Shri Ambabai Talim Sanstha's

Sanjay Bhokare Group of Institutes, Miraj

(An Autonomous Institute)

First Year Engineering Department

Structure, Teaching and Evaluation Scheme

For

First Year B. Tech.

(Common for All Branches)

To be Effective from

Academic Year 2024 – 25

Semester: I (Group A – Chemistry)

No	Course Category	Course Code	Course Title	Teaching Scheme			Evaluation Scheme					Credit
				L	T	P	CA I	CA II	Mid sem.	ESE	Total	
1	BSC	24FY**101**T	Engineering Chemistry	3	0	0	15	15	20	50	100	3
2	BSC	24FY**102**T	Engineering Mathematics – I	3	1	0	15	15	20	50	100	4
3	ESC	24FY**103**T	Engineering Mechanics	3	0	0	15	15	20	50	100	3
4	PCC	24FY**104**T	Computer Programming using C language	3	0	0	15	15	20	50	100	3
5	AEC	24FY**105**T	Communication Skills	2	0	0	15	15	20	50	100	2
6	BSC	24FY**101**L	Engineering Chemistry **Lab**	0	0	2	15	15	-	20**	50	1
7	ESC	24FY**103**L	Engineering Mechanics **Lab**	0	0	2	15	15	-	20*	50	1
8	PCC	24FY**104**L	Computer Programming using C language **Lab**	0	0	2	30	30	-	40**	100	1
9	AEC	24FY**105**L	Communication Skills **Lab**	0	0	2	15	15	-	20*	50	1
10	VSEC	24FY**110**L	Workshop Practice- Basic Civil and Mechanical Engineering **Lab**	0	0	4	30	30	-	40*	100	2
11	CC	24FY**112**L	Yoga/Sports **Lab**	0	0	2	15	15	-	20*	50	1
Total				**14**	**1**	**14**	**195**	**195**	**100**	**410**	**900**	**22**

Semester: I (Group B – Physics)

Sr. No.	Course Category	Course Code	Course Title	Teaching Scheme			Evaluation Scheme					Credit
				L	T	P	CA I	CA II	Mid sem.	ESE	Total	
1	BSC	24FY**106**T	Engineering Physics	3	0	0	15	15	20	50	100	3
2	BSC	24FY**102**T	Engineering Mathematics – I	3	1	0	15	15	20	50	100	4
3	ESC	24FY**108**T	Engineering Graphics	3	0	0	15	15	20	50	100	3
4	ESC	24FY**109**T	Basic Electrical Electronics Engineering	3	0	0	15	15	20	50	100	3
5	ESC	24FY**110**T	Basic Civil and Mechanical Engineering	3	0	0	15	15	20	50	100	3
6	IKS	24FY**111**T	Energy and Environment	2	0	0	15	15	20	50	100	2
7	BSC	24FY**106**L	Engineering Physics **Lab**	0	0	2	15	15	-	20**	50	1
8	ESC	24FY**108**L	Engineering Graphics **Lab**	0	0	2	30	30	-	40*	**100**	1
9	VSEC	24FY**109**L	Workshop Practice- Basic Electrical and Electronics Engineering **Lab**	0	0	2	30	30	-	40*	**100**	1
10	CC	24FY**113**L	Integrated Personality Development / NSS **Lab**	0	0	2	15	15	-	20*	50	1
Total				**17**	**1**	**08**	**180**	**180**	**120**	**420**	**900**	**22**

Shri Ambabai Talim Sanstha's
SANJAY BHOKARE GROUP OF INSTITUTES, MIRAJ.
Tilak Nagar, Sangli-Miraj Road Miraj - 416 410 Dist. Sangli
Faculty of Engineering
An Autonomous Institute
DTE CODE: 6644
MSBTE CODE :1552
"A" GRADE INSTITUTE
Affiliated to Dr. Babasaheb Ambedkar Technological University, Lonere, Approved By AICTE New Delhi, Recognized by Government of Maharashtra and DTE Mumbai.

Semester: I I (Group A – Physics)

Sr. No.	Course Category	Course Code	Course Title	Teaching Scheme			Evaluation Scheme					Credit
				L	T	P	CA I	CA II	Mid sem.	ESE	Total	
1	BSC	24FY**106**T	Engineering Physics	3	0	0	15	15	20	50	100	3
2	BSC	24FY**107**T	Engineering Mathematics – **I I**	3	1	0	15	15	20	50	100	4
3	ESC	24FY**108**T	Engineering Graphics	3	0	0	15	15	20	50	100	3
4	ESC	24FY**109**T	Basic Electrical and Electronics Engineering	3	0	0	15	15	20	50	100	3
5	ESC	24FY**110**T	Basic Civil and Mechanical Engineering	3	0	0	15	15	20	50	100	3
6	IKS	24FY**111**T	Energy and Environment	2	0	0	15	15	20	50	100	2
7	BSC	24FY**106**L	Engineering Physics **Lab**	0	0	2	15	15	-	20**	50	1
8	ESC	24FY**108**L	Engineering Graphics **Lab**	0	0	2	30	30	-	40*	100	1
9	VSEC	24FY**109**L	Workshop Practice- Basic Electrical Electronics Engineering **Lab**	0	0	2	30	30	-	40*	100	1
10	CC	24FY**113**L	Integrated Personality Development / NSS **Lab**	0	0	2	15	15	-	20*	50	1
Total				**17**	**1**	**08**	**180**	**180**	**120**	**420**	**900**	**22**

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Semester: I I (Group B – Chemistry)

Sr. No.	Course Category	Course Code	Course Title	Teaching Scheme			Evaluation Scheme					Credit
				L	T	P	CA I	CA II	Mid sem.	ESE	Total	
1	BSC	24FY**101**T	Engineering Chemistry	3	0	0	15	15	20	50	100	3
2	BSC	24FY**107**T	Engineering Mathematics – II	3	1	0	15	15	20	50	100	4
3	ESC	24FY**103**T	Engineering Mechanics	3	0	0	15	15	20	50	100	3
4	PCC	24FY**104**T	Computer Programming using C language	3	0	0	15	15	20	50	100	3
5	AEC	24FY**105**T	Communication Skills	2	0	0	15	15	20	50	100	2
6	BSC	24FY**101**L	Engineering Chemistry **Lab**	0	0	2	15	15	-	20**	50	1
7	ESC	24FY**103L**	Engineering Mechanics **Lab**	0	0	2	15	15	-	20*	50	1
8	PCC	24FY**104**L	Computer Programming using C language **Lab**	0	0	2	30	30	-	40**	**100**	1
9	AEC	24FY**105**L	Communication Skills **Lab**	0	0	2	15	15	-	20*	50	1
10	VSEC	24FY**110**L	Workshop Practice- Basic Civil and Mechanical Engineering **Lab**	0	0	4	30	30	-	40*	100	2
11	CC	24FY**112**L	Yoga/Sports **Lab**	0	0	2	15	15	-	20*	50	1
Total				**14**	**1**	**14**	**195**	**195**	**100**	**410**	**900**	**22**

List of Abbreviations

Sr. No.	Abbreviation	Description	Code
1	L	Lecture	
2	T	Tutorial	
3	P	Practical	
4	Cr	Credits	
5	ESE	End Semester Examination	
6	BSC	Basic Science Course	BS
7	ESC	Engineering Science Course	ES
8	AEC	Ability Enhancement Course	AE
9	VSEC	Vocational and Skill Enhancement Course	VS
10	PCC	Programme Core Course	PC
11	IKS	Indian Knowledge System	IK
12	CC	Co-curricular Course	CC
13	TA	Teacher's Assessment	
14	** POE	Practical Oral Examination	
15	* OE	Oral Examination	

Shri Ambabai Talim Sanstha's

Sanjay Bhokare Group of Institutes, Miraj

(An Autonomous Institute)

First Year Engineering Department

Syllabus

For

First Year B. Tech.

(Common for All Branches)

To be Effective from

Academic Year 2024 – 25

Semester – I

Engineering Chemistry

24FY101T	Engineering Chemistry	BSC	3L – 0T – 0P	3 Credits

Teaching Scheme	Examination Scheme
Lecture: 3 hrs/week Tutorial: 0 hrs/week	CA – I: 15 Marks Mid-Semester Examination: - 20 Marks CA – II: 15 Marks End Semester Exam: 50 Marks

Course Objectives:

1. To impart the knowledge of Chemistry in the area of Engineering and Technology.
2. To capable the student to explain the importance of chemistry in various fields Of Engineering.
3. To identify the concept of Chemistry to lay the ground work for subsequent Studies.

Course Outcomes: After the completion of the course the student should be able to:

CO1	Students should be able to understand and explain the basic concepts of Water Treatment and capable to explain softening processes and water characteristics.
CO2	Students should be able to explain analysis, Calorific value of fuel and explain Lubricants, its properties and industrial importance.
CO3	Calculate the quality parameters of advanced materials and efficiency of fuel from given data.
CO4	Student should be able to understand and explain various instrumental methods Of Analysis.
CO5	Student should be able to understand and explain properties and uses of Engineering materials such as Cement, Rubber etc.

Course Contents:

Unit 1: Water Treatment **6**

Introduction, Hard and Soft water, Disadvantages of hard water, Softening of water, Ion exchange process, Hot lime –soda process, Reverse Osmosis (RO), Hardness and Its determination by EDTA method, Treatment of water for domestic Purpose- aeration and disinfection

Unit 2: Fuels and Lubricants **6**

Fuels: Introduction, classification fuel, Calorific value of a fuel, Calorific value by- Bomb Calorimeter, Boy ‘s Calorimeter and its Numerical. Analysis of coal: Proximate and Ultimate analysis.

Lubricants-Introduction, classification of lubricant – Solid, Semi –solid and Liquid Lubricant,

Properties of lubricant: Physical and Chemical properties of lubricant –Viscosity surface tension, Flash point and Fire point.

Unit 3: Nanomaterials and Its Characterization techniques **6**

Introduction of Nanomaterials, Synthesis of Nanomaterials (top down and bottom-up approach), Characterization of Nanomaterials using X-Ray Diffraction spectroscopy (XRD), Scanning. Electron (SEM), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM)

Unit 4: Instrumental Methods of Analysis **6**

UV-Visible spectroscopy: Introduction, Laws of absorption: Lambert ‘s- Beer ‘s law, Instrumentation and working of double beam spectrophotometer. **Flame Photometry**: Introduction, Principle and working **Chromatography**: Introduction, Classification, Thin layer chromatography (TLC). **IR spectroscopy**: Introduction, Principle, Range of IR radiations.

Unit 5: Engineering Materials **6**

Cement: Introduction, Portland cement, Chemical Composition of Cement

High Polymers: Thermosetting resin, Constituent of Plastic, Synthesis of Urea formaldehyde and its Properties and Uses, Brief discussion on Natural Rubber, Synthesis of Styrene – Butadiene rubber and its properties and uses.

Text Books:

1. Jain P.C & Jain Monica, Engineering Chemistry, Dhanpat Rai& Sons, Delhi, 1992
2. Bhal &Tuli, Text book of Physical Chemistry, S. Chand & Company, New Delhi.
3. Shikha Agarwal, Engineering Chemistry- Fundamentals and applications, Cambridge Publishers – 2015.
4. Gurudeep Chatwal and Sham Anand, Instrumental methods of Chemical Analysis, Himalaya Publishing House, New Delhi.
5. V. R. Gowarikar, Polymer Science, New Age International Publication

Reference Books:

1. Barrow G.M., Physical Chemistry, McGraw-Hill Publication, New Delhi.
2. O. G. Palanna, Engineering Chemistry, Tata McGraw-Hill Publication, New Delhi
3. WILEY, Engineering Chemistry, Wiley India, New Delhi 2014.
4. S. S. Dara, Engineering Chemistry, McGraw Hill Publication, New Delhi.
5. Willard, Hobart H.; Merritt, Lynne L., Jr.; Dean, John A. Instrumental Methods Of Analysis, American Chemical Society

Engineering Chemistry Lab

24FY101L	Engineering Chemistry Lab	BSC	0L – 0T – 2P	1 Credits

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	CA – I: 15 Marks CA – II: 15 Marks Practical Examination / Oral (ESE): 20 Marks

Course Objectives:

1. To impart the knowledge of Chemistry in the area of Engineering and Technology.
2. To determine various types of water sample such as EDTA method precipitation method.
3. To determine acid based titration.

Course Outcomes: At the end of the course, students will be able to

CO1	Determination of Hardness of water sample by EDTA method and determine chloride Content in water sample by precipitation titration.
CO2	To determine dissolved oxygen and percentage purity of bleaching powder.
CO3	Acid based titration pH metric titration and conductometric titration.
CO4	To determine acidity of water saponification value of oil sample.
CO5	Determination of acidity and alkalinity of water sample.

List of Experiments: Minimum 8-10 experiments are to be performed based on contents from syllabus

1. Determination of Hardness of water sample by EDTA method.
2. Determination of Chloride content in water sample by precipitation titration Method.
3. Determination of Dissolve Oxygen in water by Iodometric method.
4. Determination of Percent purity of Bleaching Powder.
5. pH-metric Titration (Acid Base titration)
6. Conductometric Titration (Acid Base titration)
7. Surface tension
8. Viscosity
9. To determine Acidity of water sample.
10. To determine Calorific value of a fuel.
11. Determination of Acid value of an oil sample.
12. Determination of Saponification value of an oil sample.
13. To verify Beer’s-Lambert’s law.
14. To determine Alkalinity water sample.
15. To determine the maximum wavelength of absorption of a given solution by
16. Colorimeter.
17. Experiments on Chromatography.

Recommended Books:

1. Systematic experiments in Chemistry, A. Sethi, New Age International Publication, New Delhi
2. Practical Inorganic Chemistry, A. I. Vogel, ELBS Pub.

Engineering Mathematics – I

24FY102T	Engineering Mathematics – I	BSC	3L – 1T – 0P	4 Credits

Teaching Scheme	Examination Scheme
Lecture: 3 hrs/week Tutorial: 1 hrs/week	CA – I: 15 Marks Mid-Semester Examination: - 20 Marks CA – II: 15 Marks End Semester Exam: 50 Marks

Course Objectives:

1. To know the application of the matrix technique (Linear algebra) to find solutions of system of linear equations arising in many engineering problems.
2. To know the application of the matrix technique (Linear algebra) to find inverse, eigen values and eigen vector of the matrix.
3. To know and apply the concept partial derivatives and their applications to Maxima/ Minima, series expansion of multi valued functions.
4. To understand computation of Jacobian of functions of several variables and their applications to engineering problems.
5. To know and discuss the need and use of complex variables to find roots, to separate complex quantities, and to establish a relation between circular and hyperbolic functions.

Course Outcomes: After the completion of the course the student should be able to:

CO1	Apply the matrix technique (Linear algebra) to find solutions of system of linear equations arising in many engineering problems.
CO2	Apply the matrix technique to find Eigen values, Eigen vectors and inverse by Cayley Hamilton theorem.
CO3	Demonstrate the concept partial derivatives and their applications to Maxima/ Minima, series expansion of multi valued functions.
CO4	Compute Jacobian of functions of several variables and their applications to engineering problems
CO5	Use the knowledge of Complex number in engineering problems.

Course Contents

Unit 1: Linear Algebra- Matrices **9**

Inverse of a matrix by Gauss-Jordan method; Rank of a matrix; echelon form of matrix, Normal form of a matrix; Consistency of non- homogeneous and homogeneous system of linear equations

Unit 2: Eigen values and Eigen Vector **9**

Linear dependence and independence of vectors, Eigen values and Eigen vectors, Properties of eigen values and eigen vectors (without proofs); Cayley-Hamilton's theorem (without proof) and its applications.

Unit 3: Partial Differentiation **9**

Partial derivatives of first and higher orders; Homogeneous functions – Euler's Theorem for functions containing two and three variables (with proofs); Total derivatives; Change of variables.

Unit 4 Applications of Partial differentiation **9**

Jacobians-properties; Taylor's and Maclaurin's theorems (without proofs) for functions of two variables; Maxima and minima of functions of two variables; Lagrange's method of undetermined multipliers.

Unit 5: Complex Number **9**

Definition and geometrical representation; De-Moivre's theorem (without proof); Roots of complex numbers by using De-Moivre's theorem; Circular functions of complex variable – definition; Hyperbolic functions; Relations between circular and hyperbolic functions; Real and imaginary parts of circular and hyperbolic functions; Logarithm of Complex quantities.

Text Books

1. Higher Engineering Mathematics by B. S. Grewal, Khanna Publishers, New Delhi.
2. Advanced Engineering Mathematics by Erwin Kreyszig, John Wiley & Sons, New York.
3. A Course in Engineering Mathematics (Vol I) by Dr. B. B. Singh, Synergy Knowledge ware, Mumbai.
4. A Text Book of Applied Mathematics (Vol I & II) by P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi Griha Prakashan Pune.
5. Higher Engineering Mathematics by H. K. Das and Er. Rajnish Verma, S. Chand & CO. Pvt. Ltd., New Delhi.

Reference Books

1. Higher Engineering Mathematics by B. V. Ramana, Tata McGraw-Hill Publications, New Delhi.
2. A Text Book of Engineering Mathematics by Peter O‟ Neil, Thomson Asia Pte Ltd., Singapore.
3. Advanced Engineering Mathematics by C. R. Wylie & L. C. Barrett, Tata Mcgraw-Hill Publishing Company Ltd., New Delhi.

Engineering Mechanics

24FY103T	Engineering Mechanics	ESC	3L – 0T – 0P	3 Credits

Teaching Scheme	Examination Scheme
Lecture: 3 hrs/week Tutorial: 0 hrs/week	CA – I: 15 Marks Mid-Semester Examination: - 20 Marks CA – II: 15 Marks End Semester Exam: 50 Marks

Course Objectives:

1. To understand basic concepts of mechanics and system of forces.
2. To illustrate equilibrium and its application to find unknown forces.
3. To locate the centroid and calculate moment of Inertia of plane composite figures.
4. To understand the bodies in Dynamic equilibrium and solve the kinematics problems.
5. To understand basic dynamics concepts - the Work-Energy principle, Impulse-Momentum principle.

Course Outcomes: After the completion of the course the student should be able to:

CO1	Carry out resolution and composition of forces for concurrent and no concurrent force system and find unknown force acting on body
CO2	Draw free body diagram and analyze the body in static equilibrium
CO3	Determine the centroid and Moment of Inertia for composite sections.
CO4	Analyze the bodies in Dynamic equilibrium and solve the kinematics problems
CO5	To apply basic dynamics concepts - the Work-Energy principle, Impulse-Momentum principle

Course Contents:

Unit 1: Resolution and composition of force system **8**

Introduction to Mechanics, Force system, concept of Resultant, Composition and Resolution of Forces, Equivalent force system, Moment of a force, Couple, law of parallogram, Varignon's theorem, Resultant of a concurrent and non-concurrent force system

Unit 2: Equilibrium of rigid body **10**

Concept of Equilibrium, Free Body Diagram, Lami's theorem, analytical conditions of equilibrium, Beams: Types of Loads, Types of supports, Analysis of Simple beams, Introduction of Trusses: Perfect Truss, Deficient Truss, Redundant Truss, Analysis of Statically determinate plane trusses by Method of Joints & Method of Sections

Friction: Types of friction, Laws of friction.

Unit 3: Centroid and moment of Inertia **8**

Centroid of areas, Moment of Inertia, Radius of Gyration, Theorems of Moment of Inertia, M.I. of a

Lamina

Unit 4: Linear and circular motion of a body **8**

Rectilinear motion, equations of motion, motion diagrams, motion in vertical direction. Circular motion, motion on curved path, supper elevation

Unit 5: Kinetics of particles **8**

Laws of motion, D'Alembert's Principle, Work-Energy Principle, Impulse- Momentum Principle

Text Books:

1. Text Book of Engineering Mechanics, Bansal R.K. Laxmi Pub, N. Delhi.
2. Engineering Mechanics, Bhavikatti, S.S. New Age pub
3. A Textbook of Engineering Mechanics, Khurmi R S, S. Chand.
4. Engineering Mechanics, Rajshekharan S. Sanakarsubramaniam , USB Publication
5. Fundamentals Of Engineering Mechanics, Rajshekaran S, Vikas Pub, N. Delhi

Reference Books:

1. Engineering Mechanics (4th Ed.) Timoshenko S. Tata MacGraw Hill, N. Delhi
2. Engineering Mechanics Vol. II, Merium T.L., Cenage Laerning.
3. Problems & Solutions in Engineering Mechanics, Bhavikatti S.S. New Age Int, N. Delhi
4. Engineering Mechanics: Statics & Dynamics, Shames, I.H. pearson Edu, Delhi
5. Engineering Mechanics, Sawhney, G. S. PHI Learning

Engineering Mechanics Lab

24FY103L	Engineering Mechanics Laboratory	ESC	0L – 0T – 2P	1 Credits

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	CA – I: 15 Marks CA – II: 15 Marks Practical Examination / Oral (ESE): 20 Marks

Course Objectives:

1. To understand the concepts of basic Engineering Mechanism.
2. To understand the systems of forces.
3. Provide students with problem solving ability.
4. Develop skills to use the basic principles of mechanics in engineering applications.

Course Outcomes: At the end of the course, students will be able to

CO1	To know and apply Conditions of static equilibrium to analyze given force system.
CO2	Verify law of Force using bell crank lever apparatus and apparatus.
CO3	Determination of CG of various laminae.
CO4	Graphical method of analysis of Beam and Truss.

List of Experiments: Minimum 8 experiments are to be performed based on contents from syllabus

1. To verify of Law of Polygon of forces.
2. Study of Lami's theorem by Analytical method.
3. Calculation of support reaction for beam.
4. To verify of law of moments Bell crank lever.
5. To verify of law of triangle by using Jib crane.
6. Determination of CG of irregular laminae.
7. Problems in kinematics.
8. Find support reaction of beam by graphical method.
9. Problem on truss by method of joints/ method of sections.
10. Screw Jack.

Computer Programming using C Language

24FY104T	Computer Programming using C Language	PCC	3L – 0T – 0P	3 Credits

Teaching Scheme	Examination Scheme
Lecture: 3 hrs/week Tutorial: 0 hrs/week	CA – I: 15 Marks Mid-Semester Examination: - 20 Marks CA – II: 15 Marks End Semester Exam: 50 Marks

Course Objectives:

1. To introduce basic programming environment and programming concepts.
2. To develop problem solving skills amongst the students for implementing mathematical and Logical operations.
3. To develop the basic concept of algorithm, algorithmic thinking, and flowchart.
4. To write compile and debug programs and control order of program using Decision making, looping,switch case in C language.
5. To arrange data in arrays and strings implement pointers, structure, file management and dynamic memory allocation.

Course Outcomes: After the completion of the course the student should be able to:

CO1	Understand terminology in C language and various operators.
CO2	Control the sequence of a program & repeat instructions using branching and looping Statements
CO3	Comprehend concepts like arrays, strings in C programming language
CO4	Implement user defined functions for dividing big program into sub programs and later to combine into one for ease of debug and test the program.
CO5	Use pointers efficiently to support dynamic memory allocation to reduce program execution time and define structures for placing data of different types using single name useful for database creation

Course Contents:

Unit 1: ***Introduction to C Language*** **7**

Importance of C language, History, C character set Constants, Types of C Constants, Variables, Types of C Variables, Rules of Variable names,Keywords, The first C program,Input and Output statements ,C instructions - Type declaration , arithmetic instructions,Hierrarchy of operations, Data types,Preprocessor Directive. Operators in C: Arithmetic Operators, Relational Operators, Logical Operators, Ternary Operators, Bitwise Operators, Sizeof Operator

Unit 2: ***Control Statements*** **6**

Branching: The if-else statement, multiple statements within if-else, Nested if-else, use of logical operators, if-elseif ladder, Switch-Case, goto

Looping: for loop, while loop, do-while loop, nesting of loops, multiple initialisations, Loop interruption-break, continue statements

Unit 3: ***Arrays and String*** **6**

Array : The meaning of an array, One dimensional and Two dimensional arrays, declaration and initialisation of arrays, reading, writing and manipulation of above types of arrays.

String : Declaring & intialising character array, String termination, string input and output, standard string library functions

Unit 4: ***Functions*** **6**

Basics of function, need of user defined function, function declaration, definition, calling function, call by value, passing values between functions, order of passing arguments, return type of function, library functions, recursion, storage classes in C (automatic, register, static, and external).

Unit 5: ***Pointer and Structures*** **9**

An introduction to pointers, pointer notations, call by value and call by reference, accessing array elements by pointers, passing array to function, pointers to 2D arrays, passing 2D array to function. Need of structure, Structure declaration , structure variable and memory allocation, accessing structure elements, Nested structures,structure pointer,array of structure,passing structure to Function

Text Books:

1. Programming in ANSI C, E. Balguruswamy, McGraw Hill Education Publisher, 9'th Edition, 2024
2. Programming and Problem-Solving Using C Language, ISRD Group, McGraw Hill Education Publisher, 9'th Edition, 2012
3. Let Us C, Yashwant Kanetkar, BPB Publisher,20th Edition, 2024

Reference Books:

1. The 'C' Programming Language, D. M. Ritchie, Pearson Publisher, 2nd edition, 1998
2. Practical "C" Programming, Steve Oualline, Oreilly Publisher, 3rd edition, 2013

Computer Programming using C Language Lab

24FY104L	Computer Programming using C Language Lab	PCC	0L – 0T – 2P	1 Credits

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	CA – I: 30 Marks CA – II: 30 Marks Practical Examination / Oral (ESE): 40 Marks

Course Objective:

1. To design an algorithm to tackle the given problem.
2. To apply C programming concepts to solve a given problem.
3. To implement programming solutions for the given problem.
4. To analyze the developed program's performance and effectiveness.

Course Outcomes: At the end of successful completion of this course, the student will be able to:

CO1	Explain basic concepts and terminology of C language.
CO2	Design algorithm to solve the problem.
CO3	Build a program for developing algorithm in C Language.
CO4	Analyze a C Program.

List of Experiments: Minimum 8-10 experiments are to be performed based on contents from syllabus

1. Programs based on Input and Output operations, data types in C.
2. Programs based on Operators in C.
3. Programs based on Branching (if-else, nested if else, if -elseif ladder, switch-case).
4. Programs based on Looping (for, while, do-while).
5. Programs based on One-Dimensional array.
6. Programs based on Two-Dimensional array.
7. Programs based on Strings (Character Array).
8. Programs based on Functions.
9. Programs based on Recursion.
10. Programs based on Scope resolution of variables.
11. Programs based on Structure and Array of Structure.
12. Programs based on Pointers.

Reference Books:

1. The 'C' Programming Language, D. M. Ritchie, Pearson Publisher, 2nd edition, 1998
2. Practical "C" Programming, Steve Oualline, Oreilly Publisher, 3rd edition, 2013
3. Programming in ANSI C, E. Balguruswamy, McGraw Hill Education Publisher, 9'th Edition, 2024
4. Programming and Problem-Solving Using C Language, ISRD Group, McGraw Hill Education Publisher, 9'th Edition, 2012
5. Let Us C, Yashwant Kanetkar, BPB Publisher,20th Edition, 2024

Communication Skills

24FY105T	Communication Skills	AEC	2L – 0T – 0P	2 Credits

Teaching Scheme	Examination Scheme
Lecture: 2 hrs/week Tutorial: 0 hrs/week	CA – I: 15 Marks Mid-Semester Examination: - 20 Marks CA – II: 15 Marks End Semester Exam: 50 Marks

Course Objectives:

1. To know the nature, importance, process, and types of communication.
2. To know the concept effective communication and its barrier.
3. To improve formal oral skills of the students.
4. To improve formal written skills of the students.
5. To apply grammar for proper sentence construction.

Course Outcomes: After the completion of the course the student should be able to:

CO1	Illustrate the concept of communication and its process.
CO2	Apply the knowledge the Effective communication.
CO3	To exhibit oratorical skills by giving oral presentations.
CO4	Compose formal letters, emails and job application with accurate grammar and vocabulary
CO5	Utilize the knowledge of Listening skills and reading skills/ Improve listening, note-taking and observational skills

Course Contents:

Unit 1: Fundamentals of Communication **5**

Meaning and definition of communication, Process of communication, Forms of Communication, According to Direction- (upward, downward, horizontal, diagonal), According to Expression (Verbal and Non-verbal) And According to Nature (Formal and informal).

Unit 2: Effective Communication **5**

Principles of Effective communication, Barriers to communication, Physical Barrier: Environmental (time, noise, distance, and surroundings), Personal (deafness, stammering, ill-health, spastic, bad handwriting), Mechanical: Machine oriented, Psychological: Day dreaming, prejudice, emotions, blocked mind, generation gap, phobia, status inattentiveness, perception, Language: Difference in language, technical jargons, pronunciation, and allusions, how to overcome the barrier.

Unit 3: Formal Oral Communication **4**

Group Discussion, Presentation Skills, Interview Skills, Extempore and Elocution.

Unit 4: Formal Written Communication **4**

Email, Business letter (Enquiry, Order, Complaint letter), Report Writing (Accident Report and Fall in production), Job application letter with resume

Unit 5: LR Skills **4**

Listening skills: Introduction to listening, Listening versus hearing, Merits of good listening, Types of listening., Techniques of effective listening.

Reading skills: Introduction to Reading, Types of Readers and Reading, Barriers to Reading, Strategies for Reading, Comprehension.

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Reference Books:

1. Communication skills for Engineers by Sunita Mishra & C. Muralikrishna (Pearson).
2. Communication Techniques and Skills by R K Chaddha
3. Body Language by Allen Pease.
4. Speaking Effectively by Jeremy Comfort, Pamela Rogerson, Cambridge University Press New Delhi
5. Soft Skills for Managers by Dr. T. Kalyana Chakravarthi, Dr. T. Latha Chakravarthi, Biztantra
6. Soft Skills for every one by Jeff Butterfield, Cengage
7. Professional communication skills by A.K. Jain, S. Chand
8. Developing Communication Skills by Krishna Mohan & Meera Banerji (Macmillan)
9. J.D. O'Connor, Better English Pronunciation, CUP, 1980

Communication Skills Lab

24FY105L	**Communication Skills Lab**	**AEC**	**0L – 0T – 2P**	**1 Credits**

Teaching Scheme	**Examination Scheme**
Practical: 2 hrs/week	CA – I: 15 Marks CA – II: 15 Marks Practical Examination / Oral (ESE): 20 Marks

Course Objectives:

1. Understand the importance of listening, speaking, reading, and writing skills which are beneficial to enhance communication skill.
2. To acquaint students with basic English Grammar and help students in improving language skills.
3. To train the students to compose and write the business letters effectively
4. To help them communicate effectively and to present their ideas confidently.

Course Outcomes: At the end of the course, students will be able to

CO1	Apply the learnt knowledge of LSRW skills while communicating.
CO2	To formulate grammatical sentences correctly and apply communicative techniques effectively.
CO3	Compose formal letters, emails and job application with accurate grammar and vocabulary.
CO4	To exhibit oratorical skills by giving oral presentations.

List of Experiments: Minimum 8-10 experiments are to be performed based on contents from syllabus

1. How to introduce yourself
2. Vocabulary building
3. Group Discussion
4. Formal presentation on given topic
5. Interview techniques
6. Extempore
7. Tense (sentence construction)
8. Drafting Simple application letter and Writing Effective Resume
9. Effective reading (newspaper articles)
10. Active listening (memorizing)
11. Effective Communication and Barriers.
12. Report Writing

Recommended Books:

1. Communication Skills by Meenakshi Raman and Sangeeta Sharma, Oxford University Press 2016

1st Edition.
2. Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)
3. Basic Communication Skills for Technology by Rutherford, Andrea J. (2002).. Delhi: Pearson Education Asia
4. Mastering Communication by Nicky Stanton, Palgrave Master Series
5. Comfort, Jeremy, et al. (2011) Speaking Effectively: Developing Speaking Skills for Business English. Cambridge: Cambridge University Press. (Reprint)
6. Sharma, R. C. and Krishna Mohan, Basic Correspondence and Report Writing: A Practical Approach to Business and Technical Communication, Tata McGraw-Hill Publishing Company Limited, India ,5th Edition, 2017
7. Written Communication in English by Saran Freeman (Orient Longman) 08 Seely, J. The Oxford Guide to Writing and Speaking, Oxford University Press, India 3rd Edition

Workshop Practices Basic Civil and Mechanical Engineering Lab

24FY110L	Workshop Practices Basic Civil and Mechanical Engineering Lab	VSEC	0L – 0T – 4P	2 Credit

Workshop Practices Basic Civil Engineering Lab

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	CA – I: 15 Marks CA – II: 15 Marks Practical Examination / Oral (ESE): 20 Marks

Course Objectives:

1. To impart basic knowledge of symbols used in Civil Engineering
2. To gain hands-on experience in angular measurements.
3. To gain hands-on experience of leveling.

Course Outcomes: At the end of the course, students will be able to

CO1	Identify and apply symbols in Civil Engineering
CO2	Carry out angular measurements by use of Prismatic Compass
CO3	Carry out leveling by Dumpy Level, Auto Level
CO4	Usage of Sun Diagram

Perform any four experiments from the following syllabus

1. Identification & Applications of Conventional Symbol in Civil Engineering.
2. Study of Prismatic Compass.
3. Traversing by Prismatic Compass.
4. Leveling by Dumpy Level.
5. Leveling by Auto Level.
6. Utility of the Sun Diagram for Planning & Designing in Civil Engineering.

Workshop Practices Basic Mechanical Engineering Lab

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	CA – I: 15 Marks CA – II: 15 Marks Practical Examination / Oral (ESE): 20 Marks

Course Objectives:

1. Possess knowledge of safety, instruments and machines used in workshop.
2. Learn to use the techniques, skills, and modern engineering tools necessary for fitting operations

3. Have an ability to use the techniques, skills, and modern engineering tools necessary in carpentry and apply them practically.
4. Understand concepts of welding, equipment's and an ability to use the techniques, skills, and modern engineering tools necessary for welding operation operations.

Course Outcomes: At the end of the course, students will be able to

CO1	Understand basic operations and machines used in manufacturing.
CO2	Understand basic safety features, dos and don'ts to be followed in the lab.
CO3	Do basic operations and operate different tools for manufacturing.
CO4	Operate different machines for producing simple parts.

Sample List of Experiments: Every student should perform---

1. **Sheet metal Work:** One job on commercial items such as Dust bin, funnel, tray etc.
2. **Carpentry: One** composite job involving dovetail joint, T joint, cross halving joint, pen stand etc.
3. **Fitting:** One job Male/Female fitting with operations- Marking, cutting, drilling, tapping filing etc.
4. **Welding:** One job on Arc welding- Lap / Butt Joint etc. (For individual student) OR Table, Shoe stand, Bag stand etc. (For 4-6 students)

Reference Books:

1. A Course in Workshop Technology, Vol – I by B. S. Raghuvanshi, Dhanapat Rai and Sons.
2. Elements of Workshop Technology, Vol – I by HajaraChaudhari, Media Promoters.
3. Workshop Technology, Vol – I by Gupta and Kaushik, New Heights.
4. Workshop Technology, Vol – I by Chapman, The English Language Book Society.
5. Workshop Technology, Vol.-I by H.S. Bawa, TMH Publications, New Delhi

Yoga Education

24FY112L	Yoga Education	CC	0L – 0T – 2P	1 Credits

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	CA – I: 15 Marks CA – II: 15 Marks Practical Examination / Oral (ESE): 20 Marks

Course Objectives:

1. To learn Message of Vedas and Upanishads
2. To learn Four Streams of Yoga,
3. To learn Shaddarshanas or the SIX systems of Indian Philosophy,
4. To understand Life and message of spiritual masters and Indian Culture
5. To understand Anatomy and Physiology, Yoga and Exercise Physiology

Course Outcomes: At the end of the course, students will be able to

CO1	Learn Message of Vedas and Upanishads.
CO2	Learn Four Streams of Yoga.
CO3	Learn Shaddarshanas or the SIX systems of Indian Philosophy.
CO4	Understand Life and message of spiritual masters and Indian Culture.
CO5	Understand Anatomy and Physiology, Yoga and Exercise Physiology.

Course Contents:

UNIT-I: Message of Vedas and Upanishads: Search for Happiness, Search for Reality.

UNIT-II: Streams of Yoga: Bhakti Yoga, Raja Yoga, Antaranga Yoga, Bahiranga Yoga, Karma Yoga, Secrets of Action, Jnana Yoga.

UNIT-III: Shaddarshanas – Nyaya, Vaishesika, Sankhya, Uttaramimamsa, Purvamimamsa, Yoga.

UNIT-IV: Life and Message of Spiritual Masters –Sri Ramakrishna Paramahamsa, Maa Sharada Devi, Swami Vivekananda, Indian Culture.

UNIT-V: Anatomy and Physiology, Yoga and Exercise Physiology, Yoga & Health - Concept of Health and Pancha Kosha Vivek, Yogic Concept of Health and Disease.

Text Books:

1. Rajayoga - Swami Vivekananda - Ramakrishna Ashrama Publications.
2. Hathayoga Pradipika of Swatmarama - Kaivalyadhama, Lonavala
3. The Science of Yoga - Taimini - Theosophical Publishing House, Adyar, Madras.
4. Yogasutras of Patanjali - Harihārananda Aranya, University of Calcutta Press, Calcutta.

Reference Books:

1. Patanjal Yoga Pradeepa Omananda Tirtha- Geeta Press, Gorakhpur.
2. Gherandasamhita - Bihar School of Yoga, Munger, Bihar.
3. Shivayogadipika - Sadashivabrahmendra, Ananda Ashramagranthavali, Choukhamba Press.
4. Yoga Darshan: Swami Niranjanananda-Sri Panchadashanam Paramahamsa Alakh Bara, Deoghar.
5. Four chapters on Freedom (commentary on the Yoga

Shri Ambabai Talim Sanstha's
SANJAY BHOKARE GROUP OF INSTITUTES, MIRAJ.
Tilak Nagar, Sangli-Miraj Road Miraj - 416 410 Dist. Sangli
Faculty of Engineering
An Autonomous Institute
DTE CODE: 6644
MSBTE CODE :1552
"A" GRADE INSTITUTE
Affiliated to Dr. Babasaheb Ambedkar Technological University, Lonere, Approved By AICTE New Delhi, Recognized by Government of Maharashtra and DTE Mumbai.

Shri Ambabai Talim Sanstha's

Sanjay Bhokare Group of Institutes, Miraj

(An Autonomous Institute)

First Year Engineering Department

Syllabus

For

First Year B. Tech.

(Common for All Branches)

To be Effective from

Academic Year 2024 – 25

Semester – II

Engineering Physics

24FY106T	**Engineering Physics**	**BSC**	**3L – 0T – 0P**	**3 Credits**

Teaching Scheme	**Examination Scheme**
Lecture: 3 hrs/week Tutorial: 0 hrs/week	CA – I: 15 Marks Mid-Semester Examination: - 20 Marks CA – II: 15 Marks End Semester Exam: 50 Marks

Course Objectives:

1. To provide the knowledge of fundamental concepts of Physics useful in all Engineering disciplines
2. To provide a firm grounding in the basic Physics principles and concepts to resolve many Engineering and Technological problem
3. To understand and study the Physics principles behind the development of Engineering materials
4. Apply Mathematical Tools: Utilize mathematical techniques to model, analyze, and solve problems in engineering physics.
5. Understand Optical Principles: Demonstrate a thorough understanding of fundamental concepts in optics, including reflection, refraction, diffraction, interference, and polarization.

Course Outcomes: After the completion of the course the student should be able to:

CO1	Apply the basics of interference, Diffraction and polarization in Engineering applications
CO2	Students are able to describe the light propagation in optical fibre, use of Laser and optical fibre in Engineering applications
CO3	Identify types of crystal, planes in crystal and describe structure of solid
CO4	Classify magnetic materials, Analyse and interpret the BH curve to understand the magnetic properties of materials and applications of superconductor
CO5	Interpret and demonstrate motion of charged particle in electromagnetic field, Basic concept of Quantum mechanics

Course Contents

Unit 1: Interference, Diffraction and Polarization **8**

Interference -Introduction, interference in thin film due to reflected light, wedge shaped film, Newton's ring, applications

Diffraction- Introduction, types of diffraction, Plane diffraction gritting, resolving power of grating

Polarization- Introduction, types of polarization, optical activity and specific rotation, Laurent's half shade polarimeter

Unit 2: Fibre optics and LASER **8**

Fibre optics - Principle of optical fibre, structure of optical fibre, acceptance angle, acceptance cone, numerical aperture, application of optical fibre

LASER – Characteristics, absorption, spontaneous emission and stimulated emission, pumping, population inversion, Ruby laser, He-Ne laser, applications.

Unit 3 Crystal structure and X-ray **8**

Crystal structure - fundamental concepts (Lattice, basis, unit cell crystal system), 7 crystal system, cubic structure: (number of atoms per unit cell, atomic radius, coordination number, packing density), axis of symmetry, plane of symmetry, Miller indices, interplanar spacing

X- ray - X-ray diffraction, line and continuous spectrum of X-ray, applications.

Unit 4: Magnetic, superconducting and semiconducting materials **8**

Semiconductor physics - Classification of solid on basis of band theory, intrinsic and extrinsic semiconductor, Fermi level, conductivity of semiconductor, hall effect

Magnetic materials and superconductor- Types of magnetic materials (Dia, para and ferro), BH curve, superconductivity, types of superconductors, Meissner effect, application of superconductor

Unit 5: Electron optics and Quantum Mechanics **8**

Electron optics- Motion of charged particle in transverse electric field, Motion of charged particle in transverse magnetic field, motion of electron in combined effect, Bainbridge mass spectrograph,

Quantum mechanics- Wave function & De Broglie hypothesis, Heisenberg uncertainty principle, Schrodinger time independent wave equation.

Text Books

1. Engineering Physics M.N.Avadhanulu and P.G. Kshirsagar. S.Chandand Company LTD.
2. Modern Physics- B. L. Theraja, S Chand Publication
3. Physics for Engineers- M. R. Srinivasan, New age international (P) Limited publishers
4. Engineering Physics-R.K. Gaur and S. L.Gupta.Dhanpat Rai Publications Pvt. Ltd.-NewDelhi
5. Engineering Physics- Dr. Rakesh Dogra, S. K. Kataria & sons publications
6. Engineering Physics- Neeraj Mehta, PHL learning private limited.
7. Engineering Physics – Dr. L. N. Singh. SynergyKnowledgeware-Mumbai.

Reference Books

1. Solid State Physics – A.J. Dekker. McMillan India–Limited. .
2. Introduction to solid state physics – Charles Kittel. John Willey and Sons
3. Optics – Ajoy Ghatak, MacGraw Hill Education (India) Pvt.Ltd.
4. Science of Engineering Materials- C.M. Srivastava and C. Srinivasan. New Age InternationalPvt.Ltd.

Engineering Physics Lab

24FY106L	Engineering Physics Lab	BSC	0L – 0T – 2P	1 Credits

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	CA – I: 15 Marks CA – II: 15 Marks Practical Examination / Oral (ESE): 20 Marks

Course Objectives:

1. Introduce Fundamental Concepts**:** Provide hands-on experience to reinforce the theoretical principles of physics learned in lectures.
2. Develop Experimental Skills: Train students in the use of laboratory instruments, techniques, and procedures for conducting physics experiments accurately.
3. Enhance Analytical Thinking: Foster critical thinking by encouraging students to analyze experimental data, identify sources of error, and draw meaningful conclusions.
4. Bridge Theory and Practice: Enable students to apply theoretical concepts to real-world physical phenomena and engineering applications through practical experimentation.

Course Outcomes**: After the completion of the practical's the student should be able to:**

CO1	Measure Optical Properties**:** Perform accurate measurements of optical properties such as wavelength, radius of curvature, wavelength of different color and thickness of thin wire.
CO2	Skilfully set up and align optical equipment, including lasers, diffraction gratings, and measuring devices, for precise experimental outcomes.
CO3	Understand Semiconductor Basics: Demonstrate an understanding of the working principle and behaviour of a PN junction diode under different biasing conditions.
CO4	Understand Fiber Optic Principles**:** Demonstrate an understanding of the basic principles of optical fibers, including total internal reflection, numerical aperture, and modes of propagation.
CO5	Understanding of basic concepts in crystallography, including lattice structures, unit cells, and Miller indices and Determine Lattice Parameters

List of Experiments: At least 08-10 experiments should be performed from the following list

1. Newton's ring- determination of radius of curvature of Plano convex lens /wavelength of light
2. Wedge shaped film- determination of thickness of thin wire
3. Calculate the resolving power of grating
4. Diffraction grating to measure the wavelength of different colours
5. Half shade polarimeter- determination of specific rotation of optically active material
6. Laser- Determination of wavelength of He-Ne laser light
7. Experiment on fibre optics
8. Crystal plane -study of planes with the help of models related Miller indices
9. Calculate Miller indices and lattice parameter of cubic crystal by using X-ray diffraction pattern
10. PN junction diode characteristics
11. Four Probe method- Determination of resistivity of semiconductor
12. Hall effect- Determination of Hall coefficient
13. Measurement of band gap energy of semiconductors
14. Magnetron tube- Determination of 'e/m' by of electron

Engineering Mathematics – II

24FY107T	Engineering Mathematics – II	BSC	3L – 1T – 0P	4 Credits

Teaching Scheme	Examination Scheme
Lecture: 3 hrs/week Tutorial: 1 hrs/week	CA – I: 15 Marks Mid-Semester Examination: - 20 Marks CA – II: 15 Marks End Semester Exam: 50 Marks

Course Objectives:

1. To understand and solve first and higher order differential equations and apply them as a mathematical modelling in electric and mechanical systems.
2. To understand and solve first and higher order differential equations by various methods.
3. To demonstrate the concept of vector differentiation to interpret the physical and geometrical meaning of gradient, divergence & curl in various engineering problems.
4. To identify and sketch of curves in various coordinate system.
5. To evaluate multiple integrals and their applications to area and volume.

Course Outcomes: After the completion of the course the student should be able to:

CO1	Solve first order and first degree ordinary differential equations and apply them in engineering problems.
CO2	Solve higher order differential equations and apply them in engineering problems.
CO3	Demonstrate the concept of vector differentiation and interpret the physical and geometrical meaning of gradient, divergence &curl in various engineering streams.
CO4	Identify and sketch of curves in various coordinate system and understand concept of reduction formulae.
CO5	Evaluate multiple integrals and their applications to area and volume.

Course Contents

Unit 1: Ordinary Differential Equations of First Order and First Degree and Their Applications **9**

Linear equations; Reducible to linear equations (Bernoulli's equation); Exact differential equations; Equations reducible to exact equations; Engineering Applications.

Unit 2: Linear Differential Equations with Constant Coefficients **9**

Introductory remarks - complementary function, particular integral; Rules for finding complementary functions and particular integrals; Method of variation of parameters; Cauchy's homogeneous equations.

Unit 3: Vector Calculus **9**

Scalar and vector fields: Gradient, divergence, and curl; Solenoidal and irrotational vector fields; Vector identities (statement without proofs).

Unit 4: Reduction Formulae and Tracing of Curves **9**

Reduction formulae for $\int_0^{\frac{\pi}{2}} \sin^n x \ d$, $\int^2_0 \cos^n x \ \ d$, $\int^2_0 \sin^m x \cos^n x \ dx$. Tracing of standard curves given in Cartesian, Polar and Parametric forms.

Unit 5: Multiple Integral **9**

Double integration in Cartesian and polar co-ordinates; Evaluation of double integrals by changing the order of integration and changing to polar form; Triple integral; Applications of multiple integrals to find area as double integral, volume as triple integral and surface area.

Text Books

1. Higher Engineering Mathematics by B. S. Grewal, Khanna Publishers, New Delhi.
2. Advanced Engineering Mathematics by Erwin Kreyszig, John Wiley & Sons, New York.
3. A Course in Engineering Mathematics (Vol II) by Dr. B. B. Singh, Synergy Knowledge ware, Mumbai.
4. A Text Book of Applied Mathematics (Vol I & II) by P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.
5. Higher Engineering Mathematics by H. K. Das and Er. Rajnish Verma, S. Chand & CO. Pvt. Ltd., New Delhi.

Reference Books

1. Higher Engineering Mathematics by B. V. Ramana, Tata McGraw-Hill Publications, New Delhi.
2. A Text Book of Engineering Mathematics by Peter O" Neil, Thomson Asia Pte Ltd., Singapore.
3. Advanced Engineering Mathematics by C. R. Wylie & L. C. Barrett, Tata Mcgraw-Hill Publishing Company Ltd., New Delhi.

Engineering Graphics

24FY108T	Engineering Graphics	ESC	3L – 0T – 0P	3 Credits

Teaching Scheme	Examination Scheme
Lecture: 3 hrs/week Tutorial: 0 hrs/week	CA – I: 15 Marks Mid-Semester Examination: - 20 Marks CA – II: 15 Marks End Semester Exam: 50 Marks

Course Objectives:

1. To familiarize with different drawing tools, technical standards and procedures for construction of different geometric and engineering object.
2. To understand and develop the ability to project point, line, plane and solids by using 1st angle method of projections.
3. To understand and develop the ability to project orthographic Projections.
4. To prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Course Outcomes: After the completion of the course the student should be able to:

CO1	Understand the basics of engineering graphics and its applications.
CO2	Visualize and project Orthographic drawing of simple machine components and projections of points by appropriate method.
CO3	Demonstrate and projections of lines and planes by appropriate method.
CO4	Demonstrate and projections of Solids by appropriate method
CO5	Understand basic commands of CAD and use of Auto CAD 3D Modelling Workspace for practicing lines, solids, lettering and dimensioning in Engineering Graphics.

Course Contents

Unit 1: Introduction to Engineering Drawing: 6

Principles of Engineering Graphics and their significance, usage of drawing instruments, Drawing standards SP: 46, Types of lines, lettering, dimensioning, scaling conventions. Geometrical construction: Dividing a given straight line into any number of equal parts, bisecting a given angle, drawing a regular polygon given one side, special methods of constructing a polygon.

Unit 2: Orthographic Projections and Projections of Points: 6

Introduction to orthographic projection, drawing of orthographic views of objects from their isometric views. Projection of points lying in four quadrants.

Unit 3: Projections Lines and Planes and their Traces: 6

Projection of lines parallel and perpendicular to one or both planes, projection of lines inclined to one or both planes. Traces of lines. Projection of planes parallel and perpendicular to one or both planes, projection of planes inclined to one or both planes.

Unit 4 Projections of Solids: 6

Types of solids, projections of solids with axis perpendicular and parallel to HP and VP, solids with axis inclined to one or both the planes. Projection of spheres touching each other.

Unit 5: Introduction to Computer Aided Drawing: 6

Introduction to CAD & Graphical user interface of the CAD software, drafting packages and tools to make drawings.

Text Books

1. N.D.Bhatt, "Engineering Drawing", Charotar Publisher, 41th Edition, 2016
2. K. V. Nataraajan, A text book of Engineering Graphic, Dhanalakshmi Publishers, Chennai, 2006.
3. K. Venugopal and V. Prabhu Raja, Engineering Graphics, New Age International (P) Ltd, 2008.
4. Computer Aided Engineering Drawing - S. Trymbaka Murthy, -I.K. International Publishing House Pvt. Ltd., New Delhi.

Reference Books

1. Cencil Jensen, Jay D.Helsel , Dennis R. Short, "Engineering Drawing & Design", TATA McGRAWHILL,7th Edition, 2012.
2. Basant Agrawal and C M Agrawal, "Engineering Graphics", Tata Mc Graw Hill Education Pvt. Ltd.,New Delhi, 7th

Engineering Graphics Lab

24FY108L	Engineering Graphics Lab	ESC	0L – 0T – 2P	1 Credits

Teaching Scheme	Examination Scheme
Practical: 2 hr./week	CA – I: 30 Marks CA – II: 30 Marks Practical Examination / Oral (ESE): 40 Marks

Course Objectives:

The aim of this course is to provide a base for visualizing and drawing objects in different views which is an essential tool for a design engineer as well as graphics designer.

Course Outcomes: After the completion of the course the student should be able to:

CO1	Get acquainted with the basic knowledge of various lines, geometrical constructions and various kinds of scales.
CO2	Visualize and plot various projections of points and lines.
CO3	Visualize and plot various projections of planes and solids
CO4	Gain knowledge about orthographic projections and draw orthographic projections.

Minimum 10 experiments (drawing sheets) are to be performed based on contents from syllabus

Sample List of Experiments:

1. Lines, lettering and dimensioning.
2. Geometrical Constructions.
3. Orthographic projections.
4. Projections of points
5. Projection of straight lines
6. Projections of planes
7. Projections of solids

Basic Electrical and Electronics Engineering

24FY109T	Basic Electrical and Electronics Engineering	ESC	3L – 0T – 0P	3Credits

Teaching Scheme	Examination Scheme
Lecture: 3 hrs/week Tutorial: 0 hrs/week	CA – I: 15 Marks Mid-Semester Examination: - 20 Marks CA – II: 15 Marks End Semester Exam: 50 Marks

Course Objectives:

1. To equip the students with an understanding of the fundamental principles of DC and AC electrical circuits.
2. To introduce the working principles of digital electronics and applications of fundamental electronic devices and circuits.
3. To identify various measurement instruments and their use in electric and electronic measurements.

Course Outcomes: After completion of this course, students will be able to:

CO1	Apply fundamental concepts and circuit laws to solve simple DC and AC circuits
CO2	Interpret the construction and working of different types of electrical machines
CO3	Analyse building blocks of basic dc power supply
CO4	Outline the principle of BJT and its configuration. and digital number system with basic gates
CO5	Apply the knowledge of measuring instruments in electronic instrumentation system

Contents:

UNIT-I: Electrical Circuits

DC Circuits: Circuit Components: Conductor, Resistor, Inductor, Capacitor, Ohm's Law, Kirchhoff's Laws, Independent and Dependent Sources, Simple problems - Nodal Analysis, Mesh analysis with independent sources only (Steady state), Star-Delta Transformation. AC Circuits: AC Signal Parameters, Waveforms, Average value, RMS Value, Instantaneous power, active power, reactive power and apparent power, power factor – Steady state analysis of RLC circuits.

UNIT-II: Electrical Machines

Difference between Generator & motors, DC motors: Construction, working principle, types, characteristics, Back emf and Torque Equation. Working principle of Induction motor. Single Phase Transformer: Construction and working.

UNIT-III: Rectifiers and Power Supplies

PN Junction diode: Principle of operation, V-I characteristics, Diode current equation, principle

of avalanche breakdown. Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of Zener diode and its application as voltage regulator. Working of linear voltage regulators – 78xx and 79xx.

UNIT-IV: BJT it's configuration and Basic of number system

Bipolar Junction Transistors: PNP and NPN structures, Principle of operation, relation between current gains in CE, CB and CC, input and output characteristics of common emitter configuration. Number system, Conversion, arithmetic operation, Basic gates, universal gates

UNIT-V: Measurements and Instrumentation

Functional elements of an instrument, working principle of: Moving Coil and Moving Iron instruments, Ammeter, voltmeter, wattmeter, Energy meter, Block diagram & working of: Multi-meter, Function Generator and Digital Storage Oscilloscope

TEXT BOOKS: -

1. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020
2. Boylstad, Electronics Devices and Circuits Theory, Pearson Education
3. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, New Delhi, 2015

REFERENCE BOOKS: -

1. Millman Halkias: Electronic Devices and Circuits, McGraw-Hill Publication, 2000.
2. Donald Neaman, Electronic Circuit Analysis and Design, McGraw-Hill Publication, 3rd Edition
3. B. L. Theraja, Electrical Technology – Volume - I, S. Chand.
4. V. N. Mittal and Arvind Mittal, Basic Electrical Engineering, McGraw-Hill Publication.
5. D C Kulshreshtha, "Basic Electrical Engineering", Tata McGraw Hill, 2010
6. Modern Digital Electronics By R.P.Jain, Fourth Edition, Tata McGraw-Hill Education.
7. Digital Electronics: Principles and Integrated Circuits By A.K. Maini, Wiley India Publication

Basic Electrical and Electronics Engineering Lab

24FY109L	Basic Electrical and Electronics Engineering Lab	VSEC	0L – 0T – 2P	1 Credits

Teaching Scheme	Examination Scheme
Practical: 2 hrs/week	CA – I: 30 Marks CA – II: 30 Marks Practical Examination / Oral (ESE): 40 Marks

Course Outcomes: After the completion of the practicals the student should be able to:

CO1	Interpret different types of resistors, capacitors and Inductors.
CO2	Analyse and verify ohms law with VI characteristics of a PN diode.
CO3	Outline the working of Half and Full wave rectifiers.
CO4	Outline the principle and logic of logic gates.
CO5	Verify Universal logic gates

List of Experiments At least 08-10 experiments should be performed from the following list

1. Familiarization with Resistor
2. Familiarization with Capacitor
3. Familiarization with Inductor
4. Study of Ohm's law
5. Study of VI characteristics of a diode
6. Study of Half wave rectifier
7. Study of Full wave rectifier
8. Verification and interpretation of truth table for AND, OR, NOT gates.
9. Verification and interpretation of NAND gate as Universal gate.
10. Verification and interpretation of NOR gate as Universal gate.

Basic Civil and Mechanical Engineering

24FY110T	Basic Civil and Mechanical Engineering	ESC	3L – 0T – 0P	3 Credits

Teaching Scheme	Examination Scheme
Lecture: 3 hrs/week Tutorial: 0 hrs/week	CA – I: 15 Marks Mid-Semester Examination: - 20 Marks CA – II: 15 Marks End Semester Exam: 50 Marks

Course Objectives:

1. To impart basic knowledge of Civil and Mechanical Engineering.
2. To familiarize scope Civil Engineering in the development of society.
3. To gain basic knowledge of surveying methods- linear, angular measurement and levelling
4. To understand the Principles of Thermal Engineering and Power Generation.
5. To develop a Fundamental Understanding of Machines, Mechanisms, and Manufacturing Processes.

Course Outcomes: After the completion of the course the student should be able to:

CO1	Understand Principles of Planning, Basic Engineering properties and uses of materials.
CO2	Understand the Building Components and suitability of the foundation.
CO3	Understand surveying methods of linear, angular measurement and levelling
CO4	Explain fundamental concepts of thermal engineering and internal combustion engines.
CO5	Identify and describe basic machine elements, mechanisms, and manufacturing processes.

Course Contents

Basic Civil Engineering

Unit 1: Relevance of Civil Engineering and Building Planning **8**

Various Branches of Civil Engineering, Role of Civil Engineer in various construction activities,

Principles of Planning, Building Bye-Laws: Building Line, Control line, Height of Building, Open Space requirements, F.S.I., setbacks

Basic Engineering properties and uses of materials: Earth, Bricks, Timber, Stones, sand, Aggregates, Cement, Mortar, Concrete, Steel, Bitumen, Glass, FRP, composite materials.

Unit 2: Building Components & Building Planning **8**

Sub-structure: Types of soil and rocks as foundation strata, concept of bearing capacity, foundation, Functions of foundation, types of foundations: shallow and deep and their suitability.

Super-structure: Elements of super-structures and their functions.

Unit 3: Surveying **10**

Principles of surveying, Aim and Classification of surveying, Applications of Surveying,

Chain Surveying: Introduction to metric chain and tapes, Nominal scale and R.F., Ranging, Chaining and

Offsetting, Errors in chaining

Compass survey: Introduction, Meridian, Bearing and its types, System of bearing, Types of compass: Prismatic and Surveyor's compass. Calculation of included angles, Correction for Local attraction, Advantages and disadvantages of Compass Survey

Levelling: Terms, Study and Temporary adjustments of Dumpy Level, Auto Level, HI and Rise and Fall method.

Basic Mechanical Engineering

Unit 4: Introduction to Thermal Engineering **5**

Thermodynamic system, properties, state, process, cycle, path and point functions, heat and work, internal energy, thermodynamic equilibrium, Zeroth law, first law of thermodynamics. Constructional details and working of I C Engine, two stroke-four stroke engines, applications of I.C. Engines. Power Plant: Types of Power plant; Gas power plant, Thermal power plant, Hydroelectric power plant, Nuclear power plant, Automobiles: Basic definitions and objectives. Introduction to Refrigeration and Air Conditioning

Unit 5: Basics of Machines and Mechanisms **3**

Introduction, classification of links, pairs, kinematic chains, plane motion; mechanism and machines, Introduction to Belts and chain drives, Introduction to Manufacturing processes.

Text Books

1	Hiraskar G.K.	Basic Civil Engineering	Dhanpat Rai Pub.
2	Gole L.G.	Basic Civil Engineering	Mahalaxmi Pub,Kolhapur
3	Punmia,B.C. &	Basic Civil Engineering	Laxmi,pub
4	P. K. Nag	Engineering Thermodynamics	Tata McGraw Hill, New Delhi 3rd ed.2005
5	V.Ganesan	Internal Combustion Engines	Tata McGraw Hill
6	RS Khurmi , JK Gupta	A Textbook of Workshop Technology	S.Chand

Reference Books

1	N.N.Basak.	Surveying and Levelling	Mc Graw Hill Pub.Delhi
2	Dr.B.P.Varma	Civil Engineering Drawing and House Planning	Khanna Publishers
3	Domkundwar, Arora Domkundwar	Power Plant Engineering	Dhanpat Rai & Co.
4	RS Khurmi , JK Gupta	Theory of Machines	S.Chand

Energy and Environment

24FY111T	Energy and Environment	IKS	2L – 0T – 0P	2 Credits

Teaching Scheme	Examination Scheme
Lecture: 2 hrs/week Tutorial: 0 hrs/week	CA – I: 15 Marks Mid-Semester Examination: - 20 Marks CA – II: 15 Marks End Semester Exam: 50 Marks

Course Objectives:

1. To impact the knowledge of environmental education to the students of engineering and technology.
2. To explain basic concepts of sources causes, effects and control measures of environmental pollution.
3. To understand the role of individual for the protection of environment.

Course Outcomes: After the completion of the course the student should be able to:

CO1	Know and understand about components and segments of environment ecosystem and its types.
CO2	Understand the pollutants such as sources and effects.
CO3	Understand and to explain types of energies such as wind energy, solar energy, Hydro energy etc.
CO4	Understand and explain various types of air pollution, their effects and control measures.
CO5	Know the various types of water pollution, sources, waste water treatment, effects of water.

Course Contents:

Unit 1: Environment **6**

Introduction, Components of Environment, Types of Environments, Brief discussion on Segment Of Environment, Environmental Pollution, and Ecosystem: Types of Ecosystems, Components of Ecosystem

Unit 2: Air Pollution **6**

Introduction, Brief discussion on air pollutants, Sources of Air Pollution: Pollutants from Industry, Pollution by Automobiles, Effect of Air Pollutions: Acid rain, Green House Effect, Global warming; Brief discussion on Control of Air Pollution.

Unit 3: Energy and its conservation **6**

Importance of energy and its related issues. Quantifying energy, types of energy sources and uses. Conventional energy sources. Non-conventional energy sources, Energy Consumption: Historical Patterns, energy conservation practices, non-conventional energy generation potential of India,

Unit 4: Energy and Environment **6**

Introduction, Sources of Energy, Renewable sources of Energy: Solar Energy, Hydro Energy, Tidal Energy, Wind Energy, Biomass Energy, Geothermal Energy, Non-Renewable Energy Sources Coal, Petroleum, Natural Gas.

Unit 5: Water and Soil Pollution **6**

Introduction, Types of Water Pollutants, Sources of Water Pollution, Methods to remove Impurities in water, Treatment of Industrial waste water: Activated Sludge Process, Impact of Water Pollution on Human Health, Water as a carrier for the transmission of diseases. Sources of Soil Pollution, Harmful effects of Soil Pollution, Control of Soil Pollution.

Reference Books:

1. Coping with Water Scarcity: Addressing the Challenges by Iacovos Iacovides, Ian Cordery, and Luis Santos Pereira (2009)
2. Water Security in India: Hope, Despair, and the Challenges of Human Development by Ashok Chandra Shukla and Vandana Asthana (2014)
3. Energy Management and Conservation by K. V. Sharma and P. Venkataseshaiah (2011)
4. Energy Engineering and Management (Second Edition) by Amlan Chakrabarti (2011).
5. 2021-22 Syllabus of IIT Delhi for subjects “ESL727 Energy and Environment”, “ESL740 Non-Conventional Sources of Energy” and “HSL703 Perspectives on climate change: Implications”
6. World Commission non-Environment and Development. 1987.Our Common Future. Oxford University Press.
7. Khanduri, I., Pandey, M., Maikhuri, R. 2006. Environment and Ecology, Trans media Publication Srinagar Garhwal
8. P.D. Sharma, 2012 Ecology and Environment. Rastogi Publication

Integrated Personality Development

24FY113L	**Integrated Personality Development**	**CC**	**0L – 0T – 2P**	**1 Credits**

Teaching Scheme	**Examination Scheme**
Practical: 2 hr./week	CA – I: 15 Marks CA – II: 15 Marks Practical Examination / Oral (ESE): 20 Marks

Course Introduction:

The Need for Values: - Students will learn about the need for values as part of their holistic development to become successful in their many roles - as ambitious students, reliable employees, caring family members, and considerate citizens

Course Outcomes: After the completion of the course the student should be able to:

CO1	To provide students with soft skills that complement their hard skills, making them more marketable when entering the workforce.
CO2	To enhance awareness of India's glory and global values, and to create considerate citizens who strive for the betterment of their family, college, workforce, and nation.
CO3	To inspire students to strive for a higher sense of character by learning from role models who have lived principled, disciplined, and value-based lives.
CO4	To encourage students to build stronger familial bonds and contribute positively to their communities through service and ethical living.

Course Content:

UNIT I	**A.Begin with the End in Mind**	Students will learn to visualize there future goals and will structure their lives through smart goals to give themselves direction and ultimately take them to where they want to go.
	B.Being Addiction - Free	Students will explore the detrimental effects of addictions on one's health, personal life, and family life. They will learn how to take control of their life by becoming addiction free.
UNIT II	**A. Teamwork & Harmony**	Students will learn the six steps of teamwork and harmony that are essential for students': professional and daily life.
	B.Leading Without Leading	Students will explore a new approach to Leadership through humility.
UNIT III	**A.An ideal Citizen**	Students will learn that to become value-based citizens, they must first develop good values in their lives They start by exploring the values of responsibility and integrity

	B. Forgive & Forget	Students will understand the importance and benefits that forgiveness plays in their personal and professional life. They will learn to apply this knowledge in realistic situations
UNIT IV	**A.Stress Management**	Students will learn to cope with current and future causes of stress.
	B. Impact of Company	Students will understand that the type of company that we keep, has a crucial rale in determining who we are and who we will become. They will develop the ability to create a positive environment around them.

Minimum 08 assignments on following topics.

1. Begin with the End in Mind
2. Being Addiction - Free
3. Teamwork & Harmony
4. Leading Without Leading
5. An ideal Citizen
6. Forgive & Forget
7. Stress Management
8. Impact of Company

NSS

24FY113L	**NSS**	**CC**	**0L – 0T – 2P**	**1 Credits**

Teaching Scheme	**Examination Scheme**
Practical: 2 hr./week	CA – I: 15 Marks CA – II: 15 Marks Practical Examination / Oral (ESE): 20 Marks

Course Content:

Unit 1: Introduction and Basic Concepts of NSS History, Philosophy, Aims & objectives of NSS Organizational structure, Concept of regular activities, Special camping, Day Camps. Basis of adoption village/slums, Methodology of conducting Survey.

Unit 2: Youth and community mobilization Definition, Profile of youth, Categories of youth, Issues, Challenges and opportunities for youth, Youth as an agent of social change, Youth-adult partnership, Mapping of community stakeholders, identifying methods of mobilization, Needs & importance of volunteerism.

Unit 3: Importance and Role of Youth Leadership Meaning and types of leadership, Qualities of good leaders; Traits of leadership, Importance and role of youth leadership.

Unit 4: Life Competencies and skill Definition and importance of life competencies, Communication, Interpersonal, Problem solving and decision making, Positive thinking, Self-confidence and self-esteem, Life goals, Stress and time management

Unit 5: Social Harmony and National Integration Indian history and culture, Role of youth in peace-building and conflict resolution, Role of youth in Nation building, Youth Development Programmes in India National Youth Policy, Youth development programmes at the National Level, State Level and voluntary sector, Youth-focused and Youth-led organizations.