semester Theory Examination:

In question, paper weightage of each module will be proportional to the number of respective lecture hours as mentioned in the syllabus.

1. Question paper will consist of 3 questions, each carrying 15 marks.
2. Question number 1 will be compulsory and based on maximum contents of the syllabus
3. Remaining questions will be mixed in nature (for example, if Q.2 has part (a) from module 3 then part (b) will be from other than module 3)
4. Total three questions need to be solved.

References:

1. Herbert Schildt, "Java-The Complete Reference", Tenth Edition, Oracle Press, Tata McGraw Hill Education.
2. E. Balguruswamy, "Programming with Java A primer", Fifth edition, Tata McGraw Hill Publication
3. Anita Seth, B.L.Juneja, " Java One Step Ahead", Oxford university press.
4. D.T. Editorial Services, "Java 8 Programming Black Book", Dreamtech Press.
5. Learn to Master Java by Star EDU Solutions
6. Yashvant Kanetkar, "Let Us Java", 4th Edition ,BPB Publication

Java Programming- Laboratory

List of Experiments:

Hardware & Software Requirements:

Hardware Requirements	Software Requirements	Other Requirements
PC With Following Configuration: 1. Intel PIV Processor 2. 2 GB RAM 3. 500 GB Hard disk 4. Network interface card	1. Windows or Linux Desktop OS 2. JDK 1.8 or higher 3. Notepad ++ 4.JAVA IDEs like Netbeans or Eclipse	1. Internet Connection for installing additional packages if required

1. Programs on Basic programming constructs like branching and looping
2. Programs on Basic programming constructs like branching and looping
3. Programs on class and objects
4. Program on method and constructor overloading.

5. Program on Packages
6. Program on 2D array, strings functions
7. Program on String Buffer and Vectors
8. Program on types of inheritance
9. Program on Multiple Inheritance
10. Program on abstract class and abstract methods
11. Program using super and final keyword
12. Program on Exception handling
13. Program on user defined exception
14. Program on Multithreading
15. Program to create GUI application
16. Mini Project based on the content of the syllabus (Group of 3-4 students)

Practical Assessment: An Practical / Oral exam will be held based on the above syllabus. The final certification and acceptance of TW ensures the satisfactory performance of laboratory work and minimum passing in the TW.

A. Term Work: Term Work shall consist of practical's based on the above list. Also Term work Journal must include at least 2 assignments based on the topics mentioned in the syllabus.

B. Term Work Marks: 25 Marks (Total marks) = 15 Marks (Experiment) + 5 Marks (Assignments) + 5 Marks (Attendance)

Course Code	Course Name	Credits
FY 114	**Professional Communication and Ethics-I**	**3**

Subject Code	Subject Name	Theory (Hrs)	Practical (Hrs)	Tutorial (Hrs)	Theory (Credits)	Practical/Oral (Credits)	Tutorial (Credits)	Total (Credits)
FY 114	Professional Communication and Ethics-I	2	02	--	2	01	--	03

Subject Code	Subject Name	Examination Scheme (tentative)							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
FY 114	Professional Communication and Ethics-I	-20-	-20-	-20-	30--	25	--		75

Course Objectives:

The course is aimed

1. To understand, compare and demonstrate the importance and relevance of communication with specific emphasis on listening skill.
2. To promote practice in speaking skill and encourage learners to compose on the spot speeches for the purpose of developing and generating ideas.
3. To train learners in reading strategies that will enhance their global understanding of the text and help them to comprehend academic and business correspondence.
4. To illustrate effective writing skills in business, academic and technical areas.
5. To inculcate confident personality traits with grooming and social etiquette.
6. To train learners in producing words on the basis of contextual cues and reflect on errors in sentences.

Course Outcomes:

On successful completion of course learner/student will be able to:

1. Listen, comprehend and identify potential barriers in spoken discourse with ease and accuracy.
2. Develop confidence and fluency in speaking at social,academic and business situations as well as make effective professional presentations.
3. Implement reading strategies for systematic, logical understanding, that will enhance the skill of comprehension, summarisation and evaluation of texts.
4. Understand and demonstrate effective writing skills in drafting academic, business and technical documents.
5. Communicate effectively in academic as well as business settings, displaying refined grooming and social skills.
6. Anticipate the meaning of unfamiliar words with the help of contextual cues and construct grammatically correct sentences.

Syllabus:

Module	Detailed Contents	Hrs.
1	**The Importance and Strategies of Effective Listening Prerequisite: Able to listen, read, speak, write and comprehend the target language** Introduction to communication 1.1 Importance and relevance of communication 1.2 Listening skill -ability to discriminate stress and intonation -Comprehend meaning of audio text-graded on the basis of vocabulary, sentence construction and theme. -potential barriers	**5 Hrs**
2	**Developing Speaking Skills** 2.1 Intensive Speaking- on the spot topics 2.2 Responsive speaking-answering a question 2.3 Interactive speaking-conversations 2.4 Extensive speaking-speech, oral presentations-specific emphasis on plagiarism check and generating the report	**6 Hrs**

3	**Strategies and Techniques to build Reading Skil** 3.1 Develop the process of reading- a) predicting content from the given title, b) anticipating content from the given sentence, c) skimming for understanding the theme of the passage, d) scanning for specific information, e) guessing the meaning of unfamiliar words from the context, that is, the careful analysis of structural words f) inferring from the content- conclusion reached on the basis of evidence and reasoning g) deduction- logical conclusions based on the information given in a text Special emphasis on reading comprehension exercises and summarisation	**5 Hrs**
4	**Developing Professional Writing Skills** 4.1 Effective introduction with emphasis on general statement, opposing statement and thesis statement 4.2 Critical response to a text with special reference to purpose, evaluation of the content, theme and style of a text 4.3 Organization of ideas, sentence construction and word choice, grammar and usage 4.4 Explanation and support of ideas (special reference to writing paragraphs and business letters- Sales and Claim letters}	**6 hrs**
5	**Etiquette and Grooming for Personality Development** 5.1 Social Etiquette 5.2 Corporate etiquette 5.3 Confidence building and Personality development	**1 Hr**
6	**Vocabulary and Grammar** 6.1 Contextual vocabulary Development- Word Maps 6.2 Identifying errors in a sentence.	**1 Hr**

Assessment:

I.Internal Assessment Test:
Assessment consists of two class tests of 20 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and the second class test when an additional 35% syllabus is completed. Duration of each test shall be 60 minutes**.(Note: Summarization should be a compulsory question in Test II and not in the End Semester Theory Examination)**

II. End Semester Theory Examination:
Total marks 30, duration 1 and half hours.

1. Question paper will consist of 5 questions, each carrying 10 marks.
2. Total 3 questions need to be solved.
3. Q.1 will be compulsory, based on the entire syllabus.
4. Remaining questions will be randomly selected from all the modules.
5. Weightage of marks should be proportional to the number of hours assigned to each module.

References:

1.Raman Meenakshi & Sharma Sangeeta, *Communication Skills*, Oxford University Press
2.Kumar Sanjay & Lata Pushp, *Communication Skills*, Oxford University Press
3.Locker, Kitty O. Kaczmarek, Stephen Kyo. (2019). Business Communication: Building Critical Skills. Place of publication not identified: Mcgraw-hill.
4.Murphy, H. (1999). Effective Business Communication. Place of publication not identified: Mcgraw-Hill.
5.Lewis, N. (2014). Word power made easy. Random House USA.

Professional Communication and Ethics-I Laboratory

Lab Prerequisite: Basic language skills

Syllabus:

Sr. No.	Level 1. Basic 2. Design 3. Advanced 4. Project/Case Study/Seminar	Detailed Lab/Tutorial Description	LO Mapping
1	Assignment 1	Written record of listening activities-Listening practice tasks of 3 types (through audio recordings of (1) Monologues (2) Dialogues (3) Formal/Expert Talk or Lecture)	LO1
2	Assignment 2	Transcription of the public speech along with a plagiarism report-Practice public speech	LO2
3	Assignment 3	Summarization through graphic organisers (1. Text to graphic organizer 2. Graphic organizer to text)	LO3
4	Assignment 4	1. Case studies on critical thinking 2. 2 business letters in complete block format.	LO4
5	Assignment 5	Documentation of case studies/Role play based on Module 5	LO5
6	Assignment 6	1. Contextual Vocabulary Development 2. Aptitude Test	LO6

Term work:

Term Work shall consist of 6 Assignments .

The distribution of marks for term work shall be as follows:

1.Assignments : **10 marks**

2.Oral Exam/ Public Speaking : **10 marks**

3.Attendance (Theory and Tutorial) : **05 marks**

Course Code	Course Name	Credits
FY 115	**Engineering Workshop I**	**1.5**

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Tut.	Pract.	Total
FY 115	Engineering Workshop I	--	3	--	--	--	1.5	1.5

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract./oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test1	Test 2	Avg.					
FY 115	Engineering Workshop I	--	--	--	--	--	50	--	50

Course Objectives:

1. To impart training to help the students develop engineering skill sets.
2. To inculcate respect for physical work and hard labor.
3. To get exposure to interdisciplinary engineering domain.

Course Outcomes: Learners will be able to…

1. Develop the necessary skill required to handle/use different fitting tools.
2. Develop skills required for hardware maintenance.
3. Able to install an operating system and system drives.
4. Able to identify the network components and perform basic networking and crimping.
5. Able to prepare the edges of jobs and do simple arc welding.
6. Develop the necessary skill required to handle/use different plumbing tools.

7. Demonstrate the turning operation with the help of a simple job.

Trade	Detailed Content	Hrs.

Note: Trade 1 and 2 are compulsory. Select any two trade topics out of the topic at trade 3 to 5. Demonstrations and hands on experience to be provided during the periods allotted for the same. Report on the demonstration including suitable sketches is also to be included in the term work.
CO-1 is related to Trade-1.
CO-2 to CO-4 is related to Trade-2.
CO-5 is related to trade-3.
CO-6 is related to Trade-4.
CO-7 is related to Trade-5.
CO evaluation is to be done according to the opted Trades in addition to **Compulsory Trades.**Can select Any two trade topics out of the topic at trade 3 to 5. Demonstrations and hands on experience to be provided during the periods allotted for the same.

Trade-1	**Fitting (Compulsory):** Use and setting of fitting tools for chipping, cutting, filing, marking, center punching, drilling, tapping. Term work to include one job involving following operations : filing to size, one simple male- female joint, drilling and tapping		**10**
Trade-2	**Hardware and Networking: (Compulsory)** Dismantling of a Personal Computer (PC), Identification of Components of a PC such as power supply, motherboard, processor, hard disk, memory (RAM, ROM), CMOS battery, CD drive, monitor, keyboard, mouse, printer, scanner, pen drives, disk drives etc. · Assembling of PC, Installation of Operating System (Any one) and Device drivers, Boot-up sequence. Installation of application software (at least one) · Basic troubleshooting and maintenance · Identification of network components: LAN card, wireless card, switch, hub, router, different types of network cables (straight cables, crossover cables, rollover cables) Basic networking and crimping. NOTE: Hands on experience to be given in a group of not more than four students		**08**
Trade-3	**Welding:*** Edge preparation for welding jobs. Arc welding for different jobs like, Lap welding of two plates, butt welding of plates with simple cover, arc welding to join plates at right angles.		**06**
Trade 4	**Plumbing*:** Use of plumbing tools, spanners, wrenches, threading dies, demonstration of preparation of a domestic line involving fixing of a water tap and use of coupling, elbow, tee, and union etc.		**06**

Trade-5	**Machine Shop*** At least one turning job is to be demonstrated and simple job to be made for Term Work in a group of 4 students.		**06**

* Optional trade can choose Two trade out of 3,4 and 5

Workshop Assessment

InternalAssessment: 50mark

Term Work:

1. All the jobs mentioned above.

2 Complete Work-Shop Book giving details of drawing of the job and time sheet

The distribution of marks for Term work shall be as follows:

JobWork:30Marks

Workshopbook :10 marks

Attendance: 10 marks

References:

1. Workshop Technology by H K Hajara Choudhary
2. Manufacturing Technology by R C Jain
3. Workshop Technology by R S Khurmi and J S Gupta

Course Code	Course Name	Credits
FY 116	**Engineering Workshop II**	**1**

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	**Theory**		**Pract.**	**Total**
FY 116	Engineering Workshop II		3				**1**	**1**

Course Code	Course Name	Examination Scheme			
			Term Work	Practical	Total
FY 116	Engineering Workshop II		50		50

Course Objectives

1. To impart training to help the students develop engineering skill sets.
2. To inculcate respect for physical work and hard labor.
3. To get exposure to interdisciplinary engineering domain.

Course Outcomes:

Learner will be able to…

1. Develop the necessary skill required to handle/use different carpentry tools.
2. Identify and understand the safe practices to adopt in the electrical environment.
3. Demonstrate the wiring practices for the connection of simple electrical load/ equipment.
4. Design, fabricate and assemble pcb.
5. Develop the necessary skill required to handle/use different masons tools.
6. Develop the necessary skill required to use different sheet metal and brazing tools.
7. Able to demonstrate the operation, forging with the help of a simple job.

Trade	Detailed Content	Hrs.
Note: Trade 1 and 2 are compulsory. Select any two trade topics out of the topic trade 3 to 5. Demonstrationsandhandsonexperiencetobeprovidedduringtheperiodsallottedforthesame.Reporton the demonstration including suitable sketches is also to be included in the term work Trade evaluation is to be done according to the opted Trades in addition to Compulsory Trades.		
Trade-1	**Carpentry (Compulsory)** 6. Use and setting of hand tools like hacksaws, jack planes, chisels and gauges for construction of various joints, wood tuning and modern wood turning methods. 7.Termworktoincludeonecarpentryjobinvolvingajointandreportondemonstrationofajob involving wood turning	**10**
Trade-2	**Basic Electrical workshop:(Compulsory):** 8. Single phase and three phase wiring. Familiarization. Of protection switch-gears and their ratings (fuse, MCB, ELCB). Wiring standards, Electrical safety in the workplace, safe work practices. Protective equipment. 9. Layout: drawing, layout transfer to pcb, etching and drilling and soldering technique	**08**
Trade-3	**Measurement*** 10. Vernier Height gauge, wire gauge, Dial gauge. Use of the listed gauges and precaution.	**06**
Trade 4	**Sheet metal working*** 11.Use of sheet metal, working hand tools, cutting, bending, spot welding operation	**06**
Trade-5	**Forging (Smithy):*** 12. At least one forging job to be demonstrated and a simple job to be made for Term Work in a group of 4 students.	**06**

* Students can choose Two trades out of Trades 3,4 &5.

Total hours= 10+8+6+6=30 hours

2. Complete Work-Shop Book giving details of drawing of the job and time sheet The distribution of marks for Term work shall be as follows:

2. Job Work: 30 Marks
3. Workshop book 10 marks
4. Attendance : 10 marks

References:

4. Workshop Technology by H K Hajara Choudhary
5. Manufacturing Technology by R C Jain
6. Workshop Technology by R S Khurmi and J S Gupta

Course Code	Course Name	Credits
FY117	**Basic Workshop Practice I**	**1.5**

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Tut.	Pract.	Total
FY 117	Basic Workshop Practice-I	--	2	--	--	--	1.5	1.5

Course Code	Course Name	Examination Scheme			
			Term Work	Pract./ oral	Total
FY 117	Basic Workshop Practice-I		50	--	50

Course Objectives:

1. To impart training to help the students develop engineering skill sets.
2. To inculcate respect for physical work and hard labor.
3. To get exposure to interdisciplinary engineering domain.

Course Outcomes: Learners will be able to…

1. Develop the necessary skill required to handle/use different fitting tools.
2. Develop skills required for hardware maintenance.
3. Able to install an operating system and system drives.
4. Able to identify the network components and perform basic networking and crimping.
5. Able to prepare the edges of jobs and do simple arc welding.
6. Develop the necessary skill required to handle/use different plumbing tools.
7. Demonstrate the turning operation with the help of a simple job.

Trade	Detailed Content	Hrs.

Note: Trade 1 and 2 are compulsory. Select any one trade topic out of the topic at trade 3 to 5. Demonstrations and hands on experience to be provided during the periods allotted for the same. Report on the demonstration including suitable sketches is also to be included in the term work.
CO-1 is related to Trade-1.
CO-2 to CO-4 is related to Trade-2.
CO-5 is related to trade-3.
CO-6 is related to Trade-4.
CO-7 is related to Trade-5.
CO evaluation is to be done according to the opted Trades in addition to **Compulsory Trades. Students Can** select any one trade topics out of the topic at trade 3 to 5. Demonstrations and hands on experience to be provided during the periods allotted for the same.

Trade-1	**Fitting (Compulsory):** Use and setting of fitting tools for chipping, cutting, filing, marking, center punching, drilling. Term work to include one job involving following operations : filing to size, one simple male- female joint & drilling.	**08**
Trade-2	**Hardware and Networking: (Compulsory)** Dismantling of a Personal Computer (PC), Identification of Components of a PC such as power supply, motherboard, processor, hard disk, memory (RAM, ROM), CMOS battery, CD drive, monitor, keyboard, mouse, printer, scanner, pen drives, disk drives etc. · Installation of Operating System (Any one) and Device drivers, Boot-up sequence. Installation of application software (at least one) · Identification of network components: LAN card, wireless card, switch, hub, router, different types of network cables (straight cables, crossover cables, rollover cables) Basic networking and crimping. NOTE: Hands on experience to be given in a group of not more than four students.	**08**
Trade-3	***Welding:** Edge preparation for welding jobs. Arc welding for different jobs like, Lap welding of two plates, butt welding of plates with simple cover, arc welding to join plates at right angles.	**04**
Trade- 4	***Plumbing:** Use of plumbing tools, spanners, wrenches, threading dies, demonstration of preparation of a domestic line involving fixing of a water tap and use of coupling, elbow, tee, and union etc.	**04**

Trade-5	***Machine Shop:** At least one turning job is to be demonstrated and a simple job to be made for Term Work in a group of 4 students.	**04**

Total Hours = 8+8+4=20.* One Optional trade can be chosen out of 3,4 and 5

Workshop Assessment

Internal Assessment: 50

Marks Term Work:

1. All the jobs mentioned above.

2. Complete Work-Shop Book giving details of drawing of the job and time sheet.

The distribution of marks for Term work shall be as follows:

Job Work: 30 Marks
Workshop book: 10 marks
Attendance: 10 marks

Course Code	Course Name	Credits
FY 118	Basic Workshop Practice II	1

Course Code	Course Name	Teaching Scheme(Contact Hours)			CreditsAssigned			
		Theory	Pract.	Tut.	Theory	Tut.	Pract.	Total
FY118	Basic Workshop Practice-II	--	2	--	--	--	1	1

Course Code	CourseName	ExaminationScheme			
			TermWork	Pract./ oral	Total
FY118	BasicWork Workshop Practice-II		50	--	50

Course Objectives

1. To Impart Training Help the students develop engineering skills sets.
2. Toinculcaterespectforphysicalworkandhard labor.
3. To Get Exposure To Interdisciplinary Engineering Domain.

Course Outcomes:

Learner will be able to…

1. Develop The Necessary Skill required to handle/use different carpentry tools.
2. Identify and understand the safe practices to adopt in the electrical environment.
3. Demonstrate Thewiringpracticesforthe connectionof simpleelectricalload/equipment.
4. Design, fabricateandassemblePCB.
5. Develop Thenecessaryskill Required to handle/use different measuring tools.
6. Develop The Necessary Skill required to use different sheet metal tools.
7. Able To demonstrate the operation,forgingwiththehelpof asimplejob.

Trade	Detailed Content	Hrs.

Note:
Trade 1 and 2 are compulsory. Select any ONE trade topics out of the topic trade 3 to 5. Demonstrations and hands on experience to be provided during the periods. Report on the demonstration including suitable sketches is also to be included in the term work
Trade evaluation is to be done according to the opted Trades in addition to Compulsory Trades.

Trade-1	**Carpentry (Compulsory)** 6. Use and setting of hand tools like hacksaws, jack planes, chisels and gauges for construction of various joints, wood tuning and modern wood turning methods. 7.Termworktoincludeonecarpentryjobinvolvingajointandreportondemonstrationofa job involving wood turning	**08**
Trade-2	**Basic Electrical workshop:(Compulsory):** 8. Single phase and three phase wiring. Familiarization. of protection switch-gears and their ratings (fuse, MCB, ELCB). Wiring standards, Electrical safety in the workplace, safe work practices. Protective equipment. 9. Layout drawing, layout transfer to PCB, etching and drilling and soldering technique	**08**
Trade-3	**Measurement*** 10. Vernier Height gauge, wire gauge, Dial gauge. Use of the listed gauges and precaution.	**04**
Trade 4	**Sheet metal working*** 11.Use of sheet metal, working hand tools, cutting, bending, spot welding operation.	**04**
Trade-5	**Forging (Smithy):*** 12.AtleastoneforgingjobtobedemonstratedandasimplejobtobemadeforTerm Work in a group of 4 students.	**04**

* Students can choose one trade out of Trades 3,4 & 5.
Total hours= 8+8+4=20 hours
2. Complete Work-Shop Book giving details of drawing of the job and time sheet The distribution of marks for Term work shall be as follows:

5. Job Work: 30 Marks
6. Workshop book 10 marks
7. Attendance : 10 marks

References:

7. Workshop Technology by H K Hajara Choudhary
8. Manufacturing Technology by R C Jain
9. Workshop Technology by R S Khurmi and J S Gupta