Walchand Institute of Technology, Solapur
(An Autonomous Institute)

Affiliated to
Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Choice Based Credit System (CBCS)

Structure and Syllabus
for
F.Y.B.Tech.
(All Branches - Group A)
W.E.F. 2025-26

HEAD
General Engg. Department
Walchand Institute of Technology, Solapur

W.I.T SOLAPUR

Dr. Mrs. M.A. Nirgude
Dean Academics

General Engineering Department

Vision

- To produce young, globally competent Graduates / Post-Graduates / Doctoral Engineers with an aptitude for leadership and research, to face the challenges for modernization and globalization courageously who will be instrumental for overall growth of the society.

Mission

- To impart quality Technical Education in accordance with the needs of the society through various academic programs.
- To foster learning process & to provide proper ambience for motivating students for creating awareness to excel in the ever expanding field of science and technology.
- To enhance career opportunities for students through exposure to industries & research institutions.
- To strive for excellence by encouraging independent critical thinking, creativity & discipline.
- To create awareness for engineering ethics & human values for instilling moral, social values & loyalty & to appreciate the rights of others & respect towards society & its heritage.
- To help the students to implement their acquired Engineering knowledge for society & community development, thus, enhancing a strong sense of social responsibility & accountability.
- To reach to the community through various outreach programs to include the scientific technological spirit among all.
- To promote & provide a framework to meet campus sustainability goals & mitigate climate change.
- To help in nation building through a pool of dedicated, disciplined, intellectual & integrated manpower.

General Engineering Department

Legends Used	
L	Lecture Hours / week
T	Tutorial Hours / week
P	Practical Hours / week
FA	Formative Assessment
SA	Summative Assessment
ESE	End Semester Examination
ISE	In Semester Evaluation
ICA	Internal Continuous Assessment
POE	Practical and Oral Exam
OE	Oral Exam
MOOC	Massive Open Online Course
HSS	Humanity and Social Science
NPTEL	National Programme on Technology Enhanced Learning
F.Y.	First Year
S.Y.	Second Year
T.Y.	Third Year
B. Tech.	Bachelor of Technology

General Engineering Department

Course Code Format									
2	**5**	**G**	**E**	**U/P**	**2**	**C**	**C**	**1**	**T/L**
Year of Syllabus revision		Program Code		U-Under Graduate P-Post Graduate	Semester No./ Year1/2/3/…8	Course Type		Course Serial No. 1-9	Theory, L-Lab. session P- Programming

Program Code	
GE	General Engineering
Course Type	
BS	Basic Science
ES	Engineering Science
HU	Humanities & Social Science
MC	Mandatory Course
CC	Core Compulsory Course
SK	Skill Based Course

Sample Course Code	
25GEU1BS1T	Engineering Physics

General Engineering Department

First Year B. Tech. Semester I (Group A)

- **Theory Courses:**

Group	Course Code	Name of Course	Engagement Hours			Credits	ESE	ISE	ICA	Total
			L	T	P					
Basic Science	25GEU1BS1T	Engineering Physics	2	-	-	2	60	40	-	100
Basic Science	25GEU1BS3T	Engg. Mathematics-I	2	-	-	2	60	40	-	100
Basic Science	25GEU1BS3A	Engg. Mathematics-I (Tutorial)	-	1	-	1	-	-	25	25
Engg. Science	25CEU1ES4T	Engineering Mechanics	2	-	-	2	60	40	-	100
Engg. Science	25MEU1ES5T	Engg. Graphics & CAD	2	-	-	2	-	50	-	50
Ability Enha. Course	25GEU1HU6T	Professional & Communication Skills	2	-	-	2	60	40	-	100
Ability Enha. Course	25GEU1HU6A	Professional & Communication Skills (Tutorial)	-	1	-	1	-	-	25	25
IKS	25GEU1IKS7T	Indian Science & Technology	2	-	-	2	-	25	25	50
		Total	**12**	**2**	**-**	**14**	**240**	**235**	**75**	**550**

- **Laboratory Courses:**

Group	Course Code	Name of Course	Engagement Hours			Credits	ESE	ISE	ICA	Total
			L	T	P					
Basic Science	25GEU1BS1L	Engineering Physics	-	-	2	1	-	-	25	25
Engg. Science	25CEU1ES4L	Engineering Mechanics	-	-	2	1	-	-	25	25
Engg. Science	25MEU1ES5L	Engg. Graphics & CAD	-	-	2	1	-	-	50	50
Voc. & Skill Enha. Course	25GEU1SK8L	Workshop Practice	1	-	2	2	-	-	50	50
Co-curricular Course	25GEU1ES9L	Creativity & Design Thinking	1	-	2	2	-	-	50	50
		Total	**2**	**-**	**10**	**7**	**-**	**-**	**200**	**200**
		Grand Total	**14**	**2**	**10**	**21**	**240**	**235**	**275**	**750**

First Year B. Tech. Semester II (Group A)

- **Theory Courses:**

Group	Course Code	Name of Course	Engagement Hours			Credits	ESE	ISE	ICA	Total
			L	T	P					
Basic Science	25GEU2BS2T	Engineering Chemistry	2	-	-	2	60	40	-	100
Basic Science	25GEU2BS3T	Engg. Mathematics-II	2	-	-	2	60	40	-	100
Basic Science	25GEU2BS3A	Engg. Mathematics-II (Tutorial)	-	1	-	1	-	-	25	25
Engg. Science	25EEU2ES4T	Basic Electrical & Electronics Engineering	2	-	-	2	60	40	-	100
Engg. Science	25CEU2ES5T	Basic Civil & Mechanical Engineering	3	-	-	3	60	40	-	100
Voc. & Skill Enha. Course	25GEU2HU6T	English for Employability Skills	2	-	-	2	60	40	-	100
Voc. & Skill Enha. Course	25GEU2HU6A	English for Employability Skills (Tutorial)	-	1	-	1	-	-	25	25
		Total	**11**	**2**	**-**	**13**	**300**	**200**	**50**	**550**
	25GEU2MC1T	Democracy, Elections and Good Governance	-	-	-	-	50	-	-	50

- **Laboratory Courses:**

Group	Course Code	Name of Course	Engagement Hours			Credits	ESE	ISE	ICA	Total
			L	T	P					
Basic Science	25GEU2BS2L	Engineering Chemistry	-	-	2	1	-	-	25	25
Engg. Science	25EEU2ES4L	Basic Electrical & Electronics Engineering	-	-	2	1	-	-	25	25
Engg. Science	25CEU2ES5L	Basic Civil & Mechanical Engineering	-	-	2	1	-	-	25	25
Professional Core Course	25CSU2ES7P	Programming for Problem Solving	2	-	2	3	25#	50	25	100
Co-curricular Course	25GEU2SK8L	Co-curricular Activity (from basket)*	-	-	-	1	-	-	25	25
		Total	**2**	**-**	**8**	**7**	**25**	**50**	**125**	**200**
		Grand Total	**13**	**2**	**8**	**20**	**325**	**250**	**175**	**750**

Note:

- # Indicates the subject 'Programming for Problem Solving' shall have a 'Practical and Oral Examination at the end of the semester assessing student's programming skills.
- * Indicates, that students are required to chose any one of the following subjects:
    1. Yoga Education
    2. Health and Wellness
    3. Sports

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
First Year B. Tech. (All Branches - Group A), Semester-I

25GEU1BS1T Engineering Physics

Teaching Scheme		**Examination Scheme**	
Lectures	2 Hours/week	**ESE**	60 Marks
Practical	2 Hours/week	**ISE**	40 Marks
Credits	3	**ICA**	25 Marks

Introduction

Engineering Physics forms the foundational framework for understanding the physical principles underlying modern engineering and technology. This course explores essential topics including crystallography, semiconductor physics, wave optics, laser and fiber optics, quantum mechanics, nanoscience, nuclear physics, and sound engineering. Emphasizing both theoretical concepts and practical applications, it prepares students to analyze physical phenomena critical to the design and development of advanced engineering systems.

Course Prerequisites

Students taking Engineering Physics should have a solid grounding in higher secondary-level physics and mathematics, especially in topics like waves, optics, atomic structure, and basic calculus. Familiarity with physical concepts such as diffraction, semiconductors, and energy forms will help in understanding advanced topics like quantum mechanics, lasers, and nuclear physics. Basic numerical problem-solving skills are expected, along with an interest in applying physics to real-world technologies such as fiber optics, nanoscience, and acoustics.

Course Objectives

1. To enable students to analyze crystal structures using fundamental concepts and classify solids based on their band gap energy and corresponding electronic properties.
2. To equip students to apply the principles of diffraction and polarization for calculating resolving power and determining specific rotation in optical systems.
3. To ensure students can analyze the working mechanisms of lasers and optical fibers, and articulate their practical applications.
4. To help students interpret wave–particle duality through de Broglie theory and categorize nanomaterials based on their applications.
5. To develop students' ability to critically analyze nuclear fission reactions, compare them with fusion reactions, and to describe the essential components of a nuclear fission reactor.
6. To enable students to evaluate the acoustic performance of enclosed spaces and summarize the methods and applications of ultrasonic wave generation.

Course Outcomes

After completing the course, students will be able to:

1. Analyze crystal structures using Miller indices & Bragg's law and differentiate solids based on band gap energy and their associated electronic properties.
2. Apply diffraction and polarization principles to calculate resolving power and determine specific rotation in optical systems.
3. Analyze working mechanism of lasers and optical fibers along with their applications in different domains.
4. Interpret wave-particle duality from de Broglie theory and classify nanomaterials used in various fields.
5. Analyze and evaluate nuclear fission reaction, compare it with fusion reaction and describe the essential components of nuclear fission reactor.
6. Evaluate acoustic performance in enclosed spaces and summarize ultrasonic wave production methods and applications.

Unit – I	**Crystallography & Semiconductor Physics**	**5 Hours**

Lattice Planes and Miller Indices, Interplanar Spacing for Cubic System, Symmetry elements (axis, center and plane), Bragg's Law, Numericals.

Fermi-Dirac probability distribution function (introduction only), Fermi level in intrinsic and extrinsic semiconductors, Effect of impurity concentration on Fermi level, Derivation for E_{Fin} , Hall effect and applications, Numericals.

Unit – II	**Wave Optics**	**5 Hours**

Diffraction: Introduction, resolving power (R.P.), Rayleigh criterion, theory of diffraction grating and its R.P., Numericals.

Polarization: Introduction, Optical activity, Specific rotation, Numericals.

Unit – III	**LASER and Fibre Optics**	**5 Hours**

LASER: Introduction, Interaction of radiation with matter, Population Inversion and Pumping, Characteristics of laser, He-Ne LASER, Applications of LASER.

Fibre Optics: Introduction, Structure of optical fibre, Working principle of optical fibre, Acceptance Angle, Numerical Aperture, Advantages and applications of optical fibres, Communication system: basic building blocks, Numericals.

Unit – IV	**Introduction to Quantum Mechanics and Nanoscience**	**5 Hours**

Introduction to Quantum Mechanics: de Broglie hypothesis, de Broglie wavelength of matter waves: in terms of kinetic energy and associated with particle in thermal equilibrium, Properties of matter waves, Davisson-Germer Experiment (apparatus, investigations and analysis), Numericals.

Introduction to Nanoscience: Introduction, Types of Carbon Nanotubes, Applications of nanomaterials in different fields.

Unit – V	Nuclear Physics	5 Hours
Nuclear fission Reaction as a source of energy, chain reaction and multiplication factor (Introduction). Essentials of nuclear reactor, Thermonuclear reactions and types, Difference between Fusion and Fission, Numericals.		
Unit – VI	**Sound Engineering**	**5 Hours**
Acoustics: Introduction, Reverberation, Reverberation time, absorption coefficient (definition only), Sabine's formula, Factors affecting acoustics of auditorium and their remedies. Ultrasonic: Introduction, Production methods of ultrasonic waves (piezoelectric effect and magnetostriction effect (introduction only), Properties of ultrasonic waves and applications, Numericals.		

Internal Continuous Assessment (ICA)

ICA consists of performance of eight experiments based on the units.

- List of Experiments
  1. XRD analysis
  2. Crystallography
  3. Hall Effect
  4. Band Gap Energy
  5. Theory of Plane Diffraction Grating
  6. Resolving Power of Plane Diffraction Grating
  7. He-Ne Laser: Beam Divergence
  8. Numerical aperture and Acceptance angle of an optical fibre.
  9. Plank's constant
  10. Kundt's Tube

Text Books

1. A Text Book of Engineering Physics, M. N. Avadhanulu, P. G. Kshirsagar, S. Chand Publications
2. A Text Book of Optics, Subramanya and Brij Lal, S. Chand and Company Ltd.
3. Engineering Physics, R. K. Gaur, S. L Gupta, Eighth Revised Edition 2012, Dhanpat Rai Publications (P) Ltd.

Reference Books

1. Modern Physics, B. L. Theraja, S. Chand and Company Ltd.
2. Nanotechnology: Principles and Practices, Sulabha K. Kulkarni, Capital Publishing Company
3. Nanoscience and Nanotechnology: Fundamentals to Frontiers, M. S. Ramachandra Rao, Shubra Singh, Wiley India Pvt. Ltd., New Delhi
4. Engineering Physics, D. K. Bhattacharya, Poonam Tandon, Oxford University Press
5. Solid State Physics, S. O. Pillai, McGraw Hill Publications.
6. An Introduction to Laser's Theory and Applications, Dr. M. N. Avdhanulu, Dr. P. S. Hemne, Revised Edition 2017, S. Chand & Company Pvt. Ltd.

e-Resources
• https://youtube.com/playlist?list=PLM-jfaoaU5iz5hfLQrddV8Eb3maIWGCNQ&si=LMyu53kTDIPtkeTu • https://archive.nptel.ac.in/courses/115/106/115106127/

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
First Year B. Tech. (All Branches - Group A), Semester-I

25GEU1BS3T Engineering Mathematics-I

Teaching Scheme		**Examination Scheme**	
Lectures	2 Hours/week	**ESE**	60 Marks
Tutorial	1 Hour/week	**ISE**	40 Marks
Credits	3	**ICA**	25 Marks

Introduction

Engineering Mathematics-I is a fundamental course designed to equip students with essential mathematical tools and techniques necessary for engineering analysis and problem-solving. The course covers key topics such as linear algebra, series expansions, partial differentiation, and complex variable theory. Emphasizing both theoretical understanding and practical applications, it lays the groundwork for advanced mathematical concepts used in various engineering disciplines.

Course Prerequisites

Students enrolling in Engineering Mathematics-I should have a strong foundation in higher secondary mathematics, particularly in algebra, calculus, and coordinate geometry. Familiarity with basic concepts such as functions, limits, derivatives, matrices, and complex numbers is essential, as the course builds on these to explore more advanced topics like eigenvalues, Taylor series, partial differentiation, and complex variable theory. Logical reasoning and algebraic manipulation skills are important for solving systems of equations, analyzing multivariable functions, and constructing analytic expressions relevant to engineering applications.

Course Objectives

1. To introduce students to the concepts of matrix rank, solutions to systems of simultaneous equations, and the determination of eigenvalues and eigenvectors.
2. To introduce students to the expansion of functions and the evaluation of indeterminate forms in limits.
3. To introduce students to the differentiation of functions of several variables and explore its applications.
4. To introduce the tools of differentiation of functions of complex variable that are used in various techniques dealing engineering problems.

Course Outcomes

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

1. Determine the rank of a matrix using echelon form and Solve systems of linear equations.
2. Determine eigenvalues and eigenvectors of real matrices and apply the Cayley–Hamilton theorem.
3. Apply Taylor’s and Maclaurin’s theorems, use standard series expansions, and evaluate

indeterminate forms using L'Hospital's Rule.

4. Evaluate partial derivatives, apply Euler's theorem, use Jacobians, and optimize multivariable functions.
5. Identify, differentiate, and apply Cauchy-Riemann equations to analyze and construct analytic functions.

Unit – I	**Linear Algebra Part I**	**5 Hours**
Rank of matrix by echelon form, System of Linear Equations-Homogeneous and Non homogeneous equations.		
Unit – II	**Linear Algebra Part II**	**5 Hours**
Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors, Cayley – Hamilton theorem (excluding proof)		
Unit – III	**Expansion of Functions and Indeterminate forms**	**5 Hours**
Taylor's and Maclaurin's theorem, Standard series expansions, indeterminate forms by L' Hospital Rule.		
Unit – IV	**Partial Differentiation**	**5 Hours**
Functions of several variables, Partial Derivatives, Composite Function, Total Derivative, Change of Independent variables, Euler's Theorem on Homogeneous functions		
Unit – V	**Applications of Partial Differentiation**	**5 Hours**
Jacobians and its applications, Errors and Approximations, Maxima and Minima of functions of two variable.		
Unit – VI	**Complex Variable (Differentiation)**	**5 Hours**
Introduction to complex number, Differentiation, Cauchy Riemann Equations (Without Proof), Analytic Functions, Elementary Analytic Functions (Exponential, Trigonometric and Logarithmic function), Harmonic Functions and Conjugates, Construction of Analytic Function.		

Internal Continuous Assessment (ICA)

ICA shall be based on student's performance during tutorial sessions and on completion of six assignments one on each unit.

Text Books

1. A Text Book of Applied Mathematics, P.N. and J.N.Wartikar, Vol.1, Pune Vidyarthi Griha Prakashan
2. Advanced Engineering Mathematics, H.K. Das, S. Chand Publications, Delhi
3. Engineering Mathematics (Volume), ITL Education, Cengage Learning
4. Engineering Mathematics, Ravish R. Sing and Mukul Bhatt, McGraw-Hill

Reference Books

1. Higher Engineering Mathematics (42ndEdition), B.S. Grewal, Khanna Publications, Delhi
2. Engineering Mathematics, Srimanta Paland, Subodh C. Bhunia, Oxford Higher Education
3. Higher Engineering Mathematics, Ramana B.V., Tata McGraw Hill NewDelhi, 2010
4. Applied Mathematics-I, II, Kreyzig's, Wiley

e-Resources

- https://www.youtube.com/playlist?list=PLM-jfaoaU5iwcLA3lrWhIPXCvyZ3JPDbV

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
First Year B. Tech. (All Branches - Group A), Semester-I

25CEU1ES4T Engineering Mechanics

Teaching Scheme		**Examination Scheme**	
Lectures	2 Hours/week	**ESE**	60 Marks
Practical	2 Hours/week	**ISE**	40 Marks
Credits	3	**ICA**	25 Marks

Introduction

Study of Engineering Mechanics helps to formulate new ideas and theories, discover and interpret phenomena, and develop experimental and computational tools. The objective of this course is to understand the basic principles of statics and dynamics. This principle helps to formulate and solve problems related to body/object in rest and motion.

Course Prerequisites

Students taking Engineering Mechanics should have a firm grasp of higher secondary-level physics and mathematics, particularly in topics such as Newton's laws of motion, basic kinematics, forces, vectors, and algebraic manipulation. An understanding of scalar and vector quantities, concepts of mass and acceleration, and elementary geometry is essential, as these form the foundation for analyzing force systems, equilibrium, motion, and energy principles. While prior exposure to mechanics is not required, students should be comfortable with interpreting physical situations and applying mathematical reasoning to solve problems involving rigid bodies in both static and dynamic conditions.

Course Objectives

1. To impart knowledge of basic fundamentals in Engineering Mechanics for analyzing the effect of force system on a rigid body.
2. To prepare the student to analyze the beam, truss.
3. To prepare the students to solve the problem on centroid and moment of inertia of plane lamina.
4. To impart the knowledge to solve problems on kinematics and kinetics of rigid body.
5. To impart the knowledge of work- energy and impulse momentum principles on rigid body having linear motion.

Course Outcomes

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

1. Analyze effects of a various force system acting on a rigid body.
2. Analyze problems involving statically determinate beams, pin-jointed trusses.
3. Locate centroid, centre of Gravity and calculate moment of Inertia of plane lamina.

4. Apply the principles of kinematics and kinetics of rigid bodies to analyze and solve engineering problems.
5. Apply work-energy and impulse momentum principles for analyzing linear motion of bodies.

Unit – I	**Resultant of coplanar forces**	**5 Hours**

Introduction: Basic units, SI units, body, rigid body, particle, scalar quantities, vector quantities, force, law of transmissibility of force, moment of a force, couple, moment of a couple, resultant, parallelogram law of forces, triangle law of forces, polygon law of forces.
Varignon's theorem, Composition of co-planar concurrent and non-concurrent forces: analytical method, graphical method, Bow's notation.

Unit – II	**Equilibrium & Analysis of Pin-Jointed Plane Frames**	**6 Hours**

Equilibrium: Equilibrium of co-planar forces, analytical and graphical conditions of equilibrium, free body diagrams, Lami's theorem.
Support Reactions: Support reactions of statically determinate beams with different type of supports, beams and loads.
Analysis of Truss: Pin-jointed statically determinate plane trusses-perfect frames, assumptions, determination of nature and magnitude of a force in a member, simple trusses; zero force members. Analysis of trusses by method of joints, method of section.

Unit – III	**Center of Gravity and Moment of Inertia**	**4 Hours**

Centroid: Centre of gravity, centroid of a composite area, centroid of simple figures from first principle.
Moment of inertia: Definition, moment of inertia of plane sections from first principles, Theorems of moment of inertia, perpendicular axis theorem, parallel axis theorem, moment of inertia of symmetrical sections, radius of gyration, polar moment of inertia.

Unit – IV	**Kinematics and Kinetics of particles**	**10 Hours**

Linear Motion: Rectilinear motion, equations of motion, motion curves and their applications, relative velocity problems on Newton's laws of motion for linear motion.
D'Alembert's principle, rectilinear motion on a rough inclined plane, motion of a lift, motion of connected bodies.

Unit – V	**Work Energy Methods**	**5 Hours**

Work Energy Method: Potential energy, kinetic energy of line in motion, principle of conservation of energy, work energy equation.
Impulse momentum equation and its application.

Note: Scope of Graphical methods in unit1,2,3 is limited to ICA only.

Internal Continuous Assessment (ICA)

A) List of Experiments

1. Law of parallelogram of forces
2. Triangle Law of forces using Jib crane apparatus
3. Law of polygon of forces
4. Law of Moments using Bell crank lever
5. Support reaction of beams
6. Newton's Second law using Fletcher's trolley

B) Graphic Statics: Problems on

1. Finding resultant of forces (2 Problem)
2. Evaluating support reactions of beam. (2 Problem)
3. Evaluating forces in the members of truss. (2 Problem)

C) Assignments based on the various units in curriculum

Text Books

1. Engineering Mechanics, Bhavikatti S. S., New Age International Pvt. Ltd.
2. Engineering Mechanics, K. L. Kumar, Tata McGraw Hill Publications
3. Engineering Mechanics, Basudeb Bhattacharyya, Oxford University Press.
4. Engineering Mechanics - Statics and Dynamics, A. Nelson, McGraw Hill Education (India) Pvt. Ltd.
5. Engineering Mechanics - Statics and Dynamics, A.K. Dhiman, P. Dhiman& D.C.Kelshreshtha, McGraw Hill Education (India) Pvt. Ltd
6. A Text book of Engineering Mechanics, R.S. Khurmi, S. Chand Publications
7. Engineering Mechanics, Sadhu Singh (Khanna Publishers)

Reference Books

1. Vector Mechanics for Engineers: Statics and Dynamics, Beer and Johnson, Tata McGraw Hill Education (India) Pvt. Ltd.
2. Engineering Mechanics, Irving H. Shames, Prentice Hall of India, New Delhi
3. Engineering Mechanics Statics and Dynamics, Ferdinand Singer, Harper & Row Publications
4. Engineering Mechanics Statics, Vol.1, SI Version, 7th Edition, J. L. Meriam, L. G. Kraige, Wiley India Pvt. Ltd., New Delhi
5. Engineering Mechanics Dynamics, SI Version, 7th Edition, J. L. Meriam, L. G. Kraige, Wiley India Pvt. Ltd., and New Delhi

e-Resources

- https://youtube.com/playlist?list=PLM-jfaoaU5iwN0lhG58_yhAhmKFtuw_i6&si=0XRfsUM6OZM5-JNz

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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First Year B. Tech. (All Branches - Group A), Semester-I

25MEU1ES5T Engineering Graphics and CAD

Teaching Scheme		**Examination Scheme**	
Lectures	2 Hours/week	**ESE**	--
Practical	2 Hours/week	**ISE**	50 Marks
Credits	3	**ICA**	50 Marks

Introduction

Engineering Graphics and CAD has become an indispensable tool for engineers, technocrats, architects, surveyors, designers, and many other professionals in recent times. It is used to graphically convey the ideas and information necessary for the construction or analysis of machines, structures, and systems. This course focuses on creating orthographic and isometric drawings through a multidisciplinary approach.

Course Prerequisites

Students enrolling in Engineering Graphics and CAD should have basic familiarity with geometric shapes, spatial reasoning, and visualization skills, typically developed through mathematics and geometry studies at the higher secondary level. While no prior experience with technical drawing or CAD software is required, students should be comfortable interpreting 2D and 3D objects and have the patience and precision needed to represent them graphically. A keen eye for detail and interest in design-oriented thinking will help students effectively grasp orthographic and isometric projection principles and use computer tools for engineering drawing.

Course Objectives

1. To develop the ability to visualize objects in orthographic and isometric views.
2. To accurately draw orthographic and isometric views using standard conventions.

Course Outcomes

At the end of this course, students will be able to:
1. Draw orthographic views of objects.
2. Draw isometric views of objects.

Unit – I	**Introduction to Methods of Projections**	**2 Hours**

Introduction to Methods of Projections.

Unit – II	Orthographic Projections	9 Hours
Developing orthographic views (front, top, and side) from given pictorial representations using the First Angle Projection method.		
Unit – III	**Isometric Projections**	**9 Hours**
Difference between isometric view and projection. Drawing isometric views from given orthographic projection. Introduction to computer-aided drafting (CAD) software.		
Internal Continuous Assessment (ICA) ICA shall be based on drawing orthographic and isometric views on drawing sheets.		
Text Books		
1. Engineering Drawing, D. N. Jolhe, TATA McGraw Publishing Co. Ltd. 2. Engineering drawing, N. D. Bhatt, Charotar Publishing House Pvt. Ltd. 3. A Textbook of Engineering Graphics, Natarajan K.V., Dhanalakshmi Publishers, Chennai 4. Engineering Graphics-I.M.L.Dabhade,Vision Publication		
Reference Books		
1. Engineering Drawing, N. S. Parthasarathy & VelaMurali, Oxford Publication 2. Engineering Drawing, K. L. Narayana & P. Kannaiah, Scitech Publication 3. Engineering Graphics, A. M. Chandra, New Age International Publishers		
e-Resources		
• https://youtube.com/playlist?list=PLM-jfaoaU5ixN5WZtJTdzHJbJeApKOTjm&si=FEc1WgEO9Ljrd3I-		

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
First Year B. Tech. (All Branches - Group A), Semester-I

25GEU1HU6T Professional & Communication Skills

Teaching Scheme		**Examination Scheme**	
Lectures	2 Hours/week	**ESE**	60 Marks
Tutorial	1 Hour/week	**ISE**	40 Marks
Credits	3	**ICA**	25 Marks

Introduction

In today's globalized and technologically advanced world, effective communication is a vital professional skill for engineering graduates. This course, is designed to strengthen students' command of the English language, develop technical communication proficiency, and build essential employability skills. Through a blend of grammar, verbal aptitude, technical writing, listening, reading, and speaking activities, the course aims to make students industry-ready communicators equipped to perform in diverse professional scenarios.

Course Prerequisites

Students enrolling in the Communication Skills course should have a basic understanding of English language fundamentals, as typically acquired during school education. They are expected to possess elementary proficiency in grammar, vocabulary, reading, and writing. While fluency is not essential at entry, a willingness to participate actively in listening and speaking exercises, engage in group discussions, and practice technical writing is important. Students should also be open to improving their interpersonal and professional communication, as the course emphasizes real-world applications relevant to workplace and academic environments.

Course Objectives

1. Introduce students to the fundamental principles, types, and barriers of communication, while developing effective interpersonal communication strategies.
2. Strengthen students' command of English grammar, sentence structure, vocabulary, and error identification for technical and professional communication.
3. Develop effective listening and speaking skills for formal and informal technical contexts, including presentations and group discussions.
4. Foster students' abilities to read, interpret, and critically analyze technical and professional content such as articles, reports, and case studies.
5. Enhance professional writing skills through practice in composing clear, concise, and well-structured documents, including emails and reports relevant to industry and academic settings.

Course Outcomes		
At the end of this course, students will be able to: 1. Understand the communication process and apply effective strategies to overcome barriers and enhance interpersonal communication 2. Strengthen verbal and grammatical skills in professional and technical settings. 3. Demonstrate participative listening and speaking skills for technical and workplace scenarios using proper etiquette and fluency. 4. Develop critical reading and analytical abilities to comprehend, interpret, and evaluate technical and professional texts. 5. Compose well structured professional documents such as emails and reports, demonstrating proficiency in written communication.		
Unit – I	**Introduction to Communication Skills**	**3 Hours**
Communication, Process of Communication, Principles of Effective Communication, Types of Communication: Verbal, Non-Verbal, formal, informal, Barriers to Communication, 7Cs of Effective Communication, Effective measures to improve interpersonal communication skills.		
Unit – II	**Verbal Ability Skills**	**8 Hours**
Parts of Speech, Kinds of Sentences – Identification and Transformation, Sentence Pattern – Framing Sentences, Tenses – Rules and its usage, Vocabulary: Word Formation: Prefixes, Suffixes, Root words, idioms & phrases, Common Errors, Sentence Correction, Sentence Rearrangement, Verbal Analogy, and Spot the Error.		
Unit – III	**Listening and Speaking Skills**	**6 Hours**
Application of different types of listening and speaking, -Active, Passive, Critical, Empathetic, Selective Listening, Informative, Persuasive, Demonstrative, Extempore Speaking. Situational Conversation, Telephonic Etiquettes, Role Play, Extempore Speech and Public speaking.		
Unit – IV	**Reading Skills**	**6 Hours**
Application of different types of Reading: - Skimming, Scanning, Intensive and Extensive Reading, Reading Comprehension, reading and Evaluating Start-Up Case Studies.		
Unit – V	**Writing Skills**	**6 Hours**
Application of different types of Writing: Drafting notices, cover letter, Effective e-mail communication, paragraph, essay writing and creative writing.		

Internal Continuous Assessment (ICA)

Students must complete at least 10 exercises from the list below during lab and tutorial sessions:

1. Evaluate messages using the 7 Cs of communication
2. Classify words by parts of speech
3. Transform sentences (e.g. assertive to interrogative)
4. Build vocabulary using prefixes, suffixes, and root words
5. Spot and correct grammatical errors
6. Listen actively to audio clips and answer questions
7. Participate in formal and informal situational conversations (role-plays)
8. Deliver extempore speeches on assigned topics
9. Practice telephonic etiquette through role-plays
10. Making Creative advertisement and Storytelling
11. Apply skimming and scanning techniques on technical texts
12. Draft a notice, cover letter and emails on technical topics
13. Compose paragraphs and essays related to engineering

Text Books

1. Business Communication, Shalini Kalia, Shailja Agarwal, Wiley
2. Communication Skills for Technical Students, T. M. Farhathullah, Orient Black Swan, 2003
3. English Grammar Just for You, Rajeevan Karal, Oxford University Press
4. English for Practical Purposes, Z. N. Patil, B.S. Valke, A.R. Thorat, Zeenath Merchant
5. Study Writing, Liz Hamp-Lyons and Ben Heasly, Cambridge UniversityPress, 2006
6. Exercises in Spoken English, Parts I-III, CIEFL, Hyderabad, Oxford University Press
7. Communication Skills, Sanjay Kumar and Pushpa Lata, Oxford University Press, 2011
8. The Functional Aspects of Communication Skills, Dr. P. Prasad, New Delhi
9. Soft Skills: A Textbook for Undergraduates, Ajay R. Tengse, Orient BlackSwan
10. Business Communication, Nawal, Cengage Publication: 9789353502157
11. Soft Skills for Everyone, Butterfield, Cengage Publication: 9789353501051
12. Technical English: Course Book, Terry Philips, Garnet Education, 2011

Reference Books

1. English Grammar & Composition, Wren & Martin, S. Chand Publication, 2015
2. Practical English Usage, Michael Swan, OUP, 1995
3. Remedial English Grammar, F.T Wood, Macmillan, 2007
4. On Writing Well, William Zinsser, Harper Resource Book, 2001
5. Longman Dictionary of Contemporary English, Longman, Harlow, England, 1978
6. Essential Activator, Longman, Harlow, 2006
7. Word Power Made Easy, Norman Lewis, 2017
8. Communicative English for engineers and professionals, B. Nitin, Pearson Education India, 2010
9. Business communication for success, S. McLean, 2010
10. English Language Communication Skills: Lab Manual cum Workbook JNTU Board of Editors.

11. Fusion: Integrated Reading and Writing, Book 1, Kemper, Meyer, Van Rys, Sebranek
12. Handbook of Professional, Business & Technical Writing, and Communication and Journalism: A Reference Guide to All Kinds of Writing, 2023
13. English Grammar Just for You, Rajeevan Karal, Oxford University Press

e-Resources

- https://youtube.com/playlist?list=PLM-jfaoaU5iyQgWy-WHgFc2G21J-agChw&si=kaCVsm5MJ-dSmtsT

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
First Year B. Tech. (All Branches - Group A), Semester-I

25GEU1SK7T Workshop Practice

Teaching Scheme		**Examination Scheme**	
Lectures	1 Hour/week	**ESE**	--
Practical	2 Hours/week	**ISE**	--
Credits	2	**ICA**	50 Marks

(I. Mechanical and Automation Engineering)

Introduction

Workshop Practice is an essential course for first-year mechanical engineering students, aiming to bridge theoretical knowledge with practical skills. It introduces students to key manufacturing operations such as welding, fitting, 3D printing, and the use of basic machine tools. Through hands-on sessions and guided practice, students learn to safely operate machinery, interpret technical drawings, and understand mechanical assemblies. This course lays the groundwork for future technical subjects by developing the fundamental practical competencies required in engineering workshops.

Course Prerequisites

Students enrolling in the Workshop Practice course in Mechanical and Automation Engineering should have a basic understanding of physics and mathematics as covered in higher secondary education. Familiarity with core concepts such as force, energy, measurements, and simple mechanical tools is helpful in grasping the fundamentals of manufacturing processes. While prior workshop experience is not required, students should have a keen interest in hands-on mechanical tasks, be comfortable working with machines, and demonstrate attentiveness to safety protocols and precision during practical work.

Course Objectives

1. To develop foundational hands-on skills in mechanical processes including welding, fitting, 3D printing and machine tool operations.
2. To familiarize students with the construction, operation, and maintenance of key workshop equipment and mechanical assemblies.

Course Outcomes

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

1. Operate basic workshop machines and tools while following safety protocols.
2. Assemble and disassemble mechanical components and interpret their functions in mechanical systems.

Unit – I	**Welding**	**3 Hours**
Introduction to welding processes, Construction and working principles of welding machines, Safety practices in welding operations.		
Unit – II	**Fitting Job**	**2 Hours**
Introduction to fitting tools and equipment, Step-by-step fitting operations, Assembly of mechanical components with precision and safety.		
Unit – III	**3D Printing**	**3 Hours**
Basics of additive manufacturing, Types of 3D printing technologies, Construction and working of 3D printing machines, Introduction to slicing software and printing procedures.		
Unit – IV	**Assembly and Disassembly**	**3 Hours**
Practical exercises on assembling and disassembling mechanical parts, Study of components such as: Three-jaw and four-jaw chuck, Lathe tailstock and apron, Cross-slide mechanism, Tumbler gear assembly for threading operations.		
Unit – V	**Machine Tools**	**4 Hours**
Overview of basic machine tools, Construction and working ofLathe machine, drilling machine, Milling machine, Applications and safety precautions for each machine.		
Internal Continuous Assessment (ICA) Demonstration & hands on experience related to above contents should be given during practical sessions. A report of the above work should be submitted by each student.		
Text Books		
1. Workshop Technology, B. S. Raghuwanshi, Dhanpat Rai & Co. 2. Workshop Technology, Hajra Chowdhary, Media Promoters & Publishers Pvt. Ltd. 3. Rapid prototyping: Principles and Applications, Chua C.K., Leong K.F., and Lim C.S., World Scientific Publishers		

(II. Electronics and Telecommunication Engineering / Electronics and Computer Engineering)

Introduction

This course introduces students to the fundamental components and instruments used in electronics along with hands-on experience in circuit implementation and measurement techniques. It also covers the basics of the Arduino microcontroller platform, focusing on its architecture, programming environment, and interfacing with various sensors and input/output devices. The course aims to build practical skills for designing and experimenting with embedded systems.

Course Prerequisites

Students taking this course in the Workshop Practice course in Electronics and Telecommunication Engineering or Electronics and Computer Engineering should have a foundational understanding of basic physics and mathematics from higher secondary education, particularly in electricity, circuits, and measurements. Familiarity with concepts such as voltage, current, resistance, and simple logical operations will support their grasp of electronic components and instruments. Although no prior programming experience is mandatory, a basic logical mindset and interest in coding and embedded systems will aid in learning Arduino architecture and interfacing. Curiosity, careful observation, and a hands-on approach are essential, as the course heavily emphasizes practical circuit assembly and real-time experimentation with sensors and microcontrollers.

Course Objectives

1. To familiarize students with basic electronic components such as resistors, capacitors, inductors, and active devices, including their measurement and circuit implementation.
2. To provide hands-on experience with common electronic instruments like multimeters, oscilloscopes, function generators, and power supplies.
3. To introduce the Arduino platform, including its configuration, architecture, and programming using Embedded C.
4. To develop the ability to interface Arduino with various sensors and control devices through digital and analog I/O functions.

Course Outcomes

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

1. Identify and use various electronic components and instruments.
2. Develop basic electronic circuits on breadboards.
3. Demonstrate the use of an Arduino board using basic circuits.

Unit – I	**Introduction to Basic Electronic Components and Devices**	**3 Hours**

Introduction to various electrical passive components such as Resistors, inductors and capacitors, introduction to active components, introduction to breadboard, Measurement of resistance using the color code, series and parallel connection of the resistances and its implementation on breadboard. Timer IC: Application of IC-555 as an Astable mode Calculation of duty cycle and frequency of IC 555 in a stable mode.

Unit – II	**Introduction to Electronics Instruments**	**3 Hours**

Exposure to usual electronic equipment/instruments such as Soldering iron, Multimeter, Oscilloscope, Function generator, Power supply, Information about their front panels, Demonstrations on their working, Hands- on for measurement of component values and DC voltage using multimeter, measurement of amplitude, time period and frequency of the waveform Square wave/any small signal from function generator on Oscilloscope (DSO), Measurement of the voltage and current in the circuit implemented on breadboard using multimeter.

Unit – III	Introduction to Arduino	4 Hours
Arduino Configuration and architecture, Device and platform features, Concept of digital and analog ports, Familiarizing with Arduino Interfacing Board, Introduction to Embedded C and Arduino platform (IDE), Arduino data types (Variables and constants, Operators, Control Statements, Arrays, Function).		
Unit – IV	**Arduino I/O & Sensors**	**4 Hours**
Arduino I/O Functions (Pins Configured as INPUT, Pull-up Resistors, Pins Configured as OUTPUT, FUNCTIONS: pin Mode(), digital Write(), analog Read(), Arduino Interrupts), SENSORS: Humidity Sensor, Temperature Sensor, Water Detector / Sensor, PIR Sensor, Ultrasonic Sensor, Magnetic relay switches.		
Internal Continuous Assessment (ICA) ICA shall be based on completion of any of the eight LAB Sessions/Tasks on the above mentioned units along with the report writing.		
Text Books		
1. Principles of Electronics,V. K. Mehta, Rohit Mehta 2. Basic Electronics: Devices, Circuits and it Fundamentals, Kal. 3. The Basic Soldering Guide Handbook: Learn to solder electronics successfully, Alan R. Winstanley		

(III. Civil Engineering)

Introduction

This course provides foundational knowledge and practical insights into essential building elements and safety protocols in construction. Students will gain hands-on experience with substructure and superstructure activities, familiarizing themselves with the tools and equipment commonly used on construction sites. Additionally, the course covers various brick bonding techniques and the methods for testing brick quality, emphasizing construction accuracy and safety.

Course Prerequisites

Students enrolling in the Workshop Practice course in Civil Engineering course should have a basic understanding of science and mathematics at the higher secondary level, particularly in areas such as measurements, materials, and fundamental mechanics. While no prior construction experience is expected, students should be comfortable working in physical, hands-on environments and have the ability to observe, follow procedures, and apply basic reasoning. An interest in construction practices, attention to detail, and awareness of safety principles will support effective learning, especially during field visits, brick masonry exercises, and laboratory testing of materials.

Course Objectives

1. To introduce students to substructure and superstructure construction activities, including the identification and use of relevant tools, equipment, and safety measures on site.
2. To develop skills in assembling brick walls using different bonding techniques such as English, Flemish, and stretcher bonds, ensuring precision in alignment and levelling.
3. To understand and perform laboratory tests on bricks, including water absorption and compressive strength, to assess their quality for construction use.

Course Outcomes

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

1. Explain construction activities in substructure and superstructure with tools equipment along with safety measures to be taken.
2. Compare the construction of brick wall using Stretcher, Header, English, and Flemish bond.

Unit – I	**Building elements and Safety Tools in Construction**	**7 Hours**

Identify the substructure construction activities and equipments/tools being used at site along with safety tools and display boards during the visit. Identify the superstructure construction activities and the equipments/tools at site along with safety tools and display boards being used at site during the visit.

Unit – II	**Different Bonding in Brick wall**	**7 Hours**

Assemble a corner brick wall in six courses by arranging bricks in Stretcher, Header, English, and Flemish bond. Ensure that wall is in line, plumb, level using water pipe technique.

Unit – III	**Testing of Bricks**	**4 Hours**

Laboratory test of bricks:1. Water absorption of bricks. 2. Compressive strength of bricks.

Internal Continuous Assessment (ICA)

ICA shall be based on completion of any of the eight LAB Sessions/Tasks on the above mentioned units along with the report writing.

- **List of Experiments**
  1. Safety equipments and tools used in construction.
  2. Study of different components of building.
  3. Signs and Symbols used in Civil Engineering field.
  4. Visit to Centre of Excellence and report writing.
  5. Water absorption of bricks.
  6. Types of brick bonds (Sketches of 4 Brick bonds).

Text Books

1. I.S. Code for Bricks IS 3495 Part I to IV Revised, 2002
2. Building Construction, S.R.Arora, S.R.Bimdra, Dhanpat Rai Publications
3. Building Construction, Satish Kumar, Dhanpat Rai Publications
4. Practical Building Construction and it's Management, Sandeep Mantri, Satya Prakashan, New Delhi

(IV. Computer Science & Engineering/Information Technology)

Introduction

This course is designed to provide students with practical knowledge of computer hardware components, operating system installation, and productivity software. Emphasis is placed on hands-on experience, including identifying key PC components, setting up dual-boot systems, and working with Microsoft Office tools such as Word, PowerPoint, and Excel. The course aims to equip learners with essential digital skills required for academic, personal, and professional tasks in the modern technological environment.

Course Prerequisites

Students taking this course in the Workshop Practice course in Computer Science & Engineering or Information Technology should have a basic familiarity with computers and digital literacy skills, typically developed through school-level computer education. They should be comfortable navigating file systems, using a keyboard and mouse, and understanding the purpose of basic hardware components. No prior experience in operating system installation or office applications is required, but a logical approach, curiosity about how computers work, and a willingness to explore software tools are important. The course is best suited for students who are eager to build foundational digital competencies for academic and professional success.

Course Objectives

1. To make students learn the hardware and software of a computer.
2. Gain hands-on experience by installing and configuring operating systems, including dual-boot setups.
3. Develop skills in creating documents, presentations, spreadsheets, and other digital content using MS-Word, MS-PowerPoint, and MS-Excel, including advanced features and functions.

Course Outcomes

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

1. Identify various hardware and software components of a computer and compare between them.
2. Install and configure Operating systems, including dual-boot setups.
3. Design professional documents, presentations, and spreadsheets using MS-Word, MS-Power Point, and MS-Excel.

Unit – I	**Identification of various PC hardware components**	**3 Hours**
USB Mouse, PS/2 Mouse, Keyboard, LCD/LED Monitor, VGA, HDMI, CAT5, CAT6, server, routers, fiber cable, Hard disk, RAM, CMOS battery, SMPS, cache, ROM, BIOS		
Unit – II	**Installation of Operating System**	**4 Hours**
Install any two operating systems on a PC making it dual boot, including the latest version of Ubuntu Linux, Windows 10.		
Unit – III	**Introduction to Microsoft Office: MS-Word, MS-PowerPoint**	**4 Hours**
MS-Word: Overview, Creating a Simple Document, Formatting and Page Layouts, Printing Concept, Table of Content, Creating Greeting Card, Letterhead, Creating Flyer, Resume, Hyperlink and Bookmarks, Mail Merge. MS-PowerPoint: Overview, Inserting Slides, Text Typing and Formatting, Creating Digital Photo Album, Transition and Animation Effects, Automatic Timings and Action Buttons, Header and Footer, Designs and Themes		
Unit – IV	**MS-Excel and Advanced Excel**	**3 Hours**
MS – Excel: Overview of Excel, Formatting, Sum, Average, Min, Max, Len, Count, Upper, Lower, Page Layout Advanced Excel: Pivot Table and Chart, Planning Event Expenses, Creating Planner, Planning of Monthly Budget, Protect Sheet		

Internal Continuous Assessment (ICA)

ICA shall be based on completion of any of the eight LAB Sessions based on following topics.

1. Identify various computer Hardware components.
2. Installation of Windows 10 Operating system and dual booting it.
3. Design a greeting card using MS-Word, incorporating images and text.
4. Create a flyer for an event, using MS-Word's formatting and design tools.
5. Use Mail Merge to create personalized letters to multiple recipients.
6. Design a presentation on a topic of your choice, using MS-PowerPoint's formatting and design tools.
7. Create a digital photo album using MS-PowerPoint, including transitions and animation effects.
8. Create a budget spreadsheet using MS-Excel, including formulas for calculations. (SUM, AVERAGE, MIN, MAX)
9. Create a dashboard using pivot tables and charts to analyze data.
10. Create a simple chart to visualize data.

Text Books

1. Building Your Own Computer Made Easy: The Step By Step Guide (Computers Made Easy), James Bernstein
2. Raspberry Pi Cook book: Software and Hardware Problems and Solutions, Simon Monk , 3rd Edition
3. Learn to use computer: A comprehensive guide for beginners, covering the basics of MS-Office Applications, MS-Word, PowerPoint and Excel for beginners, Inderjeet Singh

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
First Year B. Tech. (All Branches - Group A), Semester-I

25GEU1ES8T Creativity and Design Thinking

Teaching Scheme		**Examination Scheme**	
Lectures	1 Hour/week	**ESE**	--
Practical	2 Hours/week	**ISE**	--
Credits	2	**ICA**	50 Marks

Introduction

Creativity and Design Thinking is an interdisciplinary course that empowers students to solve problems innovatively through user-centered approaches. The course begins by exploring memory and cognitive processes that influence creative thinking and gradually introduces structured methods such as brainstorming, lateral thinking, and TRIZ. Students learn to navigate the five-stage design thinking process—Empathize, Define, Ideate, Prototype, and Test—using practical tools and case studies. The focus on feedback and iterative improvement fosters a mindset geared toward continuous innovation and user-focused design.

Course Prerequisites

To successfully engage with the Creativity and Design Thinking course, students should have a basic understanding of cognitive processes and an interest in innovative thinking and human-centered problem-solving. Familiarity with brainstorming methods, basic observation skills, and an openness to iterative learning will support their grasp of the design thinking process. While no advanced technical knowledge is required, the ability to reflect on user experiences, communicate ideas clearly, and work collaboratively in teams will greatly enhance the learning experience.

Course Objectives

1. To relate and compare the various memory techniques and apply them in engineering education.
2. To appreciate the importance of creativity and design thinking.
3. To analyze emotional experience and experiment with emotional expressivity to understand users in a better way, while designing the products.
4. To transform thought process so as to come up with multiple solution using ideation and creative tools.
5. To develop skills for evaluating, articulating, refining, testing and creating an innovative engineering product/prototype that solves customer problems(s).

Course Outcomes		
At the end of this course, students will be able to: 1. Relate and Compare the various memory techniques and apply them in engineering education. 2. Appreciate the importance of creativity and design thinking 3. Analyze emotional experience and Experiment with emotional expressivity to understand users in a better way, while designing the products. 4. Transform their thought process so as to come up with multiple solution using Ideation and creative tools. 5. Develop skills for evaluating, articulating, refining, testing and creating an innovative engineering product/prototype that solves customer problems(s).		
Unit – I	**An Insight into Remembering**	**2 Hours**
Understanding the Memory process, Memory enhancement techniques.		
Unit – II	**Introduction to Creativity and Tools for creativity**	**4 Hours**
The creative person, Lateral & vertical thinking concept, Creative style- adaptor & Innovator. Tools for creativity: Brain storming, Six hat technique, Introduction to TRIZ, Divergent and Convergent thinking.		
Unit – III	**Basics of Design Thinking**	**4 Hours**
Definition of Design Thinking, Need for Design Thinking, Objective of Design Thinking, Stages of Design Thinking Process (explain with examples) – Empathize, Define, Ideate, Prototype, Test, User Persona		
Unit – IV	**Process of Empathize**	**4 Hours**
Empathize , Different techniques used, case studies.		
Unit – V	**Ideate**	**4 Hours**
Ideate – Explanation with case studies, tools to be used		
Unit – VI	**Prototype**	**2 Hours**
Prototype –Explanation with case studies**.** tools to be used,		
Unit – VII	**Testing the Prototype**	**4 Hours**
Testing for prototype, case studies.		

Unit – VIII	Feedback, Re-Design & Re-Create	4 Hours

Feedback loop, Focus on User Experience, User focused design, rapid prototyping & testing, final product.

Internal Continuous Assessment (ICA)

Activities are to be conducted using various tools of creative and design thinking. Typical case studies shall be done to understand process of design thinking and product development. Assessment shall be carried out on final prototype / product for end user. In addition to the above, the institute may prescribe additional modes of assessment such as product development, Case study, Quiz, Presentation, Course seminar etc. for ensuring continuous assessment of the students.

Text Books

1. Thinking Design, S. Balaram, Publisher: Sage India; ISBN-10 :8132103149
2. The Creative thinker's Toolkit: Course Guidebook, Gerard Puccio, The great courses, 2014
3. Six Thinking Hat, Marcela Pandolfo
4. Basic Design Thinking, Gavin Ambrose & Paul Harris, AVA Publishing
5. Design Thinking for Beginners: Innovation as a factor for entrepreneurial success, Publisher : Personal Growth Hackers (18 August 2019), ISBN-10 : 3967160629

Reference Books

1. Design Thinking: Understand – Improve – Apply, Hasso Plattner, Christoph Meinel and Larry Leifer (eds), Springer, 2011 (Unit I)
2. Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School, Idris Mootee, John Wiley & Sons, 2013 (Unit III)
3. Design Thinking for Educators: Unleashing Imaginnovation Ideas Being Student Centric, D.M., Arvind Mallik, Publisher : Notion Press; 1st edition, 17 September 2019, ISBN-10 : 1646506928
4. Cracking the Creativity code: Zoom in Zoom out framework for creativity, fun and success, Arie Ruttenberg and Shlimo Maital, Publisher- SAGE, 2014

e-Resources

1. https://dschool.stanford.edu/.../design resources/.../ModeGuideBOOTCAMP2010L.pdf
2. https://dschool.stanford.edu/use-our-methods/
3. https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking- process
4. http://www.creativityatwork.com/design-thinking-strategy-for-innovation/
5. https://www.nngroup.com/articles/design-thinking/
6. https://designthinkingforeducators.com/design-thinking/
7. www.designthinkingformobility.org/wp-content/.../10/NapkinPitch_Worksheet.pdf
8. https://www.behance.net/joblist?sdid=V6NZKQSK&mv=search

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
First Year B. Tech. (All Branches - Group A), Semester-I

25GEU1IKS9T Indian Science & Technology

Teaching Scheme		**Examination Scheme**	
Lectures	2 Hours/week	**ESE**	--
Tutorial	--	**ISE**	25 Marks
Credits	2	**ICA**	25 Marks

Introduction

The course Indian Science & Technology explores the rich heritage of scientific knowledge and technological practices developed in India through the ages. Spanning subjects from metallurgy and textile chemistry to water management, astronomy, and environmental planning, the course highlights the innovative and sustainable methods employed by Indian civilizations. It provides an interdisciplinary perspective, connecting traditional scientific achievements to their relevance in modern contexts, while fostering appreciation for indigenous knowledge systems and their role in shaping technological progress.

Course Prerequisites

To fully benefit from the Indian Science & Technology course, students should possess a general awareness of Indian history and basic school-level understanding of scientific concepts across disciplines such as physics, chemistry, and environmental science. An interest in cultural heritage, traditional knowledge systems, and historical innovations will enrich their learning experience. Familiarity with interpreting historical texts or archaeological findings, although not mandatory, can aid in grasping the context of India's scientific achievements and their modern-day relevance.

Course Objectives

1. To provide an overview of India’s historical contributions to science and technology across various domains.
2. To explore traditional Indian advancements in metallurgy, textile chemistry, and ceramic technologies.
3. To explore indigenous water management systems, transportation methods, and maritime developments.
4. To study key Indian contributions in mathematics and astronomy, including the evolution of calculus and time measurement.
5. To understand traditional ecological and environmental practices such as agroforestry, vernacular architecture, and water conservation.

Course Outcomes

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

1. Recognize the historical evolution and cultural richness of India's scientific and technological heritage.
2. Explore the scientific principles underlying traditional Indian practices in metallurgy, textile chemistry, and pyro technology, and evaluate their relevance in the modern context.
3. Interpret indigenous methods of water management and transportation, and analyze their sustainable and innovative features.
4. Identify Interpret India's contributions to mathematics, astronomy, ecology, and environmental practices, and assess their impact on global scientific advancements.

Unit – I	**Fundamentals**	**4 Hours**

- An overview of Indian contributions to technology
- Technological Innovations

Unit – II	**Metallurgy, Textile Chemistry & Pyro Technology**	**5 Hours**

- Copper/Bronze/Zinc: Important Mines (Zawar, Khetri mines)
- Iron and Wootz Steel Technology
- Textile and Dyeing – Indian Specialities (Kutchi Embroidery, Cotton Textile, etc.)
- Ceramic Technology, Stone (Lapidary), Shell, Ivory, Faience & Glass Technology

Unit – III	**Water Management & Transportation**	**5 Hours**

- Harappan and Traditional Water Management System of Gujarat
- Historical Sites – Sringaverpur, South Indian Water Management System, Western Ghats Cave Kanheri, etc.
- Communities Involved in Water Management
- Modes of Transportation and Reforms
- Grand Trunk Road (Uttarapath & Dakshinapath)
- Development of Trading Techniques
- Boat & Ship Building

Unit – IV	**Mathematics & Astronomy**	**5 Hours**

- Mathematics contained in the Sulba Sutra
- Weaving Mathematics into Beautiful Poetry – Bhaskaracharya
- The Evolution of Sine Function in India
- The Discovery of Calculus by Kerala Astronomers
- Vedanga Jyotish & Measuring Time & Calendar

Unit – V	Ecology and Environment	5 Hours

- Nakshatra Gyaan and Agriculture
- Vernacular Architecture
- Forest Management and Urban Planning
- Agroforestry
- Tanks, Lakes, and Stepwells

Unit – VI	India's Contribution in Science and Technology to the World	4 Hours

India's Contribution in Science and Technology to the World

Internal Continuous Assessment (ICA)
ICA shall be based on completion of Five Assignments each topic mentioned above.

Text Books

1. Introduction to Indian Knowledge System: Concepts and Applications, Mahadevan B., Bhat, Vinayak Rajat & Nagendra, Pavana R. N., PHI Learning Pvt. Ltd., 2022

Reference Books

1. Pride of India: A Glimpse into India's Scientific Heritage, R. M. Pujari, Pradeep Kolhe, N. R. Kumar, Samskrita Bharati Publication
2. Indian Contribution to Science, compiled by Vijnana Bharati
3. Knowledge Traditions and Practices of India, Kapil Kapoor, Michel Danino, CBSE, India
4. Dr. Subhash Kak, Computation in Ancient India, Mount Meru Publishing, 2016
5. Indian Science and Technology in the Eighteenth Century, Dharampal, Academy of Gandhian Studies, Hyderabad, 1971, republished by Other India Bookstore, Goa, 2000
6. The Man Who Knew Infinity: A Life of the Genius Ramanujan, Robert Kanigel, Abacus, London, 1999
7. Sciences of the Ancient Hindus: Unlocking Nature in the Pursuit of Salvation, Alok Kumar, Create Space Independent Publishing, 2014
8. Science in India: A Historical Perspective, B. V. Subbarayappa, Rupa, New Delhi, 2013
9. Indian Mathematics and Astronomy: Some Landmarks, S. Balachandra Rao, Jnana Deep Publications, Bangalore, 3rd edn, 2004
10. Vedic Mathematics and Science in Vedas, S. Balachandra Rao, Navakarnataka Publications, Bengaluru, 2019
11. Ancient Hindu Geometry: The Science of the Śulba, Bibhutibhushan Datta, 1932, Repr., Cosmo Publications, New Delhi, 1993
12. History of Hindu Mathematics, Bibhutibhushan Datta & Avadhesh Narayan Singh, 1935, Repr., Bharatiya Kala Prakashan, Delhi, 2004
13. The Crest of the Peacock, George Gheverghese Joseph, Penguin Books, London & New Delhi, 2000

14. Ancient Cities, Sacred Skies: Cosmic Geometries and City Planning in Ancient India, J. McKim Malville & Lalit M. Gujral, IGNCA & Aryan Books International, New Delhi, 2000
15. Chasing Shadows: Mathematics, Astronomy and the Early History of Eclipse Reckoning, Clemency Montelle, Johns Hopkins University Press, 2011
16. Jantar Mantar: Maharaja Sawai Jai Singh's Observatory in Delhi, Anisha Shekhar Mukherji, AMBI Knowledge Resources, New Delhi, 2010
17. Astronomy in India: A Historical Perspective, Thanu Padmanabhan (ed.), Indian National Science Academy, New Delhi & Springer (India), 2010
18. A History of Hindu Chemistry, Acharya Prafulla Chandra Ray, 1902, Republ., Shaibya Prakashan Bibhag, centenary edition, Kolkata, 2002
19. Delhi Iron Pillar: New Insights, R. Balasubramaniam, Indian Institute of Advanced Study, Shimla & Aryan Books International, New Delhi, 2002
20. Marvels of Indian Iron Through the Ages, R. Balasubramaniam, Rupa & Infinity Foundation, New Delhi, 2008
21. Dying Wisdom: Rise, Fall and Potential of India's Traditional Water-Harvesting Systems, Anil Agarwal & Sunita Narain (eds.), Centre for Science and Environment, New Delhi, 1997
22. The Iconography of Water: Well and Tank Forms of the Indian Subcontinent, Fredrick W. Bunce, DK Printworld, New Delhi, 2013

e-Resources

- https://iksindia.org/

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
First Year B. Tech. (All Branches - Group A), Semester-II

25GEU2BS2T Engineering Chemistry

Teaching Scheme		**Examination Scheme**	
Lectures	2 Hours/week	**ESE**	60 Marks
Practical	2 Hours/week	**ISE**	40 Marks
Credits	3	**ICA**	25 Marks

Introduction

The Engineering Chemistry course is designed to provide engineering students with foundational knowledge of chemical principles and their practical applications in various engineering domains. It emphasizes the chemistry of fuels, materials, water treatment processes, and analytical techniques crucial to industrial operations. Additionally, the course cultivates awareness of socio-environmental challenges, equipping students with a scientific understanding of global issues like pollution and sustainability. Through theory and numerical applications, the course bridges scientific concepts with real-world engineering problems.

Course Prerequisites

To successfully undertake the Engineering Chemistry course, students should have a basic understanding of chemistry as taught at the higher secondary (10+2) level, particularly in areas such as chemical bonding, physical chemistry, and organic chemistry. Familiarity with fundamental concepts like pH, concentration units, periodic table trends, and basic stoichiometry will aid in grasping advanced topics like fuel chemistry, water treatment, and polymers. A general awareness of environmental issues and industrial processes will further enhance comprehension of socio-environmental applications and analytical techniques introduced in the course.

Course Objectives

1. To impart fundamental knowledge of fossil fuels, their classification, and methods of determining calorific value.
2. To introduce the concepts of engineering materials such as alloys, polymers, plastics, and lubricants, focusing on their properties, uses, and characterization techniques.
3. To familiarize students with water quality parameters, water treatment methods, and their industrial relevance.
4. To provide an understanding of key analytical techniques including chromatography, thermal analysis, and electroplating with practical applications.
5. To raise awareness about major socio-environmental issues such as global warming, acid rain, ozone depletion, and water conservation practices.

Course Outcomes

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

1. Classify different types of fuels and evaluate their calorific value using theoretical and experimental methods.
2. Describe the composition, properties, and applications of engineering materials like alloys, polymers, and lubricants, and solve related numerical problems.
3. Analyze water quality parameters, calculate hardness, and explain methods for water softening and primary treatment.
4. Apply basic analytical techniques such as chromatography and thermal analysis, and explain the electroplating process and phase rule with applications.
5. Demonstrate understanding of contemporary environmental problems and suggest sustainable solutions like rainwater harvesting.

Unit – I	**Fuels**	**6 Hours**

Fuel: Classification and characteristics of fossil fuels. Comparison between solid, liquid, and gaseous fuels. Determination of the calorific value of fuels: Bomb Calorimeter and Boy's Calorimeter.
Numerical: Determination of the calorific value of a fuel sample using Dulong's formula, Bomb Calorimeter and Boy's Calorimeter.
Petroleum: Introduction, composition, classification, origin, and refining of crude oil.

Unit – II	**Engineering Materials**	**6 Hours**

Alloys: Definition and purposes of making alloys.
Metallic Materials: Properties, composition, and applications of cast iron, steel, and wrought iron.
Polymers: Introduction, definitions, polymerization, types of polymerization, and degree of polymerization. Numerical: Degree of polymerization and Number average molecular weight.
Plastics: Definition, properties, and types of plastics (Thermosoftening and thermosetting)., Properties and applications of PVC and PET
Lubricants: Definition and functions., Characteristic properties (definitions only): viscosity, viscosity index, flash point & fire point, cloud point & pour point, aniline point, oiliness, saponification value, and acid value., Numerical: Calculation of saponification value and acid value.

Unit – III	**Water Parameters and Treatment**	**6 Hours**

Introduction to water quality parameters: pH, acidity, alkalinity, total solids, dissolved oxygen, chlorides, BOD, COD. Hardness of water: Types (temporary and permanent), Numerical: Determination of Hardness. Scale and sludge formation in boilers: causes, disadvantages, and Prevention. Water softening methods: Ion exchange process and Zeolite process. Primary treatment of water: Aeration, sedimentation with coagulation, and disinfection.

Unit – IV	Analytical Techniques	6 Hours

Strength of solution: Definitions and numerical based on Normality, Molarity, and Molality.
Chromatography: Definition and types, Gas-Liquid Chromatography (GLC): Definition, instrumentation, and applications.
Thermal Analysis: Thermogravametric Analysis (TGA): Definition, instrumentation, and applications.
Electroplating: Process and factors affecting the nature of deposit. Electroplating of copper.
Phase Rule: Definition and terminology. Application to one-component system (water): triple point, Metastable systems, and the effect of temperature and pressure on equilibria.

Unit – V	Socio-Environmental Problems	6 Hours

Global warming and greenhouse effect. Acid rain and ozone layer depletion. Water conservation techniques with emphasis on rainwater harvesting.

Internal Continuous Assessment (ICA)

ICA consists of performance of eight experiments based on the units.

1. Estimation of Copper in Bronze metal alloy.
2. Determination of Hardness of water.
3. Determination of Alkalinity of water.
4. Determination of Chloride content in given water.
5. Determination of dissolved oxygen in water.
6. Preparation of phenol formaldehyde resin.
7. Preparation of urea Formaldehyde resin.
8. Determination of COD of water sample.
9. Separation of mixture of organic compounds by TLC.
10. Determination of oil and grease from waste water.
11. Hands on Determination of pH by pH meter.
12. Hands on Determination of EMF of acid base titration by potentiometer.

Text Books

1. A textbook of Engineering Chemistry, S.S. Dara, S.S Umare, S.Chand Publication
2. A text book of Engineering Chemistry, Shashi Chawala, Dhanpat Rai & Co.
3. A text book of Experiments and Calculations in Engineering Chemistry, S.S.Dara. S.Chand Publication

Reference Books

1. Engineering Chemistry, Jain and Jain, Dhanpat Rai & Co.
2. Engineering Chemistry, M.Subha Ramesh, Dr.S.Vairan (Ed.), IInd Wiley
3. Instrumental Methods of Chemical Analysis, Chatwaland Anand, Himalaya Pub. House
4. Industrial Chemistry, B.K. Sharma, Goyal

5. Chemistry for Engineers, Rajesh Agnihotri, Wiley
6. Fundamentals of Engineering Chemistry, S.K.Singh, New Age Int.
7. Engineering Chemistry, B.L.Tembe, Kamaluddin & M.S. Krishnan, NPTELWebbook

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- https://youtube.com/playlist?list=PLM-jfaoaU5ixWTj7vaqQF3Ov3FP8yHks5&si=qwQJ0vXWtTUkKJ1v

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
First Year B. Tech. (All Branches - Group A), Semester-II

25GEU2BS3T Engineering Mathematics-II

Teaching Scheme		**Examination Scheme**	
Lectures	2 Hours/week	**ESE**	60 Marks
Tutorial	1 Hour/week	**ISE**	40 Marks
Credits	3	**ICA**	25 Marks

Introduction

Engineering Mathematics-II builds upon foundational calculus and differential equations, equipping students with analytical tools for solving complex engineering problems. This course explores first-order differential equations, their applications in physical systems, and numerical methods for their solution. It also introduces integral calculus, multiple integrals, and vector calculus, emphasizing real-world applications in physics, engineering, and computer simulations.

Course Prerequisites

To effectively engage with Engineering Mathematics–II, students should have a solid grasp of basic calculus and algebra as taught in Engineering Mathematics–I or equivalent first-semester coursework. This includes familiarity with differentiation and integration techniques, basic knowledge of coordinate geometry, and an understanding of elementary functions. Additionally, prior exposure to the concepts of limits, continuity, and basic differential equations is essential. Comfort with mathematical reasoning and manipulation will aid in tackling topics such as vector calculus, multiple integrals, and numerical methods introduced in this course.

Course Objectives

1. To introduce students to the methods for solving ordinary differential equations and to demonstrate their applications in engineering and physical sciences.
2. To introduce students to numerical methods for solving ordinary differential equations and to develop their ability to apply these techniques to practical problems.
3. To introduce students to integral calculus and enable them to evaluate improper integrals using special functions.
4. To introduce students to the concepts of gradient, directional derivatives, curl, and divergence, and to explain their significance in vector calculus.

Course Outcomes

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

1. Solve the ordinary differential equations and apply their applications in various engineering problems.
2. Use numerical method for solving the ordinary differential equations.

3. Evaluate the improper integrals by some special functions.
4. Compute the double and triple integrals.
5. Analyze scalar and vector fields, and apply concepts of gradient, divergence, and curl to interpret physical phenomena in vector calculus.

Unit – I	**First Order Ordinary differential Equations**	**6 Hours**

Exact differential equations, Equations reducible to exact form. Linear differential Equations, equations reducible to linear form, Bernoulli's equation.

Unit – II	**Applications of Differential Equations**	**4 Hours**

Applications of Differential Equations to Orthogonal Trajectories, Newton's Law of Cooling, Kirchhoff's Law of Electrical Circuits.

Unit – III	**Numerical solution of ordinary differential Equation**	**5 Hours**

Picard's method, Euler's method, Modified Euler's method and Runge-Kutta method of fourth order.

Unit – IV	**Integral Calculus**	**5 Hours**

Beta and Gamma functions, Differentiation under Integral Sign.

Unit – V	**Multiple Integrals**	**5 Hours**

Double and Triple integrations, Double integration over a given region, Change of Order of integration, Change to polar coordinates.

Unit – VI	**Vector Calculus**	**5 Hours**

Scalar and vector fields, gradient of scalar point function, directional derivatives, curl and divergence - physical interpretation, solenoidal and irrotational vector fields.

Internal Continuous Assessment (ICA)
ICA shall be based on student's performance during tutorial sessions and on completion of six assignments one on each unit.

Text Books

1. A Text Book of Applied Mathematics, P.N. and J.N.Wartikar,Vol.1, Pune VidyarthiGriha Prakashan
2. Advanced Engineering Mathematics, H.K. Das, S. Chand Publications, Delhi
3. Engineering Mathematics (Volume), ITL Education, Cengage Learning
4. Engineering Mathematics, Ravish R Sing and Mukul Bhatt, McGraw-Hill

Reference Books
1. Higher Engineering Mathematics (42ndEdition), B.S. Grewal Khanna Publications, Delhi 2. Engineering Mathematics, Srimanta Paland Subodh C. Bhunia, Oxford Higher Education 3. Higher Engineering Mathematics, Ramana B.V., Tata McGraw Hill NewDelhi, 2010 4. Applied Mathematics-I, II, Kreyzig's, Wiley
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• https://www.youtube.com/playlist?list=PLM-jfaoaU5ixfcUcahxFeH7qVKY4oc3Ec

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
First Year B. Tech. (All Branches - Group A), Semester-II

25EEU2ES4T Basic Electrical and Electronics Engineering

Teaching Scheme		**Examination Scheme**	
Lectures	2 Hours/week	**ESE**	60 Marks
Practical	2 Hours/week	**ISE**	40 Marks
Credits	3	**ICA**	25 Marks

Introduction

Electrical and Electronic engineers work at the forefront of practical technology, improving the devices and systems we use every day. From solar-energy systems to mobile phones, we innovate to meet society's communication, tech. and energy needs. Electricity is integral to modern life - power generation, transport, medicine, quantum information, and electrical engineering deal with the supply and flow of power; circuits where electricity flows from one point to another, and high-voltage applications with heavy current. Electronic engineering is about electrical circuits and components, creating, designing, and testing them, and integrating them into the hardware of the systems, and circuits that process. Both fields focus on real-world applications.

Course Prerequisites

Before undertaking the Basic Electrical and Electronics Engineering course, students should be familiar with the fundamentals of physics, particularly electricity and magnetism, as introduced at the higher secondary level. A basic understanding of Ohm’s law, current, voltage, resistance, and simple circuit elements is essential. Students are also expected to have preliminary exposure to mathematics, including algebra and trigonometry, which are necessary for analyzing AC/DC circuits and solving equations related to electrical quantities. Familiarity with basic binary number systems and logic gates will provide a helpful foundation for the digital electronics portion of the course.

Course Objectives

1. To introduce student various simplification methods for DC circuits so that student can analyze DC circuits and can solve numerical problems based on it
2. To introduce student fundamentals of magnetic circuits and electromagnetic induction and their application.
3. To make student comprehend the generation and behavior of single-phase and poly-phase AC circuits.
4. To make student comprehend the working of a diode and bipolar junction transistor.
5. To make student understand different types of transducers & application areas of transducers.
6. To introduce to student the fundamental of digital electronics.

Course Outcomes

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

1. Apply the various simplification methods to analyze dc circuits.
2. Use the concept of magnetic circuits to analyze different application parameters.
3. Apply knowledge of AC fundamentals to analyze AC circuits.
4. Explain the working, characteristics, and applications of diode and BJT.
5. Select appropriate transducers to measure various physical parameters like distance, temperature, etc.
6. Perform arithmetic operations on digital number systems and solve Boolean expressions.

Unit – I	**DC Circuits**	**4 Hours**

Kirchhoff's voltage and current law & its implementations, simplifications of resistive circuits - series and parallel combinations, star-delta, delta-star conversions

Unit – II	**Electromagnetism**	**5 Hours**

Series Magnetic Circuits: Introduction, Faraday's law of electromagnetic induction, Lenz's law, self and mutual inductance.
Single-Phase Transformer: Working principle and construction.
DC motor: Construction, working principle, and speed control.

Unit – III	**AC Circuits**	**6 Hours**

Single phase AC: Generation of voltage and current, RMS value, average value, form factor, crest factor, and peak factor.
AC circuits: R, L and C circuits, its behavior for single phase AC and phasor diagram.
Three phase AC: Generation, star and delta connections for balanced systems.

Unit – IV	**Diodes and Rectifiers**	**4 Hours**

P-N junction diode: Construction, working, V-I characteristics.
Rectifiers: Circuit diagram & working of half wave rectifier, full wave rectifier, bridge rectifier, bridge rectifier with capacitor filter.
Special Purpose Diodes: Photodiode, Zener, LED-working and application

Unit – V	**Bipolar Junction Transistor**	**3 Hours**

BJT: Construction, working, current components, relationship between α and β, CB, CE, CC configuration, I/O characteristics of CE configuration.
Application of BJT: Switch and CE amplifier.

Unit – VI	Electrical Transducers	2 Hours
Parameters for selection of transducers. Construction and Working: Strain gauge, LVDT, thermocouple, thermistor, LDR, solar cell.		
Unit – VII	**Digital Electronics**	**6 Hours**
Number system: Decimal, binary, octal, hexadecimal & their inter-conversion, BCD code Binary Arithmetic: Addition, subtraction, subtraction using 2's complement Logic Gates: Symbol, output equation, truth table, the realization of basic gates using universal gates. Boolean Algebra: Laws & rules, De- Morgan theorem		
Internal Continuous Assessment (ICA) ICA consists of the performance of eight experiments based on the units.		
Text Books		
1. Electrical Technology (Volume I & 2), B L Theraja, 22nd edition, S. Chand & Company Ltd. 2. Basic Electrical Engineering, V K Mehta, Revised edition, S. Chand & Company Ltd. 3. Basic Electronics Solid State, B L Thereja, Revised edition, S. Chand & Company Ltd.		
Reference Books		
1. Electrical Technology, E. Hughes, 10th edition, ELBS, Longman 2. Electronic Devices and Circuits, David A. Bell Oxford University, Press India, Fifth edition 3. Principles of Electronic Devices and Circuits (Analog and Digital), B.L. Theraja, R.S. Sedha, S. Chand Publication 4. Digital Principles and Applications, Albert Malvino, Donald Leach, Tata McGraw Hills Publication		
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• https://youtube.com/playlist?list=PLM-jfaoaU5ixvQUWrsTYex62TUx0hOkEb&si=w9CnJC_hqezo72fq		

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
First Year B. Tech. (All Branches - Group A), Semester-II

25CEU2ES5T Basic Civil & Mechanical Engineering

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hours/week	**ESE**	60 Marks
Practical	2 Hours/week	**ISE**	40 Marks
Credits	4	**ICA**	25 Marks

Introduction

The Basic Civil Engineering course offers an overview of key areas like infrastructure, surveying, construction materials, and foundation types. It introduces modern tools like GIS, GPS, and total stations, along with green building and environmental engineering concepts. The course equips students with essential skills for planning and managing civil projects.
The course on Basic Mechanical Engineering is aimed at providing him the knowledge in all those areas through demonstrations and shop instructions. This course is also aimed at providing the student the exposure to Engineering concepts and machines which will help him to adapt to the teaching which takes place in higher semesters.

Course Prerequisites

To effectively grasp the concepts in the Basic Civil and Mechanical Engineering course, students should have a foundational understanding of physics and general science from secondary education. Familiarity with basic mechanical concepts like force, pressure, energy, and simple machines will support learning about fluid machines, thermodynamic systems, and power transmission. A working knowledge of geometry, units, and measurement techniques is essential for understanding surveying principles and interpreting construction elements. Some exposure to everyday materials such as cement, bricks, metals, and tools will help in comprehending construction practices and machine operations. Basic arithmetic and algebra are important for performing calculations related to belt drives, energy equations, and field measurements.

Course Objectives

1. To introduce Civil Engineering sub-domains, roles of engineers, and basics of roads, railways, bridges, and transportation systems.
2. To develop skills in surveying, levelling, angular measurements, and use of GIS, GPS, and total station for accurate field data.
3. To provide knowledge of building elements, materials, foundation types, green building, and basic environmental engineering.
4. To provide students with a fundamental understanding of fluid machines including pumps, compressors, turbines, and thermodynamic principles
5. To introduce students to power transmission systems, basic machine tools, and metal joining processes used in mechanical engineering applications.

Course Outcomes		
At the end of this course, students will be able to: 1. Recognize Civil Engineering sub-domains, the role of Civil Engineers, and basic components of roads, railways, bridges, and transportation modes. 2. Describe principles of surveying, levelling, angular measurements, and apply GIS, GPS, and total station techniques in fieldwork. 3. Identify building components, materials, foundation types, green building concepts, and basics of environmental engineering. 4. Identify and explain the construction, working principles, and applications of various fluid machines and apply the first law of thermodynamics to simple systems. 5. Identify power transmission elements, perform basic calculations on belt drives, and explain the operations of machine tools and basic welding techniques.		
Section-I (Basic Civil Engineering)		
Unit – I	**Introduction to Civil Infrastructure**	**6 Hours**
Introduction to various sub domains of Civil Engineering. Role of Civil Engineer in various construction activities. Various modes of transportation. Introduction to roads: IRC classification, typical functional cross sections. Introduction to railways: cross section and components and their functions. Introduction to Bridges: cross section and components and their functions.		
Unit – II	**Introduction of Surveying and Geospatial Technologies**	**6 Hours**
General Principles of Surveying, Leveling and its types, Determination of reduced levels using auto level. Introduction to Geographic Information System (GIS), Fundamentals of Global Positioning System (GPS), Application of total station.		
Unit – III	**Fundamentals of Building Construction and Environmental Engineering**	**9 Hours**
Elements of a building substructure and superstructure (Foundation, Column, beam, plinth, lintel, chajja, roof, parapet, spout, etc.) and their functions. Building Materials: Use of basic and advanced materials: Cement, Concrete, bricks, aggregate, sand, stones, mortar, timber, reinforcing steel, smart and ecofriendly materials Types of foundation (Shallow and deep foundation) and their functions, Concept of Green building. Environmental Engineering: Water treatment systems; Solid waste management.		
Section-II (Basic Mechanical Engineering)		
Unit – IV	**Fluid Machines and Fundamentals of Thermodynamics**	**10 Hours**
Power absorbing devices: Pumps: definition, classification, construction, working and applications of reciprocating pump, centrifugal pump.		

Compressors: construction, working and applications of reciprocating compressor, rotary compressors (vane blower)
Power producing devices:
Turbines: construction, working and applications of Pelton-wheel, Francis and Kaplan turbines.
Fundamentals of Thermodynamics:
Definition of thermodynamics, thermodynamic Systems, surrounding, universe, types of systems, state of system, properties- intensive and extensive, thermodynamic equilibrium, process and cycle, Zeroth Law of thermodynamics. Work, heat, first law of thermodynamics, first law applied to flow processes, steady flow process, steady flow energy equation (SFEE) (Numerical on first law of thermodynamics)

Unit – V	**Power Transmission Systems, Machine Tools, and Metal Joining Processes**	**10 Hours**

Belt drives: Open and cross belt drives, materials of belt, types of belts, length of belt for open and cross drive, velocity ratio of simple and compound belt drive, centrifugal tension, maximum power transmitted (numerical on simple belt drive only)
Other Transmission Systems: Chain drive, gear, types of gears (excluding gear terminology), gear trains- simple and compound, epicyclical gear train.
Machine tools:
Centre lathe: Basic elements, construction, working, and operations (turning and facing only).
Drilling machine: Basic elements, construction, working, and operations on pillar drilling machine (drilling and reaming only)
Metal Joining Processes:
Welding: Definition and types of welding processes: Manual Metal Arc Welding, Spot Welding

Internal Continuous Assessment (ICA)
The ICA shall consist of any 4 (four) number of Practical's / Demonstrations for each section from the respective section list:
***Note:**
1. Practical's of Basic Civil Engineering and Basic Mechanical Engineering will be conducted in alternate weeks.
2. As a part of the completion of ICA, students shall submit separate completed Assignments, Journals and drawings at the end of the course.

List of Experiments
1. Study and Use of Auto Level for Determination of difference in Elevations.
2. Study and Use of Total station.
3. Determination of Latitude, Longitude, and Elevation Using GPS.
4. To determine the strength of coarse aggregates.
5. Exploring Building Materials: Visit and Lab Demonstration Experience.
6. Determination of Compressive Strength of Concrete Cube
7. Study and demonstration of vapour compression refrigeration cycle (e.g., domestic refrigerator and split AC).
8. Study and comparison of 2-stroke and 4-stroke engines
9. Study of pumps and compressors

10. Study of belt, chain, and gear drive mechanisms in power transmission systems.
11. Demonstration of turbines.

Text Books

1. Elements of Civil Engineering, S. S. Bhavikatti, New Age International Publishers
2. Building Construction and Drawing, Bindra and Arora, Dhanpat Rai Publications
3. Essentials of Civil Engineering, Rangwala, S. C, Charotar Publishing House
4. Basics of Remote Sensing & amp; GIS, S. Kumar, University Sc. Press
5. Thermal Engineering, P.L. Ballaney, Khanna Publishers
6. Thermal Engineering, Domkundwar, Kothandaraman, Domkundwar, Dhanpat Rai & Co.
7. Elements of Workshop Technology, Vol-I and II, S.K. Hajra Choudhary, A K, Hajra Choudhary, Nirjhar Roy, Media Promoters & Publishers Pvt. Ltd.
8. Design of Machine Elements, V.B. Bhandari, Tata McGraw Hill Publications

Reference Books

1. Manual on Green Building, Kolhatkar
2. Energy-efficient buildings in India, Mili Majumdar, TERI Press
3. Construction Technology, Vol. I to IV, Chudley, R, Longman group, England Course Plan
4. Materials for Civil and Construction Engineering, Mamlouk, M. S., and Zaniewski, J. P., Pearson Publishers
5. Engineering Thermo dynamics, P. K. Nag, Tata McGraw-Hill Companies
6. Mechanical Engineering Design, Joseph E. Shigley, Charles R. Mischke, Tata McGraw-Hill Company

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- https://youtube.com/playlist?list=PLM-jfaoaU5iyy18fs4C4JdCkkBNu8j8ss&si=m2uCzJSSvUOZRQtt
- https://youtube.com/playlist?list=PLM-jfaoaU5iztC05LVCaHzZCn1p0BpdNt&si=6CdqgGICWh-gkmNW

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
First Year B. Tech. (All Branches - Group A), Semester-II

25GEU2HU6T English for Employability Skills

Teaching Scheme		**Examination Scheme**	
Lectures	2 Hours/week	**ESE**	60 Marks
Tutorial	1 Hour/week	**ISE**	40 Marks
Credits	3	**ICA**	25 Marks

Introduction

In today's competitive and dynamic job market, technical knowledge alone is not sufficient to ensure employability. Employers increasingly seek graduates who possess excellent communication abilities, interpersonal skills, and emotional intelligence in addition to technical competencies. English for Employability Skills is designed to bridge this gap by enhancing students' soft skills, with a focus on communication, teamwork, leadership, time management, and personal development. The course empowers students to present themselves confidently, perform effectively in interviews and group discussions, and thrive in both academic and professional environments.

Course Prerequisites

To make the most of the English for Employability Skills course, students should have a basic proficiency in English language, including understanding simple instructions, forming coherent sentences, and reading comprehension. Prior exposure to general written communication—such as email writing or paragraph writing—is helpful. A foundational understanding of common social interactions and general etiquette aids in grasping interpersonal and soft skills. Additionally, basic computer literacy, including familiarity with presentation software like PowerPoint, is useful for developing presentation skills. Overall, a willingness to participate actively, self-reflect, and improve both spoken and written communication is essential as a prerequisite for this course.

Course Objectives

1. Develop students' proficiency in preparing and delivering effective presentations.
2. Equip students with the necessary skills to participate meaningfully in group discussions.
3. Enhance students' ability to handle personal interviews with confidence and competence.
4. Strengthen students' technical writing abilities, including resume, various applications and report writing.
5. Foster essential soft skills for personal growth and professional success.

Course Outcomes

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

1. Design and deliver professional presentations with clarity and impact.
2. Participate effectively and confidently in group discussions.
3. Perform successfully in various types of personal interviews.

4. Create impactful resumes and write technical reports, applications appropriately.
5. Demonstrate soft skills such as leadership, teamwork, time management, and emotional intelligence in real-life scenarios.

Unit – I	**Mastering Presentation Skills**	**6 Hours**
Introduction Presentation, Importance of presentation Skills for Engineers, Structure of a Good Presentation, Use of AI for making PPT, 4 P's of Effective Presentation, Do's and Don'ts of Online and Hybrid effective presentation, Presenting PPT and Content delivery Skills		
Unit – II	**Effective Group Discussion Skills**	**6 Hours**
Introduction to Group Discussion, prerequisites of GD, Tips for successful GD, Do's and Don'ts of GD, Advanced strategies to overcome group discussion challenges		
Unit – III	**Personal Interview skills**	**6 Hours**
Fundamentals of Interviewing & Types, Preparation of PI, Effective Interview Techniques, Do's and Don'ts of personal Interview, Mock Interview & Feedback, strategic answering, FAQ's, Advanced strategies to overcome personal Interview challenges		
Unit – IV	**Technical Writing Skills**	**6 Hours**
ATS friendly Resume writing, Components of an Effective Resume, resume as per the Job Description, Writing various applications and Technical Reports writing		
Unit – V	**Employability Skills**	**6 Hours**
SMART Goal setting, strategies for effective time management, Team building and leadership, SWOC Analysis, Motivation and Positive thinking, Stress management and, Emotional intelligence.		

Internal Continuous Assessment (ICA)

Students must complete at least 10 exercises from the list below during language lab sessions:

1. Prepare a PowerPoint presentation using AI and deliver on a selected topic.
2. Oral presentation on personal short-term and long-term goals using vision Board.
3. Participate in a group discussion and submit a written reflection on the topic.
4. Present and record the responsesof frequently asked interview questions.
5. Prepare an ATS friendly resume tailored for campus placement opportunities.
6. Visit an industry and write a detailed technical report.
7. Conduct and document a personal SWOT analysis.
8. Prepare a case study on a company entering a global market and write about the risks it faced.
9. Analyse how teamwork contributed to the success of a challenging project.
10. Analyse the impact of different leadership styles on team motivation.
11. Participate in exercises focused on emotional intelligence and stress management.
12. Engage in creativity and entrepreneurship-focused motivational tasks.

Text Books

1. Soft Skills: An Integrated Approach to Maximize Personality, Gajendra Singh Chauhan & Sangeeta Sharma, Wiley India Pvt. Ltd.
2. Communication Skills for Professionals, Nira Konar, PHI Learning, 3rd Edition, 2022
3. On Writing Well, William Zinsser, Harper Resource Book, 2001
4. Technical English, Dr. M. Hemamalini, Wiley India Pvt. Ltd.
5. Professional Speaking Skills, Aruna Koneru, Paperback, January 2018
6. Group Discussion and Interview Skills, Priyadarshi Patnaik, Cambridge University Press India, 2nd Edition, 2015

Reference Books

1. Soft Skills, K. Alex, S. Chand Publications
2. Soft Skills: A Textbook for Undergraduates, Ajay R. Tengse, Orient Black Swan
3. Communication Skills, Sanjay Kumar & Pushpa Lata, Oxford University Press
4. Managing Soft Skills for Personality Development, B. N. Ghosh, McGraw Hill
5. Soft Skills for Everyone, Jeff Butterfield, Cengage Learning
6. Soft Skills for Managers, Dr. T. Kalyana Chakravarthi & Dr. T. Latha Chakravarthi, Biztantra Publication
7. Effective Communication, Adair, John, London: Pan Macmillan Ltd., 2003
8. Good English: Getting it Right, Ajmani J. C.,Rupa Pubications, New Delhi, 2012
9. Handling Tough Job Interviews, Amos, Julie-Ann, Jaico Publishing, Mumbai, 2004

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- https://youtube.com/playlist?list=PLM-jfaoaU5iyQgWy-WHgFc2G21J-agChw&si=kaCVsm5MJ-dSmtsT

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
First Year B. Tech. (All Branches - Group A), Semester-II

25CSU2ES7P Programming for Problem Solving

Teaching Scheme		**Examination Scheme**	
Lectures	2 Hours/week	**ESE**	25 Marks
Practical	2 Hours/week	**ISE**	50 Marks
Credits	3	**ICA**	25 Marks

Introduction

C programming language is a procedural and general-purpose programming language. It is fast and simple to learn and implement. It includes low-level memory access and simple syntax. It makes the C programming language suitable for system programming like compiler development and operating system development. C language is also known as a structured programming language. C language has features like simple, powerful, structure-oriented, case-sensitive, fast and efficient.

Course Prerequisites

To effectively learn C Programming, students should possess a basic understanding of computers, including familiarity with using an operating system and basic typing skills. Logical reasoning and problem-solving abilities, such as identifying steps in a process or solving simple puzzles, are essential for grasping algorithms and flowcharts. Comfort with basic mathematical concepts like arithmetic operations, variables, and order of operations will aid in learning expressions and control structures. Exposure to general programming ideas or block-based coding (like Scratch or flow-based logic) is beneficial but not mandatory. Overall, an analytical mindset and foundational computational thinking are important prerequisites for this course.

Course Objectives

1. To introduce the concepts of algorithms & flowcharts for problem solving.
2. To introduce the fundamentals of structured programming.
3. To formulate simple C programs using various control structures & loop structures.
4. To apply the concept of functions & pointers to solve the problems.
5. To apply the concept of arrays to solve the problems.
6. To apply the concept of structures, unions and files to solve the problems.

Course Outcomes

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

1. Design the flowcharts and algorithms for the given problem.
2. Translate the algorithms into C programs and test & execute the programs.
3. Design & develop C programs by appropriately selecting control and loop structures.
4. Design & develop C programs using functions and pointers.
5. Design & develop C programs using arrays, structures, unions and files.

Unit – I	**Fundamentals of Computers & Structure of a 'C' Program**	**6 Hours**
Techniques for Problem Solving: algorithm, flow chart, examples. Algorithms specifications, formulation of simple algorithms and logical problems. Structure of C program, building blocks of C, program (preprocessor, compilation and execution & debugging of C program), IDE, C character set, tokens, constants, variables, keywords, primitive data types, 'C' operators (arithmetic, unary, binary, ternary, Logical, assignment, relational, increment and decrement, conditional, bitwise, size of) Operator precedence, expressions, typecasting and type conversion, formatting input and output (getchar, putchar, printf, scanf).		
Unit – II	**Control Structures**	**5 Hours**
Control Statement: if, if-else, nested if –else, else if ladder Loops: while, do-while, for, nesting of loops, break, continue, goto statement, switch-case statement.		
Unit – III	**Arrays and Strings**	**5 Hours**
Declaration and initialization of one-dimensional array, accessing elements, Array handling. String handling functions. Declaration and initialization of two-dimensional arrays, accessing elements, Array handling, Matrix operations		
Unit – IV	**Structures and Unions**	**3 Hours**
Definition of structure and union, declaration, Accessing elements and displaying elements, difference between structure and union.		
Unit – V	**Pointers**	**3 Hours**
Introduction, Declaration of pointer, initialization, accessing pointer, pointer to basic data types, pointer to array (one dimensional)		
Unit – VI	**Functions**	**6 Hours**
Declaration & definition, passing parameters to functions, pass by value, scope of variable, return statement. Function using call by value and call by reference Recursion: Processes and Recursion in C. How recursion works, Factorial, Fibonacci sequence, Towers of Hanoi, Advantages and Disadvantages of recursive Techniques		
Unit – VII	**Files**	**3 Hours**
Introduction, Streams and file types, File operations, File I/O, Structures of read and write.		

Internal Continuous Assessment (ICA)

ICA shall be based on the programming assignments.

- **List of Assignments:**

1. Fundamentals of algorithm & flow chart, structure of a C program
2. Formatted input/output functions and different operators in C
3. Control structures - Decision control statement (if, if-else , nested if-else, else if ladder), Loop Statement (for, while, do-while, nested loop) and Switch-case statement
4. Arrays(one-dimensional & two-dimensional) and string operations
5. Structures and unions
6. Pointers and dynamic memory allocation
7. Functions (call-by-value & call-by-reference), recursion
8. File operations

POE (#): The Course 'Programming for Problem Solving' shall have a 'Practical and Oral Examination' at the end of the semester assessing student's programming

Text Books

1. Schaum's Outline of Programming with C, Byron Gottfried, Mc Graw-Hill
2. Simplifying C, Harshal Arolkar & Sonal Jain, Dreamtech (For Unit-01)
3. Lets 'C', Yaswant Kanetkar, BPB Publication
4. Programming in ANSIC, C. Balgurusamy, Tata Mc GrawHill

Reference Books

1. The C Programming Language (ANSIC Version), Brian W. Kernighan, Dennis M. Ritchie, PHI Publications
2. Programming in C, B. L. Juneja, Cengage Learning
3. Projects using C, P. V. N. Varalaxmi, Scitech Publications
4. The C Programming Language, Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall of India

e-Resources

- https://www.w3resource.com/c-programming-exercises/
- https://www.geeksforgeeks.org/c-programming-language/
- https://www.tutorialspoint.com/cprogramming/c_useful_resources.htm
- https://www.learn-c.org/

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
First Year B. Tech. (All Branches - Group A), Semester-II

25GEU2MC1T Democracy, Elections and Good Governance

Teaching Scheme		**Examination Scheme**	
Lectures	--	**ESE**	50 Marks
Tutorial	--	**ISE**	--
Credits	--	**ICA**	--

Introduction

This course introduces students to the foundational principles and functioning of democracy in India, with a special focus on the role of elections and the framework of good governance. It explores the multidimensional nature of democracy, the constitutional basis for local self-governance, and citizen responsibilities in the democratic process. Additionally, it provides insights into governance reforms and initiatives aimed at enhancing transparency, accountability, and participatory administration.

Course Prerequisites

Before taking this course, students should possess a basic understanding of the Indian Constitution, including its fundamental rights and duties. Familiarity with the structure of the Indian government—such as the roles of the legislature, executive, and judiciary—is recommended. A general awareness of current national and local civic issues will also aid comprehension. Basic civic sense, awareness of voting rights, and an interest in public affairs or social issues will help students engage more meaningfully with topics like democratic participation, electoral processes, and governance reforms. An open and analytical mindset is beneficial for exploring the challenges and practical aspects of governance and democracy in India.

Course Objectives

1. To make the pupil aware of the importance of democracy.
2. To make the individual understand the different aspects of democracy and its implications in the overall development of the state.

Course Outcomes

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

1. Explain dimensions of Democracy and Challenges before Democracy
2. Explain duties of an individual towards electoral process
3. Express Concept and Good Governance initiatives in India

Unit – I	**Democracy in India**	
Dimensions of Democracy: Social, Economic and Political, Decentralization: Grassroots Level Democracy, Challenges before Democracy; women and marginalized sections of the society		
Unit – II	**Election to Local Self Government Bodies**	
73rd and 74th constitutional amendment Acts: Institutions at the local level and Role of State Election Commission, Local Body Elections, Duties of an Individual towards electoral process, Awareness of Voters		
Unit – III	**Good Governance**	
Meaning and concept, Government and Governance, Good Governance initiatives in India		

Text Books

1. Who Wants Democracy? Alam Javeed, Orient Longman, Delhi, 2004
2. Why India votes?, Banerjee Mukulika, Routledge, Delhi, 2014
3. Good Governance: Never on India's Radar, Godbole Madhav, Rupa and Co., New Delhi, 2014
4. India After Gandhi: The History of the World's Largest Democracy, Guha Ramchandra, Pan Macmillan, New Delhi, India, 2017
5. Dr. Ambedkar and Democracy: An Anthology, Jaffrel ot Christophe and Narendar Kumar (ed.), Oxford University Press, New Delhi, 2018
6. Local Governance in India: Decentralization and Beyond, Jayal Niraja, Amit Prakash, Pradeep Sharma, Oxford University Press, New Delhi, 2006
7. The Success of India's Democracy, Kohli Atul (ed.), Cambridge University Press, Cambridge, 2001
8. Indian Democracy, Oxford India Short Introductions, Palshikar Suhas, Oxford University Press, New Delhi, 2017
9. A Grammer of Democracy, Sawant P. B., Bhashya Prakashan, Mumbai, 2013
10. Indian Democracy, ICSSR Research Survey and Explorations Volume II, Suri K.C.(ed.), Oxford University Press, New Delhi, 2013
11. Indian Democracy: Meaning and Practices, Vora Rajendra and Suhas Plashikar (ed.), Sage Publications, New Delhi, 2001
12. हरवलेले सुशासन, गोडबोले सुजाता (अनुवादित), विश्वकर्मा पब्लिकेशन्स, पुणे, २०१५
13. भारतीय लोकशाही: अर्थ आणि व्यवहार, लेले चित्रा (अनुवादित), डायमंड पब्लिकेशन्स, पुणे, २०१०
14. गांधीनंतरचा भारत: जगातील सर्वात मोठ्या लोकशाहीचा इतिहास, साठे शारदा (अनुवादित), मॅजेस्टिक पब्लिशिंग हाऊस, ठाणे, २०१७
15. लोकशाही जिंदाबाद, सोनावणे मनोहर(अनुवादित), समकालीन प्रकाशन, पुणे, २०१०

WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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25GEU2SK8L Co-curricular Activity (from basket)

Teaching Scheme		**Examination Scheme**	
Lectures	--	**ESE**	--
Tutorial	--	**ISE**	--
Credits	1	**ICA**	25 Marks

Introduction

Students are required to go through the list of following Co-curricular Activities and select any one of their interests. On campus/Online activities, discussions, presentations and lecture methods will be conducted by experts from respective activity.

Students are required to submit hard copy of a report on the activities performed related to topics opted for Co-curricular Activity. Evaluation will be done based on the report submitted by student.

Selecting co-curricular activities that align with your interests and goals can significantly enrich your educational journey. Remember to maintain a balance and choose activities that you are genuinely excited about. This approach will help you gain the most from your co-curricular activities.

Basket of Co-Curricular Course

1. Yoga Education
2. Health and Wellness
3. Sports

Study Material

1. Yoga Education
   - https://onlinecourses.swayam2.ac.in/aic22_ge09/preview
   - https://onlinecourses.swayam2.ac.in/cec25_ed19/preview
   - https://onlinecourses.nptel.ac.in/noc25_mg104/preview
   - https://onlinecourses.nptel.ac.in/noc21_hs29/preview
   - https://www.youtube.com/playlist?list=PLzF4lOyPf_Z9yQ_Gphjh1wZ5fEhMg6hmP
2. Health and Wellness
   - https://onlinecourses.nptel.ac.in/noc25_hs109/preview
   - https://onlinecourses.nptel.ac.in/noc21_hs29/preview
3. Sports
   - https://onlinecourses.nptel.ac.in/noc25_hs156/preview