COURSE STRUCTURE AND DETAILED SYLLABI FOR
FOUR YEAR B.TECH
UNDER ACADEMIC REGULATIONS R23

FOR

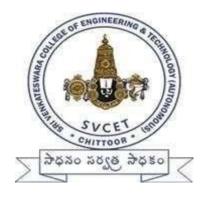## B. Tech Regular (Full-Time) Four Year Degree Courses
(For the Batches Admitted from 2023-2024)

&

B. Tech (Lateral Entry Scheme)
(For the Batches Admitted From 2024-2025)

MECHANICAL ENGINEERING

B.TECH. - COURSE STRUCTURE – R23
(Applicable from the academic year 2023-24 onwards)

INDUCTION PROGRAMME

S. No.	Course Name	Category	L-T-P-C
1	Physical Activities -- Sports, Yoga and Meditation,Plantation	MC	0-0-6-0
2	Career Counselling	MC	2-0-2-0
3	Orientation to all branches -- career options, tools, etc.	MC	3-0-0-0
4	Orientation on admitted Branch -- corresponding labs,tools and platforms	EC	2-0-3-0
5	Proficiency Modules & Productivity Tools	ES	2-1-2-0
6	Assessment on basic aptitude and mathematical skills	MC	2-0-3-0
7	Remedial Training in Foundation Courses	MC	2-1-2-0
8	Human Values & Professional Ethics	MC	3-0-0-0
9	Communication Skills -- focus on Listening, Speaking,Reading, Writing skills	BS	2-1-2-0
10	Concepts of Programming	ES	2-0-2-0

Course Structure and Scheme of Examination

I B. Tech I Semester – ME   **Regulations: R23**

S. No	Category	Course Code	Course Name	Hours/week			Credits	Scheme of Examination Maximum Marks		
				L	T	P	C	CIA	SEE	Total
1.	BS & H	23AHS01	Communicative English	2	0	0	2	30	70	100
2.	BS & H	23AHS03	Engineering Chemistry	3	0	0	3	30	70	100
3.	ES	23ACE01	Basic Civil and Mechanical Engineering	3	0	0	3	30	70	100
4.	ES	23ACS01	Introduction to Programming	3	0	0	3	30	70	100
5.	BS & H	23AHS04	Linear Algebra and Calculus	3	0	0	3	30	70	100
6.	ES	23AME02	Engineering Workshop	0	0	3	1.5	30	70	100
7.	BS & H	23AHS06	Communicative English Lab	0	0	2	1	30	70	100
8.	BS & H	23AHS08	Engineering Chemistry Lab	0	0	2	1	30	70	100
9.	ES	23ACS02	Computer Programming Lab	0	0	3	1.5	30	70	100
10	MC	23AHS10	Health and Wellness, Yogaand Sports	0	0	1	0.5	100	0	100
			TOTAL	**14**	**0**	**11**	**19.5**	**370**	**630**	**1000**

I B. Tech II Semester – ME   **Regulations: R23**

S. No	Category	Course Code	Course Name	Hours/week			Credits	Scheme of Examination Maximum Marks		
				L	T	P	C	CIA	SEE	Total
1.	BS & H	23AHS05	Engineering Physics	3	0	0	3	30	70	100
2.	ES	23AEE01	Basic Electrical and Electronics Engineering	3	0	0	3	30	70	100
3.	ES	23AME01	Engineering Graphics	1	0	4	3	30	70	100
4.	BS & H	23AHS11	Differential Equations andvector calculus	3	0	0	3	30	70	100
5.	ES	23AEE02	Electrical and Electronics Engineering Workshop	0	0	3	1.5	30	70	100
6.	ES	23AIT01	IT Workshop	0	0	2	1	30	70	100
7.	PC	23ACE02	Engineering Mechanics	3	0	0	3	30	70	100
8.	BS & H	23AHS09	Engineering Physics Lab	0	0	2	1	30	70	100
9.	PC	23ACE04	Engineering Mechanics Lab	0	0	3	1.5	30	70	100
10	MC	23AHS12	NSS /NCC/Scouts and Guides/Community Service	0	0	1	0.5	100	0	100
			TOTAL	**13**	**0**	**15**	**20.5**	**370**	**630**	**1000**

S. No	Category	Course Code	Course Name	Hours/week			Credits	Scheme of Examination Maximum Marks		
				L	T	P	C	CIA	SEE	Total
1.	BS	23AHS15	Numerical Methods &Transform Techniques	3	0	0	3	30	70	100
2.	HSMC	23AMB01	Universal Human Values Understanding Harmony& Ethical human conduct	2	1	0	3	30	70	100
3.	ES	23AME03	Thermodynamics	2	0	0	2	30	70	100
4.	PC	23ACE08	Mechanics of Solids	3	0	0	3	30	70	100
5.	PC	23AME04	Material Science and Metallurgy	3	0	0	3	30	70	100
6.	PC LAB	23ACE12	Mechanics of Solids and Materials Science Lab	0	0	3	1.5	30	70	100
7.	PC LAB	23AME06	Computer-Aided Machine Drawing	0	0	3	1.5	30	70	100
8.	SC	23AEC07	Embedded Systems and IoT	0	0	2	1.0	30	70	100
9.	ES	23ACS09	Python programming	0	1	2	2	30	70	100
10	AC	23AHS18	Environmental Science	2	0	0	-	-	-	-
11	AC	23AHS24	Quantitative Aptitude and Reasoning-1	4	0	0	-	-	-	-
		TOTAL		19	2	10	20	270	630	900

S. No	Category	Course Code	Course Name	Hours/week			Credits	Scheme of Examination Maximum Marks		
				L	T	P	C	CIA	SEE	Total
1.	ME-1	23AME07	Industrial Management	2	0	0	2	30	70	100
2.	BS	23AHS19	Complex Variables, Probability and Statistics	3	0	0	3	30	70	100
3.	PC	23AME08	Manufacturing processes	3	0	0	3	30	70	100
4.	PC	23ACE17	Fluid Mechanics & Hydraulic Machines	3	0	0	3	30	70	100
5.	PC	23AME09	Theory of Machines	3	0	0	3	30	70	100
6.	PC LAB	23ACE20	Fluid Mechanics & Hydraulic Machines Lab	0	0	3	1.5	30	70	100
7.	PC LAB	23AME10	Manufacturing processes Lab	0	0	3	1.5	30	70	100
8.	SC	23AHS20	Soft Skills	0	1	2	2	30	70	100
9.	ES	23AMB05	Design Thinking & Innovation	1	0	2	2	30	70	100
10	AC	23AHS25	Quantitative aptitude-2	4	0	0	-	-	-	-
		TOTAL		19	1	10	21	270	630	900

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)
I B.Tech - I SEM (Common to CE, ME)

23AHS01- COMMUNICATIVE ENGLISH

	L	T	P	C
	2	0	0	2

Course Outcomes:

CO1: Understand the context, topic, and pieces of specific information from social or Transactionaldialogues.

CO2: Apply grammatical structures to formulate sentences and correct word forms.

CO3: Analyze discourse markers to speak clearly on a specific topic in informal discussions.

CO4: Evaluate reading / listening texts and to write summaries based on global comprehension of thesetexts.

CO5: Create a coherent paragraph, essay, and resume.

UNIT I

Lesson	:	**HUMAN VALUES:** Gift of Magi **(Short Story)**
Listening	:	Identifying the topic, the context and specific pieces of information by listening toshort audio texts and answering a series of questions.
Speaking	:	Asking and answering general questions on familiar topics such as home,family, work, studies and interests; introducing oneself and others.
Reading	:	Skimming to get the main idea of a text; scanning to look for specific pieces ofinformation.
Writing	:	Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.
Grammar	:	Parts of Speech, Basic Sentence Structures-forming questions
Vocabulary	:	Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT II

Lesson	:	**NATURE: The Brook by Alfred Tennyson (Poem)**
Listening	:	Answering a series of questions about main ideas and supporting ideas afterlistening to audio texts.
Speaking	:	Discussion in pairs/small groups on specific topics followed by short structuretalks.
Reading	:	Identifying sequence of ideas; recognizing verbal techniques that help to linktheideas in a paragraph together.
Writing	:	Structure of a paragraph - Paragraph writing (specific topics)
Grammar	:	Cohesive devices - linkers, use of articles and zero article; prepositions.**Vocabulary** : Homonyms, Homophones, Homographs.

UNIT III

Lesson	:	**BIOGRAPHY: Elon Musk**
Listening	:	Listening for global comprehension and summarizing what is listened to.
Speaking	:	Discussing specific topics in pairs or small groups and reporting w hat isdiscussed
Reading	:	Reading a text in detail by making basic inferences -recognizing and Interpretingspecific context clues; strategies to use text clues for comprehension.
Writing	:	Summarizing, Note-making, paraphrasing
Grammar	:	Verbs - tenses; subject-verb agreement; Compound words, Collocations
Vocabulary	:	Compound words, Collocations

UNIT IV

Lesson	:	**INSPIRATION: The Toys of Peace by** Saki
Listening	:	Making predictions while listening to conversations/ transactional dialogues withoutvideo; listening with video.
Speaking	:	Role plays for practice of conversational English in academic contexts (formal andinformal) - asking for and giving information/directions.
Reading	:	Studying the use of graphic elements in texts to convey information, reveal Trends /patterns/relationships, communicate processes or display complicated data.
Writing	:	Letter Writing: Official Letters, Resumes
Grammar	:	Reporting verbs, Direct & Indirect speech, Active & Passive Voice
Vocabulary	:	Words often confused, Jargons

UNIT V

Lesson	:	**MOTIVATION:** The Power of Intrapersonal Communication (An Essay)
Listening	:	Identifying key terms, understanding concepts and answering a series of relevantquestions that test comprehension.
Speaking	:	Formal oral presentations on topics from academic contexts
Reading	:	Reading comprehension.
Writing	:	Critical Writing - Writing structured essays on specific topics.
Grammar	:	Editing short texts –identifying and correcting common errors in grammar andusage (articles, prepositions, tenses, subject verb agreement)
Vocabulary	:	Technical Jargons

Text books:
1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, OrientBlackSwan, 2023 (Units 1,2 & 3)
2. Empowering with Language by Cengage Publications, 2023 (Units 4 & 5)

Reference Books:
1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge, 2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge UniversityPress, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a SuperiorVocabulary. Anchor, 2014.

Web Resources:
GRAMMAR:
1. www.bbc.co.uk/learningenglish
2. https://dictionary.cambridge.org/grammar/british-grammar/
3. www.eslpod.com/index.html
4. https://www.learngrammar.net/
5. https://english4today.com/english-grammar-online-with-quizzes/
6. https://www.talkenglish.com/grammar/grammar.aspx

VOCABULARY
1. https://www.youtube.com/c/DailyVideoVocabulary/videos
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

23AHS03   **ENGINEERING** CHEMISTRY   **L T P C**
                                                          3 - - 3

Course Outcomes:
 At the end of the course, the students will be able to
CO1: Understand the impact of hard water and its removal, apply the concept
    ofestimation of hardness.
CO2: Demonstrate the corrosion prevention methods and factors affecting corrosion.
    Explain thepreparation, properties, and applications of thermoplastics &
    thermosetting, elastomers & conducting polymers.
CO3: Explain calorific values, octane number, refining of petroleum and cracking of oils.
 CO4: Explain the setting and hardening of cement.
CO5: Summarize the concepts of colloids, micelle and nanomaterials.

UNIT I
Water Technology
 Soft and hardwater, Estimation of hardness of water by EDTA Method, Estimation of dissolved Oxygen - Boiler troubles –Priming, foaming, scale and sludge, Caustic embrittlement, Industrial water treatment – Specifications for drinking water, Bureau of Indian Standards(BIS) and World health organization(WHO) standards, Ion-exchange processes - desalination of brackish water, reverse osmosis (RO) and electrodialysis.

UNIT II Electrochemistry and Applications
Electrodes –electrochemical cell, Nernst equation, cell potential calculations. Primary cells – Zinc-air battery,Secondary cells – Nickel-Cadmium (NiCad),and lithium ion batteries- working principle of the batteries including cell reactions; Fuel cells-Basic Concepts, the principle and working of hydrogen-oxygen Fuel cell. Corrosion: Introduction to corrosion, electrochemical theory of corrosion, differential aeration cell corrosion, galvanic corrosion, metal oxide formation by dry electrochemical corrosion, Pilling Bedworth ratios and uses,Factors affecting the corrosion, cathodic and anodic protection, electroplating and electro less plating (Nickeland Copper).

UNIT III Polymers and Fuel Chemistry
Introduction to polymers, functionality of monomers, Mechanism of chain growth, step growth polymerization. Thermoplastics and Thermo-setting plastics-: Preparation, properties and applications of polystyrene. PVC Nylon 6,6 and Bakelite. Elastomers – Preparation, properties and applications of Buna S, Buna N, Thiokol rubbers.

Fuels – Types of fuels, calorific value of fuels, numerical problems based on calorific value; Analysis of coal(Proximate and Ultimate analysis), Liquid Fuels, refining of petroleum, Octane and Cetane number- alternativefuels- propane, methanol, ethanol and bio fuel-bio diesel.

 UNIT IV Modern Engineering Materials
Composites- Definition, Constituents, Classification- Particle, Fibre and Structural reinforced composites,properties and Engineering applications
Refractories- Classification, Properties, Factors affecting the refractory materials and Applications.
Lubricants- Classification, Functions of lubricants, Mechanism, Properties of lubricating oils –
Viscosity,Viscosity Index, Flash point, Fire point, Cloud point, saponification and Applications.
 Building materials- Portland Cement, constituents, Setting and Hardening of cement.

UNIT V Surface Chemistry and Nanomaterials

Introduction to surface chemistry, colloids, nanometals and nanometal oxides, micelle formation, synthesis of colloids (Braggs Method), chemical and biological methods of preparation of nanometals and metal oxides, stabilization of colloids and nanomaterials by stabilizing agents, adsorption isotherm (Freundlich and Langmuir), BET equation (no derivation), applications of colloids and nanomaterials – catalysis, medicine, sensors, etc.

Text Books:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press,2010.

Reference Books:

1. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
2. D.J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth-Heineman, 1992.
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition

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I B.Tech - I Semester (Common to All Branches)

23ACE01   BASIC CIVIL AND MECHANICAL ENGINEERING

Course Outcomes: On completion of the course, the student should be able to:
1. Understand various sub-divisions of Civil Engineering and to appreciate their role inensuring bettersociety.
2. Know the concepts of surveying and to understand the measurement of distances,angles andlevels through surveying.
3. Realize the importance of Transportation in nation's economy and the engineeringmeasures relatedto highways in terms of geometrics.
4. Understand the importance of water resources and storage structures so that the socialresponsibilitiesof water conservation will be appreciated.
5. Understand the different manufacturing processes and explain the basics of thermalengineeringand its applications.
6. Describe the working of different mechanical power transmission systems and powerplants; learnbasics of robotics.

PART A: BASIC CIVIL ENGINEERING

UNIT I
Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of CivilEngineering- Structural Engineering- Geo-technical Engineering- Transportation Engineering Hydraulics and Water Resources Engineering - Environmental Engineering -Scope of eachdiscipline - Building Construction and Planning- Construction Materials-Cement – Aggregate Bricks - Cement concrete- Steel-Tests on these materials.
Factors to be considered in Building Planning- Nature of Buildings- Typical Layouts of a Residential Building- Industrial Building- Commercial Building like a Supermarket / Hotel / Theatre.

UNIT II
Surveying: Objectives of Surveying- Horizontal Measurements- Vertical Measurements- Angular Measurements- Levelling instruments used for levelling- Introduction to Bearings- Simple problems on levelling and bearings-Contour mapping.

UNIT III
Transportation Engineering, Water Resources and Environmental Engineering: Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences - Basic geometric design elements of a highway- Camber- Stopping Sight Distance- Super elevation- Introduction.

Water Resources and Environmental Engineering: Sources of water- Quality of water- Specifications and Tests- Introduction to Hydrology- Hydrograph –Rain water Harvesting- Rain water runoff- Water Storage Structures (Simple introduction to Dams and Reservoirs).

Textbooks:
1. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, TataMcgraw Hillpublications (India) Pvt. Ltd.
2. Basic Civil Engineering, S.S. Bhavikatti, New Age International Publishers.
3. Engineering Materials, Dr. S.C. Rangwala, Charotor Publishing House.

4. Highway Engineering, S.K.Khanna, C.E.G. Justo and Veeraraghavan, Nemchand and Brothers Publications.
5. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, KhannaPublishers, Delhi.
6. Building Construction, Dr. B. C. Punmia, Lakshmi Publications, Delhi.

Reference Books:
1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi.

PART B: BASIC MECHANICAL ENGINEERING

UNIT I
Introduction to Mechanical Engineering: Role of Mechanical Engineering in Industries and Society- Technologies in different sectors such as Energy, Manufacturing, Automotive, Aerospace, and Marine sectors.
Engineering Materials - Metals-Ferrous and Non-ferrous, Ceramics, Composites, Smart materials.

UNIT II
Manufacturing Processes: Principles of Casting**,** Forming, joining processes, Machining, Introduction to CNC machines, 3D printing, and Smart manufacturing.
Thermal Engineering – working principle of Boilers, Otto cycle, Diesel cycle, Refrigerationand air- conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric andHybrid Vehicles.

UNIT III
Power plants – working principle of Steam, Diesel, Hydro, Nuclear power plants. **Mechanical Power Transmission -** Belt Drives, Chain, Rope drives, Gear Drives and theirapplications.
Introduction to Robotics - Joints & links, configurations, and applications of robotics.

(Note: The subject covers only the basic principles of Civil and Mechanical Engineering systems. The evaluation shall be intended to test only the fundamentals of the subject)

Textbooks:
1. Internal Combustion Engines by V.Ganesan, By Tata McGraw Hill publications (India)Pvt. Ltd.
2. A Tear book of Theory of Machines by S.S. Rattan, Tata McGraw Hill Publications,(India) Pvt.Ltd.
3. An introduction to Mechanical Engg by Jonathan Wicker and Kemper Lewis, cengage learning Indiapvt. Ltd.

Reference Books:
1. Appuu Kuttan KK, Robotics, I.K. International Publishing House Pvt. Ltd. Volume-I
2. 3D printing & Additive Manufacturing Technology- L. Jyothish Kumar, Pulak MPandey, Springer publications
3. Thermal Engineering by Mahesh M Rathore Tata Mcgraw Hill publications (India) Pvt.Ltd.
4. G. Shanmugam and M.S.Palanisamy, Basic Civil and the Mechanical Engineering, TataMcgraw Hillpublications (India) Pvt. Ltd.

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I B.Tech I Semester ,CSE

	L	**T**	**P**	**C**
	3	**-**	**-**	**3**

23ACS01: INTRODUCTION TO PROGRAMMING
(Common to all branches)

Course Outcomes: At the end of the course students will be able to
1. Understand basics of computers, the concept of algorithm and algorithmic thinking.
2. Develop the ability to analyze a problem, develop an algorithm to solve it.
3. Proficiently use the C programming language to implement various algorithms.
4. Understand more advanced features of C language.
5. Develop problem-solving skills and the ability to debug and optimize the code.

UNIT I Introduction to Programming and Problem Solving
History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program-Algorithms, flowcharts (Using DiaTool), pseudo code.

Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies
: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

Overview of C: History Of C, Basic Structure of C Program, Primitive Data Types, Variables, and Constants,Basic Input and Output, Operations, Type Conversion, and Casting.

UNIT II Control Structures
Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while, do-while) Break and Continue.

UNIT III Arrays and Strings
Definition of Arrays, Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Multidimensional Arrays, Introduction to Strings, operations on strings

UNIT IV Functions
Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments,modifying parameters inside functions using pointers, arrays as parameters. Scope and Lifetime of Variables,Recursion.

UNIT V User Defined Data types, File Handling, Pointers
User-defined data types-Structures- Introduction, Nested Structures, Array of Structures, Structures and Functions, and Unions, pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers. Operations on file handling Self-Referential structures, Linked List (creation anddisplay)

Text Books:

1. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach UsingC, 3/e, Cengage Learning, 2007.
2. Problem solving with C, M.T.Somashekara, PHI
3. "The C Programming Language" by Brian W. Kernighan and Dennis M. Ritchie
4. Schaum's Outline of Programming with C by Byron S Gottfried (1996), McGraw-HillEducation (ISBN:978-0070240353)

Reference Books:

1. Balagurusamy, E. (2008). Computing fundamentals and C Programming. McGraw-HillEducation.
2. Programming in C Rema Theraja-2nd edition 2016
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE
4. Jeri R. Hanly, Ellot B. Koffman, Problem Solving and Program Design in C, 5/e, Pearson

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(AUTONOMOUS)

I B.Tech I Semester (Common to All Branches)

L	T	P	C
3	0	0	3

23AHS04   **LINEAR ALGEBRA & CALCULUS**

Course Outcomes: At the end of the course, the student will be able to
CO1: Develop and use of matrix algebra techniques that are needed by engineers for practical applications.
CO2: Utilize mean value theorems to real life problems.
CO3: Familiarize with functions of several variables which is useful in optimization.
CO4: Learn important tools of calculus in higher dimensions.
CO5: Familiarize with double and triple integrals of functions of several variables in two dimensions usingCartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.

UNIT I Matrices
Rank of a matrix by echelon form, normal form. Cauchy–Binet formulae (without proof). Inverse of Non- singular matrices by Gauss-Jordan method, System of linear equations: Solvingsystem of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT II Eigenvalues, Eigenvectors and Orthogonal Transformation
Eigen values, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem,Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT III   Calculus
Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT IV   Partial differentiation and Applications (Multi variable calculus)
Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Directional derivative, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functionsof two variables, method of Lagrange multipliers.

UNIT V   Multiple Integrals (Multi variable Calculus)
Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical andspherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

Textbooks:
1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10thEdition.

Reference Books:
1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018,14th Edition.
2. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, AlphaScience InternationalLtd., 2021 5th Edition(9th reprint).
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5thEdition.
4. Advanced Engineering Mathematics, Micheael Greenberg, , Pearson publishers, 9thedition
5. Higher Engineering Mathematics, H. K Das, Er. Rajnish Verma, S. ChandPublications,2014,Third Edition (Reprint 2021)

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY, CHITTOOR
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		L	T	P	C
23AME02	**ENGINEERING WORKSHOP**	0	0	3	1.5

(Common to All branches of Engineering)

Course Outcomes:

After completion of this course, the student will be able to.

CO1: Identify workshop tools and their operational capabilities.

CO2: Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.

CO3: Apply fitting operations in various applications.

CO4: Apply basic electrical engineering knowledge for House Wiring Practice.

SYLLABUS

1. **Demonstration**: Safety practices and precautions to be observed in workshop.

2. **Wood Working:** Familiarity with different types of woods and tools used in wood working and make following joints.
    a) Half– Lap joint   b) Mortise and Tenon joint
    c) Corner Dovetail joint or Bridlejoint.

3. **Sheet Metal Working**: Familiarity with different types of tools used in sheet metal working, Developments of following sheet metal job from GI sheets.
    a) Tapered tray   b) Conical funnel   c) Elbow pipe   d) Brazing

4. **Fitting:** Familiarity with different types of tools used in fitting and do the following fitting exercises.
    a) V-fit   b) Dovetail fit   c) Semi-circular fit
    d) Bicycle tirepuncture and change of two-wheeler tyre

5. **Electrical Wiring**: Familiarity with different types of basic electrical circuits and make the following connections.
a) Parallel and series   b) Two-way switch   c) Go down lighting   d) Tube light
e) Three phase motor   f) Soldering of wires

6. **Foundry Trade:** Demonstration and practice on Moulding tools and processes, Preparation of Green Sand Moulds for given Patterns.

7. **Welding Shop**: Demonstration and practice on Arc Welding and Gas welding. Preparation of Lap joint and Butt joint.

8. **Plumbing:** Demonstration and practice of Plumbing tools, Preparation of Pipe joints with coupling for same diameter and with reducer for different diameters.

Textbooks:

1. Basic Workshop Technology: Manufacturing Process, Felix W.; Independently Published, 2019.

Workshop Processes, Practices and Materials; Bruce J. Black, Routledge publishers, 5th Edn. 2015.

2. A Course in Workshop Technology Vol I. & II, B.S. Raghuwanshi, Dhanpath Rai & Co.,2015&2017.

Reference Books:

1. Elements of Workshop Technology, Vol. I by S. K. Hajra Choudhury & Others, Media Promoters and Publishers, Mumbai. 2007,14th edition

2. Workshop Practice by H. S. Bawa, Tata-McGraw Hill, 2004.

3. Wiring Estimating, Costing and Contracting; Soni P.M. & Upadhyay P. A.; Atul Prakashan,2021-22.

L	T	P	C
0	0	2	1

20AHS06 - Communicative English Lab

I B.Tech I Semester (Common to CSE, CSD, CSM, CE & ME)
I B.Tech II Semester (Common to ECE, EEE, CSC, IT, CAI, CSO, CSBS & EBM)

Course Outcomes:

CO1: Understand the different aspects of the English language proficiency with emphasison LSRWskills.
CO2: Apply communication skills through various language learning activities.
CO3: Analyze the English speech sounds, stress, rhythm, intonation and syllable divisionfor betterlistening and speaking comprehension.
CO4: Evaluate and exhibit professionalism in participating in debates and group discussions.CO5: Createeffective Course Objectives:

List of Topics:
1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates - Methods & Practice
9. PPT Presentations/ Poster Presentation
10. Interviews Skills

Suggested Software:
- Young India Films
- Walden Infotech

Reference Books:
1. Raman Meenakshi, Sangeeta-Sharma. *Technical Communication*. Oxford Press.2018.
2. Taylor Grant: *English Conversation Practice*, Tata McGraw-Hill Education India,2016
3. Hewing's, Martin. Cambridge *Academic English* (B2). CUP, 2012.
4. J. Sethi & P.V. Dhamija. *A Course in Phonetics and Spoken English*, (2nd Ed),Kindle, 2013

Web Resources:

Spoken English:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured
9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

1. https://www.youtube.com/user/letstalkaccent/videos
2. https://www.youtube.com/c/EngLanguageClub/featured
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
   https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

I B.Tech- I SEM   **(Common to CE, ME)**

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23AHS08   **ENGINEERING CHEMISTRY LAB**

List of Experiments: (Any 10 experiments)

1. Determination of Hardness of a groundwater sample.

2. Estimation of Dissolved Oxygen by Winkler's method

3. Determination of Strength of an acid in Pb-Acid battery

4. Preparation of a polymer (Bakelite)

5. Determination of percentage of Iron in Cement sample by colorimetry

6. Estimation of Calcium in port land Cement

7. Preparation of nanomaterials by precipitation method.

8. Adsorption of acetic acid by charcoal

9. Determination of percentage Moisture content in a coal sample

10. Determination of Viscosity of lubricating oil by Redwood Viscometer 1

11. Determination of Viscosity of lubricating oil by Redwood Viscometer 2

12. Determination of Calorific value of gases by Junker's gas Calorimeter

13. Estimation of Acidity of water sample

14. Estimation of Alkalinity of water sample

15. Determination of Viscosity of a polymer solution using Ostwald Viscometer

Reference: "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C. Denney, J.D. Barnes and B. Sivasankar

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23ACS02:   COMPUTER PROGRAMMING LAB

Course Outcomes : At the end of the course, Student will be able to
1. Read, understand and trace the execution of programs written in C language.
2. Select the right control structure for solving the problem.
3. Develop C programs which utilize the memory efficiently using programmingconstructs like pointers.
4. Develop, Debug and Execute programs to demonstrate the applications of arrays,functions, basic concepts of pointers in C.

List of Experiments:

WEEK 1
Objective: Getting familiar with the programming environment on the computer and writing thefirst program.

Suggested Experiments/Activities:
Tutorial 1: Problem-solving using Computers.
Familiarization with programming environment
  i) Basic Linux environment and its editors like Vi, Vim & Emacs etc.
  ii) Exposure to Turbo C, gcc
  iii) Writing simple programs using printf(), scanf()

WEEK 2
Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite stepsboth using textual notation and graphic notation.
Suggested Experiments
/Activities:Tutorial 2: Problem-solving using Algorithms and
Flow charts.
Converting algorithms/flow charts into C Source code.
Developing the algorithms/flowcharts for the following sample programs
  i) Sum and average of 3 numbers
  ii) Conversion of Fahrenheit to Celsius and vice versa
  iii) Simple interest calculation

WEEK 3
Objective: Learn how to define variables with the desired data-type, initialize them with appropriate valuesand how arithmetic operators can be used with variables and constants.suggested Experiments/Activities:
 Tutorial 3: Variable types and type conversions:
 Simple computational problems using arithmetic expressions.
  i) Finding the square root of a given number
  ii) Finding compound interest
  iii) Area of a triangle using heron's formulae
  iv) Distance travelled by an object

WEEK 4

Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operatorsused in the expression and how operator precedence works.

Suggested Experiments/Activities:

Tutorial4: Operators and the precedence and as associativity:

Simple computational problems using the operator' precedence and associativity

  i) Evaluate the following expressions.
       a. A+B*C+(D*E) + F*G
       b. A/B*C-B+A*D/3
       c. A+++B---A
       d. J= (i++) + (++i)
  ii) Find the maximum of three numbers using conditional operator
  iii) Take marks of 5 subjects in integers, and find the total, average in float

WEEK 5

Objective: Explore the full scope of different variants of "if construct" namely if-else, null- else, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for "if construct".

Suggested Experiments/Activities:

Tutorial 5: Branching and logical expressions:

Problems involving if-then-else structures.

  i) Write a C program to find the max and min of four numbers using if-else.
  ii) Write a C program to generate electricity bill.
  iii) Find the roots of the quadratic equation.
  iv) Write a C program to simulate a calculator using switch case.
  v) Write a C program to find the given year is a leap year or not.

WEEK 6

Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and for loop inaddition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.

Suggested Experiments/Activities:

Tutorial 6: Loops, while and for loops Iterative problems e.g., the sum of series

  i) Find the factorial of given number using any loop.
  ii) Find the given number is a prime or not.
  iii) Compute sine and cos series
  iv) Checking a number palindrome
  v) Construct a pyramid of numbers.

WEEK 7:

Objective: Explore the full scope of Arrays construct namely defining and initializing 1-D and 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-D arrays, explore search solution linear search.

Suggested Experiments/Activities:

Tutorial 7: 1 D Arrays: searching.

  D Array manipulation, linear search

  i) Find the min and max of a 1-D integer array.
  ii) Perform linear search on1D array.
  iii) The reverse of a 1D integer array
  iv) Find 2's complement of the given binary number.
  v) Eliminate duplicate elements in an array.

WEEK 8:
Objective: Explore the difference between other arrays and character arrays that can be used as Strings byusing null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays.

Suggested Experiments/Activities:
Tutorial 8: 2 D arrays, sorting and Strings.
Matrix problems, String operations, Bubble sort
    i)   Addition of two matrices
    ii) Multiplication two matrices
    iii) Sort array elements using bubble sort
    iv) Concatenate two strings without built-in functions
    v) Reverse a string using built-in and without built-in string functions

WEEK 9:
Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments byparameter passing using call by value. Basic methods of numerical integration

Suggested Experiments/Activities:
Tutorial 9: Functions, call by value, scope and extent,
Simple functions using call by value, solving differential equations using Eulers theorem
    i)   Write a C function to calculate NCR value
    ii) Write a C function to find the length of a string
    iii) Write a C function to transpose of a matrix
    iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 10:
Objective: Explore how recursive solutions can be programmed by writing recursive functions that can beinvoked from the main by programming at-least five distinct problems that have naturally recursive solutions.

Suggested Experiments/Activities:
Tutorial 10: Recursion, the structure of recursive
callsRecursive functions
    i)   Write a recursive function to generate Fibonacci series
    ii) Write a recursive function to find the lcm of two numbers
    iii) Write a recursive function to find the factorial of a number
    iv) Write a C Program to implement Ackermann function using recursion
    v) Write a recursive function to find the sum of series.

WEEK 11:
Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations usingpointers and passing variables to functions using pointers

Suggested Experiments/Activities:
Tutorial 11: Call by reference, dangling pointers
Simple functions using Call by reference, Dangling pointers
    i)   Write a C program to swap two numbers using call by reference
    ii) Demonstrate Dangling pointer problem using a C program
    iii) Write a C program to copy one string into another using pointer
    iv) Write a C program to find no of lowercase, uppercase, digits and other characters usingpointers.

WEEK12:
Objective: Explore pointers to manage a dynamic array of integers, including memory allocation & value initialization, resizing changing and reordering the contents of an array and memory de-allocation using malloc (), calloc (), realloc () and free () functions. Gain experience processing command-line arguments received by C

Suggested Experiments/Activities:
Tutorial 12: Pointers, structures and dynamic memory allocation Pointers and structures, memorydereference.
  i)   Write a C program to find the sum of a 1D array using malloc()
  ii) Write a C program to find the total, average of n students using structures
  iii) Enter n students data using calloc() and display failed students list
  iv) Read student name and marks from the command line and display the student details alongwith the total.
  v)   Write a C program to implement realloc()

WEEK 13:
Objective: Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linkedlists) and nested structures

Suggested Experiments/Activities:
Tutorial 13: Bitfields, Self-Referential Structures, Linked lists Bitfields, linked lists
  Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without usingbit- fields
  i)   Create and display a singly linked list using self-referential structure.
  ii) Demonstrate the differences between structures and unions using a C program.
  iii) Write a C program to shift/rotate using bitfields.
  iv) Write a C program to copy one structure variable to another structure of the same type.

WEEK14:
Objective: To understand data files and file handling with various file I/O functions. Explore the differencesbetween text and binary files.

Suggested Experiments/Activities:
Tutorial 14: File
handlingFile operations
  i)   Write a C program to write and read text into a file.
  ii) Write a C program to write and read text into a binary file using fread() and fwrite()
  iii) Copy the contents of one file to another file.
  iv) Write a C program to merge two files into the third file using command-line arguments.
  v)   Find no. of lines, words and characters in a file
  vi) Write a C program to print last n characters of a given file.

Text Books
  1. Ajay Mittal, Programming in C: A practical approach, Pearson.
  2. Byron Gottfried, Schaum' s Outline of Programming with C, McGraw Hill

Reference Books
  1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice- Hall of India
  2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad,CENGAGE

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
I B. Tech I Semester (Common to EEE, ECE, IT, CAI, CSO, CSC, EBM & CSBS)
I B. Tech II Semester (Common to CE, ME, CSE, CSE (DS) & CSE(AI &ML))

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23AHS05   ENGINEERING PHYSICS

COURSE OUTCOMES

1. **CO1**: **Explain** the need of coherent sources and the conditions for sustained interference (L2). **Identify** the applications of interference in engineering (L3). **Analyze** the differences between interference and diffraction with applications (L4). **Illustrate** the concept of polarization of light and its applications (L2). **Classify** ordinary refracted light and extraordinary refracted raysby their states of polarization (L2)

2. **CO2**: **Interpret** various crystal systems (L2) and **Analyze** the characterization of materials by XRD (L4). **Identify** the important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction technique (L3). **Analysis** of structure of the crystals by Laue's method (L2).

3. **CO3**: **Describe** the dual nature of matter (L1). **Explain** the significance of wave function (L2). **Identify** the role of Schrodinger's time independent wave equation in studying particle in one- dimensional infinite potential well (L3). **Identify** the role of classical and quantum free electron theoryin the study of electrical conductivity (L3).

4. **CO4**: **Classify** the crystalline solids (L2). **Outline** the properties of charge carriers in semiconductors (L2). **Identify** the type of semiconductor using Hall effect (L2). **Classify** superconductors based on Meissner's effect (L2). **Explain** Meissner's effect, BCS theory & Josephson effect in superconductors(L2)**.**

5. **CO5**: **Explain** the concept of dielectric constant and polarization in dielectric materials (L2). **Summarize** various types of polarization of dielectrics (L2). **Interpret** Lorentz field and Claussius- Mosotti relation in dielectrics (L2). **Classify** the magnetic materials based on susceptibility (L2).

Unit-I: Wave Optics
Interference- Principle of superposition – Interference of light – Conditions for sustained interference - Interference in thin films (Reflection Geometry) – Colors in thin films – Newton's Rings – Determination of wavelength and refractive index.

Diffraction- Introduction – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction due to single slit, double slit and N-slits (qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative).

Polarization- Introduction – Types of polarization – Polarization by reflection, refraction and double refraction - Nicol's Prism - Half wave and Quarter wave plates.

Unit II: Crystallography and X-ray diffraction   8hrs
Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Crystal systems - BravaisLattices — Coordination number - Packing fraction of SC, BCC & FCC - Miller indices – Separationbetween successive (h k l) planes.
X- ray diffraction: Bragg's law - X-ray Diffractometer – Crystal structure determination by Laue'smethod.

Unit-III: Quantum Mechanics and Free Electron Theory   **9hrs**
Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle - Schrodinger's time independent and dependent wave equation – Significance and properties of wave function – Particle in a one-dimensional infinite potential well.
Free Electron Theory- Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory – Equation for electrical conductivity based on quantum free electron theory – Fermi-Dirac distribution – Fermi energy - Failures of free electron theory.

Unit – IV: Semiconductors and Superconductors   **8hrs**
Semiconductors: Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsicsemiconductors: density of charge carriers - Drift and diffusion currents – Einstein's equation - Hall effectand its Applications.
Superconductors: Introduction – Properties of superconductors – Meissner effect– Type I and Type II superconductors – AC and DC Josephson effects – BCS theory (qualitative treatment) – High Tc superconductors – Applications of superconductors.

Unit–V: Dielectric and Magnetic Materials   **8hrs**
Dielectric Materials- Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz field - Clausius-Mossotti equation - Dielectric loss.
Magnetic Materials- Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and Permeability – Atomic origin of magnetism – Classification of magnetic materials: Dia, Para, Ferro, Ferri & Antiferro – Domain concept of Ferromagnetism (Qualitative) – Hysteresis – Soft and Hard magneticmaterials.

Text books:
1. Engineering Physics by M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy S.ChandPublications, 11th Edition 2019.
2. Engineering Physics" by D.K. Bhattacharya and Poonam Tandon, Oxford press (2018).
3. Applied Physics by P.K. Palanisamy ,SciTech publications (2018)

Reference Books:
1. "Engineering Physics" - B.K. Pandey and S. Chaturvedi, Cengage Learning
2. "Fundamentals of Physics" - Halliday, Resnick and Walker, John Wiley &Sons.
3. "Fundamentals of Physics with Applications", Arthur Beiser, Samarjit Sengupta, Schaum Series.
4. "Engineering Physics" - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
5. "Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press.
6. "Semiconductor physics and devices: Basic principle" - A. Donald, Neamen, Mc GrawHill.
7. "Solid state physics" – A.J.Dekker , Pan Macmillan publishers
8. "Introduction to Solid State Physics" -Charles Kittel ,Wiley

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY,

(AUTONOMOUS)

I B.Tech I Semester

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23AEE01   BASIC ELECTRICAL & ELECTRONICS ENGINEERING

(Common to All branches of Engineering)

PART A: BASIC ELECTRICAL ENGINEERING

UNIT I DC & AC Circuits

DC Circuits: Electrical circuit elements (R, L and C), Ohm's Law and its limitations, KCL & KVL, series, parallel, series-parallel circuits, Super Position theorem, Simple numerical problems.

AC Circuits: A.C. Fundamentals: Equation of AC Voltage and current, waveform, time period, frequency, amplitude, phase, phase difference, average value, RMS value, form factor, peak factor, Voltage and current relationship with phasor diagrams in R, L, and C circuits, Concept of Impedance, Active power, reactive power and apparent power, Concept of power factor (Simple Numerical problems).

UNIT II Machines and Measuring Instruments

Machines: Construction, principle and operation of (i) DC Motor, (ii) DC Generator, (iii) Single PhaseTransformer, (iv) Three Phase Induction Motor and (v) Alternator, Applications of electrical machines.

Measuring Instruments: Construction and working principle of Permanent Magnet Moving Coil (PMMC),Moving Iron (MI) Instruments and Wheat Stone bridge.

UNIT III Energy Resources, Electricity Bill & Safety Measures

Energy Resources: Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Nuclear, Solar & Wind power generation.

Electricity bill: Power rating of household appliances including air conditioners, PCs, Laptops, Printers, etc. Definition of "unit" used for consumption of electrical energy, two-part electricity tariff, calculation of electricity bill for domestic consumers.

Equipment Safety Measures: Working principle of Fuse and Miniature circuit breaker (MCB), merits and demerits. Personal safety measures: Electric Shock, Earthing and its types, Safety Precautions to avoid shock.

COURSE OUTCOMES:

 After the completion of the course students will be able to

CO1: Remember the fundamental laws, operating principles of motors, generators, MC and MI instruments.

CO2: Understand the problem solving concepts associated to AC and DC circuits, construction and operation of AC and DC machines, measuring instruments; different power generation mechanisms, Electricity billing concept and important safety measures related to electrical operations.

CO3: Apply mathematical tools and fundamental concepts to derive various equations related to machines, circuits and measuring instruments; electricity bill calculations and layout representation of electrical power systems.

CO4: Analyze different electrical circuits, performance of machines and measuring instruments.

CO5: Evaluate different circuit configurations, Machine performance and Power systems operation

Text Books:

1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition

2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co,2013

3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

Reference Books:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Mc Graw Hill, 2019, Fourth Edition

2. Principles of Power Systems, V.K. Mehtha, S.Chand Technical Publishers, 2020

3. Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2017

4. Basic Electrical and Electronics Engineering, S. K. Bhatacharya, Person Publications, 2018, Second Edition.

Web Resources:

1. https://nptel.ac.in/courses/108105053

2. https://nptel.ac.in/courses/108108076

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23AME01 ENGINEERING GRAPHICS

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

CO1: Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
CO2: Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
CO3: Understand and draw projection of solids in various positions in first quadrant.
CO4: Explain principles behind development of surfaces.
CO5: Prepare isometric and perspective sections of simple solids.

UNIT I
Introduction: Lines, Lettering and Dimensioning, Geometrical Constructions and Constructing regular polygons by general methods.
Curves: construction of ellipse, parabola and hyperbola by general, Cycloids, Involutes, Normal and tangent to Curves.
Scales: Plain scales, diagonal scales and vernier scales.

UNIT II
Orthographic Projections: Reference plane, importance of reference lines or Plane, Projections of a point situated in any one of the four quadrants.
Projections of Straight Lines: Projections of straight lines parallel to both reference planes, perpendicular to one reference plane and parallel to other reference plane, inclined to one reference plane and parallel to the other reference plane. Projections of Straight Line Inclined to both the reference planes.
Projections of Planes: regular planes Perpendicular to both reference planes, parallel to one reference plane and inclined to the other reference plane; plane inclined to both the reference planes.

UNIT III
Projections of Solids: Types of solids: Polyhedra and Solids of revolution. Projections of Solids in simple positions: Axis perpendicular to horizontal plane, Axis perpendicular to vertical plane and Axis parallel to both the reference planes, Projection of Solids with axis inclined to one reference plane and parallel to another plane.

UNIT IV
Sections of Solids: Per **Development of Surfaces:** Methods of Development: Parallel line development and radial line development.Development of a cube, prism, cylinder, pyramid and cone.

UNIT V
Pendicular and inclined section planes, Sectional views and True shape of section, Sections of solids in simple position only.

Conversion of Views: Conversion of isometric views to orthographic views;
Conversion of orthographic views to isometric views.

Computer graphics: Creating 2D&3D drawings of objects including PCB and
Transformations using AutoCAD (*Not for end examination*).

Note: The practice will be carried out by using AutoCAD software.

Text Book s:
1.N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016

Reference Books:
1. Engineering Drawing, K.L. Narayana and P. Kannai ah, Tata McGraw Hill, 2013
2. Engineering Drawing, M.B.Shah and B.C. Rana, Pearson Education Inc,2009
3. Engineering Drawing with an Introduction to AutoCAD, Dhananjay Jolhe, TataMcGraw Hill, 2017

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
I B.Tech II Semester (Common to All Branches)

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23AHS11 DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

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

CO1: Solve the differential equations related to various engineering fields.
CO2: Identify solution methods for partial differential equations that model physical processes.
CO3: Interpret the physical meaning of different operators such as gradient, curl and divergence.
CO4: Estimate the work done against a field, circulation and flux using vector calculus.

UNIT I Differential equations of first order and first degree
Linear differential equations – Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay- Electrical circuits- Orthogonal trajectories.

UNIT II Linear differential equations of higher order (Constant Coefficients)
Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L- C-R Circuit problems and Simple Harmonic motion.

UNIT III Partial Differential Equations
Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogeneous Linear Partial differential equations with constant coefficients.

UNIT IV Vector differentiation
Scalar and vector point functions, vector operator Del, Del applies to scalar point functions-Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities.

UNIT V Vector integration
Line integral -Circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

Textbooks:
1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10thEdition.

Reference Books:
1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, PearsonPublishers, 2018,14[th] Edition.
2. Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones andBartlett,2018.
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018,5th Edition.
4. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha ScienceInternational Ltd., 2021 5th Edition (9th reprint).
5. Higher Engineering Mathematics, B. V. R Ramana, , McGraw Hill Education, 2017

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY, (AUTONOMOUS)

I B.Tech I Semester

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23AEE02 ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP
(Common to All branches of Engineering)

Activities:
1. Familiarization of commonly used Electrical & Electronic Workshop Tools: Bread board, Solder,cables, relays, switches, connectors, fuses, Cutter, plier, screwdriver set, wire stripper, flux, knife/blade, soldering iron, de-soldering pump etc. Provide some exercises so that hardware toolsand instruments are learned to be used by the students.
2. Familiarization of Measuring Instruments like Voltmeters, Ammeters, multimeter, LCR-Q meter,Power Supplies, CRO, DSO, Function Generator, Frequency counter.
3. Provide some exercises so that measuring instruments are learned to be used by the students.
4. Components:
5. Familiarization/Identification of components (Resistors, Capacitors, Inductors, Diodes, transistors,IC's etc.) – Functionality, type, size, colour coding package, symbol, cost etc.
6. Testing of components like Resistor, Capacitor, Diode, Transistor, ICs etc. -Compare values of components like resistors, inductors, capacitors etc with the measured values by using instruments

PART A: ELECTRICAL ENGINEERING LAB

List of experiments:

1. Verification of KCL and KVL

2. Verification of Superposition theorem

3. Measurement of Resistance using Wheat stone bridge

4. Magnetization Characteristics of DC shunt Generator

5. Measurement of Power and Power factor using Single-phase wattmeter

6. Measurement of Earth Resistance using Megger

7. Calculation of Electrical Energy for Domestic Premises

Reference Books:
1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai &Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

Note: Minimum Six Experiments to be performed.

COURSE OUTCOMES:

At the end of this course students will demonstrate the ability to

CO1: Understand the Electrical circuit design concept; measurement of resistance, power, power factor;concept of wiring and operation of Electrical Machines and Transformer.
CO2: Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power andpower factor.
CO3: Apply the theoretical concepts to obtain calculations for the measurement of resistance, power andpower factor.
CO4: Analyse various characteristics of electrical circuits, electrical machines and measuring instruments.
CO5: Design suitable circuits and methodologies for the measurement of various electrical parameters;Household and commercial wiring.

Reference Books:
1. Basic Electrical Engineering, D. C. Kulshreshtha, Tata McGraw Hill, 2019, First Edition
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai& Co, 2013
3. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI publishers, 2014, Third Edition

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
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I B.Tech I Semester

23AIT01   IT WORKSHOP

(Common to all branches)

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Course Outcomes:
1. Perform Hardware troubleshooting.
2. Understand Hardware components and inter dependencies.
3. Safeguard computer systems from viruses/worms.
4. Document/ Presentation preparation.
5. Perform calculations using spreadsheets.

PC HARDWARE

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content. Differentiate RAM &ROM.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

INTERNET & WORLD WIDE WEB

Task 1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1: Word Orientation: The mentor needs to give an overview of La TeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as wordProcessors, Details of the four tasks and features that would be covered in each, Using La TeXand word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using La TeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both La TeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Mergein word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel asa Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel
– Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function.

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting Power point

LOOKUP/VLOOKUP

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets andNumbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notesetc), and Inserting – Background, textures, Design Templates, Hidden slides.

AI TOOLS – ChatGPT

Task 1: Prompt Engineering: Experiment with different types of prompts to see how the model responds. Try asking questions, starting conversations, or even providing incomplete sentences to see how the model completes them.

• Ex: Prompt: "You are a knowledgeable AI. Please answer the following question: What is the capital of France?"

Task 2: Creative Writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstormcreative ideas

• Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write astory about how society adapted to this new reality."

Task 3: Code Generation: Test the model's ability to generate code by giving it partial code snippets and asking it to complete them. You can also ask the model to explain programming concepts or help you debugcode.

• Ex:Prompt: "Complete the following Python code to swap the values of two variables:
\npython\na = 5\nb = 10\ntemp = a\na = b\nb = temp\n"

Task 4: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it into another language. Compare the output to see how accurate and fluentthe translations are.

• Ex:Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

Task 5: Summarization: Provide a long piece of text, such as an article or a blog post, and ask the model to summarize it. Compare the model's summary with the original text to assess its ability to condense information effectively.

• Ex: Prompt: "Summarize the article titled 'Ramayanam' in 3-4 sentences."

Task 6: Futuristic Predictions: Have fun by asking the model to predict future technological advancements, societal changes, or even hypothetical scenarios. Compare its responses with your own ideas.

• Ex:Prompt: "Predict how artificial intelligence will transform everyday life in the next 20 years."

Task 7: Technical Explanations: Challenge the model with technical questions from different domains. Ask it to explain scientific concepts, mathematical theorems, or complex algorithms in simple terms.

• Ex:Prompt: "Explain the concept of neural networks in machine learning, including their layers and theprocess of backpropagation."

Reference Books:
1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dream tech.
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, WILEYDream tech.
3. Introduction to Information Technology, ITL Education Solutions limited, PearsonEducation.
4. PC Hardware - A Handbook – Kate J. Chase PHI (Microsoft).

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I B.Tech - II Semester (Common to All Branches)

23ACE02   ENGINEERING MECHANICS

Course Outcomes: On Completion of the course, the student should be able to
1. Understand the fundamental concepts in mechanics and determine the frictional forcesfor bodies in contact.
2. Analyze different force systems such as concurrent, coplanar and spatial systems and calculate their resultant forces and moments.
3. Calculate the centroids, center of gravity and moment of inertia of different geometrical shapes.
4. Apply the principles of work-energy and impulse-momentum to solve the problems of rectilinear and curvilinear motion of a particle.
5. Solve the problems involving the translational and rotational motion of rigid bodies.

UNIT I
Introduction to Engineering Mechanics – Basic Concepts. Scope and Applications
Systems of Forces: Coplanar Concurrent Forces – Components in Space – Resultant –Moment of Force andits Application – Couples and Resultant of Force Systems.
Friction: Introduction**,** limiting friction and impending motion, Coulomb's laws of dryfriction, coefficientof friction, Cone of Static friction.

UNIT II
Equilibrium of Systems of Forces: Free Body Diagrams, Lami's Theorm, Equations of Equilibrium of Coplanar Systems, Graphical method for the equilibrium, Triangle law of forces, converse of the lawof polygon of forces condition of equilibrium, Equations of Equilibrium for Spatial System of forces, Numerical examples on spatial system of forces using vector approach, Analysis of plane trusses. Principle of virtual work with simple examples

UNIT III
Centroid: Centroids of simple figures (from basic principles) – Centroids of Composite Figures
Centre of Gravity: Centre of gravity of simple body (from basic principles), Centre of gravity of composite bodies, Pappus theorems.
Area Moments of Inertia: Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.
Mass Moment of Inertia: Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia,Mass Moment of Inertia of composite bodies.

UNIT IV
Rectilinear and Curvilinear motion of a particle: Kinematics and Kinetics –D'Alembert's Principle - Work Energy method and applications to particle motion- Impulse Momentum method.

UNIT V
Rigid body Motion: Kinematics and Kinetics of translation, Rotation about fixed axis andplane motion, Work Energy method and Impulse Momentum method.

Textbooks:
1. S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., Engineering Mechanics, 5th Edition,McGraw Hill Education.
2. Hibbeler R.C., Engineering Mechanics: Statics and Dynamics, 14th Edition, Pearson Education, Inc., New Delhi, 2022

Reference Books:
1. Engineering Mechanics, Statics and Dynamics, Rogers and M A. Nelson., McGraw Hill Education.
2. Engineering Mechanics, Statics and Dynamics, I.H. Shames., 4th Edition, PHI, 2002.
3. Engineering Mechanics, Volume-I: Statics, Volume-II: Dynamics, J. L. Meriam and L. G. Kraige., 6th Edition, John Wiley, 2008.
4. Engineering Mechanics: Principles of Statics and Dynamics, R.C. Hibbler., PearsonPress, 2006.
5. Introduction to Statics and Dynamics, Andy Ruina and Rudra Pratap., OxfordUniversity Press, 2011.

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I B.Tech I Semester (Common to EEE, ECE, IT, CAI, CSO, CSC, EBM & CSBS)
I B.Tech II Semester (Common to CE, ME, CSE, CSE(DS) & CSE(AI &ML))

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23AHS09 ENGINEERING PHYSICS LAB
(Any **TEN** of the following listed experiments)
<u>**List of Engineering Physics Experiments**</u>

1. Determination of radius of curvature of a given plano convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffractiongrating in normal incidence configuration.
3. Determination of dispersive power of prism.
4. Verification of Brewster's law
5. Determination of the resistivity of semiconductor by four probe method.
6. Determination of energy gap of a semiconductor using p-n junction diode.
7. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
8. Determination of dielectric constant using charging and discharging method.
9. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
10. Magnetic field along the axis of a current carrying circular coil by Stewart & Gee'sMethod.
11. Determination of wavelength of Laser light using diffraction grating.
12. Estimation of Planck's constant using photoelectric effect.
13. Determination of temperature coefficients of a thermistor.
14. Determination of acceleration due to gravity and radius of Gyration by using a compoundpendulum.
15. Determination of rigidity modulus of the material of the given wire using Torsional pendulum.
16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scale by non-uniformbending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork by Melde's experiment.

Course Outcomes:
The students will be able to
 ➢ **Operate** optical instruments like microscope and spectrometer
 ➢ **Estimate** the wavelength of different colors using diffraction grating and resolving power
 ➢ **Plot** the intensity of the magnetic field of circular coil carrying current with distance
 ➢ **Determine** the resistivity of the given semiconductor using four probe method
 ➢ **Identify** the type of semiconductor i.e., n-type or p-type using hall effect
 ➢ **Calculate** the band gap of a given semiconductor

References: 1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"-
S.ChandPublishers, 2017.

URL:*www.vlab.co.in*

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I B.Tech - II Semester (ME)

23ACE04   ENGINEERING MECHANICS LAB

Course Outcomes: On completion of the course, the student should be able to:
1. Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller.
2. Verify Law of Polygon of forces and Law of Moment using force polygon and bell crank lever.
3. Determine the Centre of gravity and Moment of Inertia of different configurations.
4. Verify the equilibrium conditions of a rigid body under the action of different force systems.

Students have to perform any 10 of the following Experiments:
List of Experiments:
1. Verification of Law of Parallelogram of Forces.
2. Verification of Law of Triangle of Forces.
3. Verification of the Law of polygon for coplanar-concurrent forces acting on a particle in equilibrium and to find the value of unknown forces considering particle to be in equilibrium using universal force table.
4. Determination of coefficient of Static and Rolling Frictions
5. Determination of Centre of Gravity of different shaped Plane Lamina.
6. Verification of the conditions of equilibrium of a rigid body under the action of coplanar non-concurrent, parallel force system with the help of a simply supportedbeam.
7. Study of the systems of pulleys and draw the free body diagram of the system.
8. Determine the acceleration due to gravity using a compound pendulum.
9. Determine the Moment of Inertia of the compound pendulum about an axis perpendicular to the plane of oscillation and passing through its centre of mass.
10. Determine the Moment of Inertia of a Flywheel.
11. Verification of Law of Moment using Rotation Disc Apparatus and Bell Crank Lever.

References:
1. S. Timoshenko, D. H. Young, J.V. Rao, S. Pati., Engineering Mechanics, 5th Edition, McGraw Hill Education.
2. Hibbeler R.C., Engineering Mechanics: Statics and Dynamics, 14th Edition, Pearson Education, Inc., New Delhi, 2022

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II B.Tech - I Semester (ME)

23AHS15   NUMERICAL METHODS & TRANSFORM TECHNIQUES (MECH)

Course Outcomes:
1. Apply numerical methods to solve algebraic and transcendental equations.
2. Derive interpolating polynomials using interpolation formulae.
3. Solve differential and integral equations numerically.
4. Understand the use of Laplace transform in system modeling, digital signal processing, process control, solving Boundary Value Problems.
5. Apply Fourier series and Fourier transform in communication theory and signal analysis, image processing   and filters, data processing and analysis, solving partial differential equations for problems on gravity.

UNIT I
Solution of Algebraic & Transcendental Equations
Introduction-Bisection Method-Iterative method, Regula-falsi method and Newton Raphson Method System of Algebraic equations: Gauss Elimination, Jacoby and Gauss Siedal method.

UNIT II
Interpolation
Finite Differences-Newton's forward and backward interpolation formulae – Lagrange's formulae. Curve fitting: Fitting of straight line, second-degree and Exponential curve by method of least squares.

UNIT III
Solution of Initial value problems to Ordinary differential equations
Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's and modified Euler's methods-Runge-Kutta methods (second and fourth order).

UNIT IV
Laplace Transforms
Definition-Laplace transform of standard functions-existence of Laplace Transform – Inverse transform – First shifting Theorem, transforms of derivatives and integrals – Unit step function – Second shifting theorem– Convolution theorem – Laplace transform of Periodic function.

UNIT V
Fourier series and Fourier transforms
Fourier series: Determination of Fourier coefficients (Euler's) – Dirichlet conditions for the existence of Fourier series -Fourier series of Even and odd functions – Fourier series in an arbitrary interval – Half-range Fourier sine and cosine expansions
Fourier transforms: Fourier integral theorem (without proof) – Fourier sine and cosine integrals-complex form of Fourier integral. Fourier transform – Fourier sine and cosine transforms – Properties – Inverse transforms – convolution theorem.

Textbooks:
1. S S Sastry, Introductory Methods of Numerical Analysis, PHI Learning Private Limited.
2. B. S. Grewal,Higher Engineering Mathematics, Khanna Publishers, 2017, 44th Edition

Reference Books:

    1. ErwinKreyszig, Advanced Engineering Mathematics, John Wiley &Sons, 2018, 10th Edition.

    2. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, Alpha Science International Ltd.,2021 5th Edition (9th reprint).

    3. H. K Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand blications,2014, Third Edition (Reprint 2021)

    4. Alan Jeffrey, Advanced Engineering Mathematics, Elsevier.

Online Learning Resources:

1. https://onlinecourses.nptel.ac.in/noc17_ma14/preview
2. https://onlinecourses.nptel.ac.in/noc24_ma05/preview
3. http://nptel.ac.in/courses/111105090

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II B.Tech - I Semester (ME)

23AMB01   UNIVERSAL HUMAN VALUES – UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT
(Common to All Branches of Engineering)

Course Outcomes:
1. Define the terms like Natural Acceptance, Happiness and Prosperity.
2. Identify one's self, and one's surroundings (family, society nature).
3. Apply what they have learnt to their own self in different day-to-day settings in real life
4. Relate human values with human relationship and human society.
5. Justify the need for universal human values and harmonious existence.

Course Topics
The course has 28 lectures and 14 tutorials in 5 modules. The lectures and tutorials are of 1- hour duration. Tutorial sessions are to be used to explore and practice what has been proposed during the lecture sessions.
The Teacher's Manual provides the outline for lectures as well as practice sessions. The teacher is expected to present the issues to be discussed as propositions and encourage the students to have a dialogue.

UNIT I
Introduction to Value Education (6 lectures and 3 tutorials for practice session)
Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic
Development and the Role of Education)
Lecture 2: Understanding Value Education
Tutorial 1: Practice Session PS1 Sharing about Oneself
Lecture 3: self-exploration as the Process for Value Education
Lecture4: Continuous Happiness and Prosperity – the Basic Human
Aspirations
Tutorial 2: Practice Session PS2 Exploring Human Consciousness
Lecture 5: Happiness and Prosperity – Current Scenario.
Lecture 6: Method to Fulfill the Basic Human Aspirations Tutorial 3: Practice Session PS3
Exploring Natural Acceptance

UNIT II
Harmony in the Human Being (6 lectures and 3 tutorials for practice session)
Lecture 7: Understanding Human being as the Co-existence of the self and the
body.
Lecture 8: Distinguishing between the Needs of the self and the body
Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self and
body.
Lecture 9: The body as an Instrument of the self
Lecture 10: Understanding Harmony in the self
Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the self
Lecture 11: Harmony of the self with the body
Lecture 12: Programme to ensure self-regulation and Health
Tutorial 6: Practice Session PS6 Exploring Harmony of self with the body

UNIT III
Harmony in the Family and Society (6 lectures and 3 tutorials for practice session)
Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction
Lecture 14: 'Trust' – the Foundational Value in Relationship
Tutorial 7: Practice Session PS7 Exploring the Feeling of Trust
Lecture 15: 'Respect' – as the Right Evaluation
Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect
Lecture 16: Other Feelings, Justice in Human-to-Human Relationship
Lecture 17: Understanding Harmony in the Society
Lecture 18: Vision for the Universal Human Order
Tutorial 9: Practice Session PS9 Exploring Systems to fulfil Human Goa

UNIT IV
Harmony in the Nature/Existence (4 lectures and 2 tutorials for practice session)
 Lecture 19: Understanding Harmony in the Nature
Lecture 20: Interconnectedness, self-regulation and Mutual Fulfilment among
the Four Orders of Nature
Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature
Lecture 21: Realizing Existence as Co-existence at All Levels
Lecture 22: The Holistic Perception of Harmony in Existence
Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence

UNIT V
Implications of the Holistic Understanding – a Look at Professional Ethics (6 lectures and 3 tutorials for practice session)
Lecture 23: Natural Acceptance of Human Values
Lecture 24: Definitiveness of (Ethical) Human Conduct
Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct
Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and
Universal Human Order
Lecture 26: Competence in Professional Ethics
Tutorial 13: Practice Session PS13 Exploring Humanistic Models in Education
Lecture 27: Holistic Technologies, Production Systems and Management
Models-Typical Case Studies
Lecture 28: Strategies for Transition towards Value-based Life and Profession
Practice Sessions for UNIT I – Introduction to Value Education
PS1 Sharing about Oneself
PS2 Exploring Human Consciousness
PS3 Exploring Natural Acceptance
Practice Sessions for UNIT II – Harmony in the Human Being
PS4 Exploring the difference of Needs of self and body
PS5 Exploring Sources of Imagination in the self
PS6 Exploring Harmony of self with the body
Practice Sessions for UNIT III – Harmony in the Family and Society
PS7 Exploring the Feeling of Trust
PS8 Exploring the Feeling of Respect
PS9 Exploring Systems to fulfil Human Goal
Practice Sessions for UNIT IV – Harmony in the Nature (Existence)
PS10 Exploring the Four Orders of Nature
PS11 Exploring Co-existence in Existence
Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look at
Professional Ethics
PS12 Exploring Ethical Human Conduct
PS13 Exploring Humanistic Models in Education
PS14 Exploring Steps of Transition towards Universal Human Order

Textbooks and Teacher manuals:
   a. The Textbook
   R R Gaur, R Asthana, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
   b. The Teacher's Manual
   R R Gaur, R Asthana, G P Bagaria,Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2.

Reference Books:
1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj – PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad.
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

Mode of Conduct:
Lecture hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.
Tutorial hours are to be used for practice sessions.
While analyzing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements.
In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own self and do self-observation, self-reflection and selfexploration. Scenarios may be used to initiate discussion.
The student is encouraged to take up" ordinary" situations rather than" extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.
Tutorials (experiments or practical) are important for the course.
 The difference is that the laboratory is everyday life, and practical are how you behave and work in real life.
Depending on the nature of topics, worksheets, home assignment and/or activity are included.

The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.
It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content.
Additional content may be offered in separate, higher courses.
This course is to be taught by faculty from every teaching department, not exclusively by any one department.
Teacher preparation with a minimum exposure to at least one 8-day Faculty Development Program on Universal Human Values is deemed essential.

Online Resources

1. https://fdp-si.aicte-india.org/UHVII%20Class%20Notes%20&%20Handouts/UHV%20Handout%201-Introduction%20to%20Value%20Education.pdf
2. https://fdp-si.aicte-india.org/UHVII%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf
3. https://fdp-si.aicte-india.org/UHVII%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf
4. https://fdp-si.aicte-india.org/UHVII%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf

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II B.Tech - I Semester (ME)

23AME03   THERMODYNAMICS

Course Outcomes:
1. Explain the importance of thermodynamic properties related to conversion of heat energy into work.
2 Apply the Zeroeth and First Law of Thermodynamics.
3 Understand Second Law of Thermodynamics.
4. Analyze the Mollier charts, T-S and h-s diagrams, Steam calorimetry, Phase Transformations.
5. Evaluate the COP of refrigerating systems and properties, processes of psychrometry and sensible and latent heat loads.

UNIT I
Introduction: Basic Concepts: System, boundary, Surrounding, control volume, Universe, Types of Systems, Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process, Cycle – Reversibility – Quasi static Process, Irreversible Process, Causes of Irreversibility.

UNIT II
Energy in State and in Transition, Types, Work and Heat, Point and Path function. Zeroth Law of Thermodynamics – PMM-I, Joule's Experiment – First law of Thermodynamics and applications. Limitations of the First Law – Enthalpy, Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance.

UNIT III
Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM-II, Carnot's principle, Carnot cycle and its specialties, Thermodynamic scale of Temperature, Clausius Inequality, Entropy, Principle of Entropy Increase – Energy Equation, Availability and Irreversibility – Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations – Elementary Treatment of the Third Law of Thermodynamics

UNIT IV
Pure Substances, P-V-T- surfaces, T-S and h-s diagrams, Mollier Charts, Phase Transformations – Triple point at critical state properties during change of phase, Dryness Fraction – Clausius – Clapeyron Equation Property tables. Mollier charts – Various Thermodynamic processes and energy Transfer – Steam Calorimetry.

UNIT V
Introduction to Refrigeration: working of Air, Vapourcompression,VCR system Components, COP Refrigerants.
Introduction to Air Conditioning: Psychrometric properties & processes – characterization of sensible and latent heat loads – load concepts of SHF. Requirements of human comfort and concept of effective temperature- comfort chart – comfort air conditioning, and load calculations.

Textbooks:
1. P.K.Nag, Engineering Thermodynamics, 5/e, Tata McGraw Hill, 2013.
2. Claus Borgnakke Richard E. Sonntag, Fundamentals of Thermodynamics, 7/e, Wiley, 2009

Reference Books:

1. J.B. Jones, and R.E. Dugan, Engineering Thermodynamics, 1/e,Prentice Hall, 1995.
2. Y.A.Cengel&M.A.Boles ,Thermodynamics – An Engineering Approach, 7/e, McGraw Hill, 2010.
3. P.Chattopadhyay, Engineering Thermodynamics, 1/e, Oxford University Press, 2011.
4. CP Arora, Refrigeration and Air-conditioning, 4/e, McGraw Hill, 2021.

Online Learning Resources:

1. https://www.edx.org/learn/thermodynamics.
2. https://www.youtube.com/watch?v=7NI5P4KqrAs&t=1s
3. https://kp.kiit.ac.in/pdf_files/02/Study-Material_3rdSemester_Winter_2021_Mechanical-Engg.
4. Thermal-Engineering-1_AbhijitSamant.pdf https://www.coursera.org/learn/thermodynamics-intr

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II B.Tech - I Semester (ME)

23ACE08   MECHANICS OF SOLIDS

Course Outcomes:

1. Learn all the methods to analyze beams, columns, frames for normal, shear, and torsion stresses and to solve deflection problems in preparation for the design of such structural components.
2 Analyse beams and draw correct and complete shear and bending moment diagrams for beams.
3 Apply the concept of stress and strain to analyze and design structural members and machine parts under axial, shear and bending loads, and moments.
4. Model &Analyze the behavior of basic structural members subjected to various load.
5. Design and analysis of Industrial components like pressure vessels.

UNIT I
Simple Stresses & Strains : Elasticity and plasticity – Types of stresses & strains–Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio & volumetric strain – Bars of varying section – composite bars – Temperature stresses- Complex Stresses - Stresses on an inclined plane under different uniaxial and biaxial stress conditions - Principal planes and principal stresses - Mohr's circle - Relation between elastic constants, Strain energy – Resilience – Gradual, sudden, impact and shock loadings.

UNIT II
Shear Force and Bending Moment: Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, u.d.l, uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate ofloadingata section of a beam.

UNIT III
Flexural Stresses: Theory of simple bending, Derivation of bending equation, Determination of bending stresses – section modulus of rectangular, circular, I and T sections– Design of simple beam sections.
Shear Stresses: Derivation of formula – Shear stress distribution across various beams sections like rectangular, circular, triangular, I and T sections.

UNIT IV
Deflection of Beams: Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, UDL and UVL. Mohr's theorem and Moment area method – application to simple cases.
Torsion: Introduction-Derivation- Torsion of Circular shafts- Pure Shear-Transmission of power by circular shafts, Shafts in series, Shafts in parallel.

UNIT V
Thin and Thick Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in dia, and volume of thin cylinders– Thin spherical shells. Wire wound thin cylinders. Lame's equation – cylinders subjected to inside & outside pressures – compound cylinders.
COLUMNS: Buckling and Stability, Columns with Pinned ends, Columns with other support Conditions, Limitations of Euler's Formula, Rankine's Formula.

Textbooks:

1. GH Ryder,Strength of materials, Palgrave Macmillan publishers India Ltd, 1961.
2. B.C. Punmia,Strength of materials,10/e, Lakshmi publications Pvt.Ltd, New Delhi, 2018.

Reference Books:

1. Gere &Timoshenko,Mechanics of materials, 2/e, CBS publications, 2004.
2. U.C. Jindal, Strength of Materials, 2/e, Pearson Education, 2017.
3. Timoshenko, Strength of Materials Part – I& II, 3/e, CBS Publishers, 2004.
4. Andrew Pytel and Ferdinand L. Singer,Strength of Materials,4/e, Longman Pulications, 1990.
5. Popov, Mechanics of Solids, 2/e, New Pearson Education, 2015.

Online Learning Resources:

- https://onlinecourses.nptel.ac.in/noc19_ce18/preview.
- https://youtube/iY_ypychVNY?si=310htc4ksTQJ8Fv6.
- https://www.youtube.com/watch?v=WEy939Rkd_M&t=2s
- https://www.classcentral.com/course/swayam-strength-of-materials-iitm-184204
- https://www.coursera.org/learn/mechanics-1
- https://archive.nptel.ac.in/courses/112/107/112107146

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II B.Tech - I Semester (ME)

23AME04   MATERIAL SCIENCE & METALLURGY

Course Outcomes:

1. Understand the crystalline structure of different metals and study the stability of phases in different alloy systems.
2. Study the behavior of ferrous and non-ferrous metals and alloys and their application in different domains.
3. Understand the effect of heat treatment, addition of alloying elements on properties of ferrous metals.
4. Grasp the methods of making of metal powders and applications of powder metallurgy.
5. Comprehend the properties and applications of ceramic, composites and other advanced methods.

UNIT I
Structure of Metals and Constitution of alloys: Crystallization of metals, Packing Factor - SC, BCC, FCC& HCP-line density, plane density. Grain and grain boundaries, effect of grain boundaries–determination of grain size. Imperfections, Slip and Twinning. Necessity of alloying, types of solid solutions, Hume Rothay's rules, intermediate alloy phases, and electron compounds
Equilibrium Diagrams: Experimental methods of construction of equilibrium diagrams, Isomorphs alloy systems, equilibrium cooling and heating of alloys, Lever rule, coring miscibility gaps, eutectic systems, congruent melting intermediate phases, paratactic reaction. Transformations in the solid state – allotropy, eutectoid, peritectoidreactions, phase rule, relationship between equilibrium diagrams and properties of alloys. Study of binary phase diagrams such as Cu-Ni and Fe-Fe3C.

UNIT II
Ferrous metals and alloys: Structure and properties of White Cast iron, Malleable Cast iron, grey cast-iron, Spheroidal graphite cast-iron, Alloy cast-iron. Classification of steels, structure and properties of plain carbon steels, Low alloy steels, Hadfield manganese steels, tool and die steels. Non-ferrous Metals and Alloys: Structure and properties of Copper and its alloys, Aluminium and its alloys, Titanium and its alloys, Magnesium and its alloys, Super alloys.

UNIT III
Heat treatment of Steels: Effect of alloying elements on Fe-Fe3C system, annealing, normalizing, hardening, TTT diagrams, tempering, hardenability, surface - hardening methods, age hardening treatment, Cryogenic treatment.

UNIT IV
Powder Metallurgy: Basic processes- Methods of producing metal powders- milling atomization-Granulation-Reduction-Electrolytic Deposition. Compacting methods – Sintering - Methods of manufacturing sintered parts. Secondary operations, Applications of powder metallurgical products.

UNIT V
Ceramic and Advanced materials: Crystalline ceramics, glasses, cermets, abrasive materials, Classification of composites, manufacturing methods, particle reinforced composites, fiber reinforced composites, PMC, MMC, CMC and CCCs. Introduction to Nanomaterials and smart materials.

Textbooks:
1. S.H.Avner, Introduction to Physical Metallurgy, 2/e, Tata McGraw- Hill, 1997.
2. Donald R.Askeland, Essentials of Materials science and Engineering, 4/e, CL Engineering publications, 2018.

Reference Books:
1. Dr.V.D.kodgire, Material Science and Metallurgy, 39/e, Everest Publishing House, 2017.
2. V.Raghavan, Material Science and Engineering, 5/e, Prentice Hall of India, 2004.
3. William D. Callister Jr, Materials Science and Engineering: An Introduction, 8/e, John Wiley and Sons, 2009.
4. George E.Dieter, Mechanical Metallurgy, 3/e, McGraw-Hill, 2013.
5. Yip-Wah Chung, Introduction to Material Science and Engineering, 2/e, CRC Press, 2022.
6. A V K Suryanarayana, Material Science and Metallurgy, B S Publications, 2014.
7.. U. C. Jindal, Material Science and Metallurgy, 1/e, Pearson Publications, 2011.

Online Learning Resources:
- https://archive.nptel.ac.in/courses/113/106/113106032/
- https://www.edx.org/learn/mechanics/massachusetts-institute-of-technologymechanical-behavior-of-materials-part-3-time-dependent-behavior.
- https://www.youtube.com/watch?v=9Sf278j1GTU
- https://www.coursera.org/learn/fundamentals-of-materials-science
- https://www.coursera.org/learn/material-behavior.

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II B.Tech - I Semester (ME)

23ACE12   MECHANICS OF SOLIDS & MATERIAL SCIENCE LAB

Course Outcomes:
   1. Understand the stress strain behavior of different materials.
   2 Evaluate the hardness of different materials.
   3 Explain the relation between elastic constants and hardness of materials.
   4. Identify various microstructures of steels and cast irons.
   5. Evaluate hardness of treated and untreated steels.

NOTE: Any 6 experiments from each section A and B.

A) MECHANICSOFSOLIDSLAB:
1. Tensile test
2. Bending test on a) Simply supported beam b) Cantilever beam
3. Torsion test
4. Hardness test a) Brinell's hardness test b) Rockwell hardness test c) Vickers hardness test
5. Test on springs
6. Impact test a) Charpy test b) Izod test
7. Punch shear test
8. Liquid penetration test

B) MATERIAL SCIENCELAB:
 1. Preparation and study of the Microstructure of pure metals.
2. Preparation and study of the Microstructure of Mild steel, medium carbon steels, and High carbon steels.
3. Study of the Microstructures of Cast Irons.
4. Study of the Microstructures of Non-Ferrous alloys.
5. Study of the Microstructures of Heat treated steels.
6. Hardenability of steels by Jominy End Quench Test.

Virtual lab:
1. To investigate the principal stresses σa and σb at any given point of a structural element or machine component when it is in a state of plane stress.
(https://virtuallabs.github.io/exp-rockwell-hardness-experiment-iiith/objective.html)

2. To find the impact resistance of mild steel and cast iron.
(https://smnitk.vlabs.ac.in/exp/izod-impact-test).

3. To find the impact resistance of mild steel.
(https://sm-nitk.vlabs.ac.in/exp/charpyimpact-test/index.html)

4. To find the Rockwell hardness number of mild steel, cast iron, brass, aluminum and spring steel etc.
(https://sm-nitk.vlabs.ac.in/exp/rockwell-hardness-test)

5. To determine the indentation hardness of mild steel, brass, aluminum etc. using Vickers hardness testing machine.
 (https://sm-nitk.vlabs.ac.in/exp/vickers-hardnesstes

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II B.Tech - I Semester (ME)

23AME06   COMPUTER-AIDED MACHINE DRAWING

Course Outcomes:
1. Demonstrate the conventional representations of materials and machine components.
2 Model riveted, welded and key joints using CAD system.
3 Create solid models and sectional views of machine components
4. Generate solid models of machine parts and assemble them.
5. Translate 3D assemblies into 2D drawings.

The following are to be done by any 2D software package

Conventional representation of materials and components:
Detachable joints: Drawing of thread profiles, hexagonal and square-headed bolts and nuts, bolted joint with washer and locknut, stud joint, screw joint and foundation bolts.
Riveted joints: Drawing of rivet, lap joint, butt joint with single strap, single riveted, double riveted double strap joints.
Welded joints: Lap joint and T joint with fillet, butt joint with conventions.
Keys: Taper key, sunk taper key, round key, saddle key, feather key, woodruff key.
Couplings: rigid – Muff, flange; flexible – bushed pin-type flange coupling, universal coupling, Oldham's' coupling.

The following exercises are to be done by any 3D software package:

Sectional views:
Creating solid models of complex machine parts and sectional views.
Assembly drawings:(Any four of the following using solid model software)
Lathe tool post, tool head of shaping machine, tail-stock, machine vice, gate valve, carburetor, piston, connecting rod, eccentric, screw jack, plumber block, axle bearing, pipe vice, clamping device, Geneva cam, universal coupling.

Production drawing:
Representation of limits, fits and tolerances for mating parts. Use any four parts of above assembly drawings and prepare manufacturing drawing with dimensional and geometric tolerances.

Textbooks:
1. Machine Drawing byK.L.Narayana, P.Kannaiah and K.Venkat Reddy, New Age International Publishers, 3/e, 2014
2. 2 Machine drawing by N.Sideshwar, P. Kannaiah, V.V.S.Sastry, TMH Publishers. 2014.

Reference Books:
1. Cecil Jensen, Jay Helsel and Donald D.Voisinet, Computer Aided Engineering Drawing, Tata McGraw-Hill, NY, 2000.
2. James Barclay, Brain Griffiths, Engineering Drawing for Manufacture, Kogan Page Science, 2003.
3. N.D.Bhatt, Machine Drawing, Charotar Publishers, 50/e, 2014.

Online Learning Resources:

- https://eeedocs.wordpress.com/wp-content/uploads/2014/02/machinedrawing.pdf
- https://archive.nptel.ac.in/courses/112/105/112105294/
- https://www.youtube.com/watch?v=0bQkS3_3Fq

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II B.Tech - I Semester (ME)

23ACE07   EMBEDDED SYSTEMS & IoT

Course Outcomes:
1. Comprehend Microcontroller-Transducers Interface techniques.
2 Establish Serial Communication link with Arduino
3 Analyse basics of SPI interface.
4. Understand the concept of M2M (machine to machine) with necessary protocols and get awareness in implementation of distance sensor.
5. Realize the revolution of internet in mobile devices, cloud and sensor networks.

Embedded Systems Experiments: (Any 5 experiments from the following)
1. Measure Analog signal from Temperature Sensor.
2. Generate PWM output.
3. Drive single character generation on Hyper Terminal.
4. Drive a given string on Hyper Terminal.
5. Full duplex Link establishment using Hyper terminal.
6. Drive a given value on a 8 bit DAC consisting of SPI.
7. Drive Stepper motor using Analog GPIOs.
8. Drive Accelerometer and Display the readings on Hyper Terminal.
COMPONENTS/ BOARDS: 1. Arduino Duemilanove Board 2. Arduino Software ID

Text Books:
1. Embedded Systems Architecture- By Tammy Noergaard, Elsevier Publications, 2013.
2. Embedded Systems-By Shibu. K.V-Tata McGraw Hill Education Private Limited, 2013.
3. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley Publications, 2013.
4. Embedded Systems-Lyla B.Das-Pearson Publications,2013.

Internet of Things Experiments: (Any 5 experiments from the following)
1. Getting started with Raspberry Pi, Install Raspian on your SD card.
2. Python-based IDE (integrated development environments) for the Raspberry Pi and how to trace
3. and debug Python code on the device.
4. Using Raspberry pi a. Calculate the distance using distance sensor. b. Basic LED functionality.
5. Raspberry Pi interact with online services through the use of public APIs and SDKs.
6. Study and Install IDE of Arduino and different types of Arduino.
7. Study and Implement Zigbee Protocol using Arduino / Raspberry Pi.
8. Calculate the distance using distance sensor Using Arduino.
9. Basic LED functionality Using Arduino and Node MCU.
10. Calculate the moisture content in the soil using Arduino and Node MCU.
11. Calculate the distance using distance sensor Using Node MCU.
12. Basic LED functionality Using Node MCU

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II B.Tech - I Semester (ME)

23ACS09   PYTHON PROGRAMMING (SKILL ENHANCEMENT COURSE)

Course Outcomes:
1. Classify data structures of Python.
2. Apply Python programming concepts to solve a variety of computational problems.
3. Understand the principles of object-oriented programming (OOP) in Python, including classes, objects, inheritance, polymorphism, and encapsulation, and apply them to design and implement Python programs.
4. Become proficient in using commonly used Python libraries and frameworks such as JSON, XML, NumPy, pandas.
5. Exhibit competence in implementing and manipulating fundamental data structures such as lists, tuples, sets, dictionaries.
6. Propose new solutions to computational problems.

UNIT I
History of Python Programming Language, Thrust Areas of Python, Installing Anaconda Python Distribution, Installing and Using Jupiter Notebook.
Parts of Python Programming Language: Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, the type () Function and Is Operator, Dynamic and Strongly Typed Language.
Control Flow Statements: if statement, if-else statement, if...elif…else, Nested if statement, while Loop, for Loop, continue and break Statements, Catching Exceptions Using try and except Statement.

Sample Experiments:
1. Write a program to find the largest element among three Numbers.
2. Write a Program to display all prime numbers within an interval
3. Write a program to swap two numbers without using a temporary variable.
4. Demonstrate the following Operators in Python with suitable examples.
i) Arithmetic Operators ii) Relational Operators iii) Assignment Operatorsiv) Logical
Operators v) Bit wise Operators vi) Ternary Operator vii) Membership Operators
viii) Identity Operators
5. Write a program to add and multiply complex numbers
6. Write a program to print multiplication table of a given number.

UNIT II
Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the function, return Statement and void Function, Scope and Lifetime of Variables. Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.
Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings.
Lists: Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, del Statement.

Sample Experiments:
7. Write a program to define a function with multiple return values.
8. Write a program to define a function using default arguments.
9. Write a program to find the length of the string without using any library functions.
10. Write a program to check if the substring is present in a given string or not.
11. Write a program to perform the given operations on a list:
i. Addition ii. Insertion iii. slicing

UNIT III
Dictionaries: Creating Dictionary, Accessing and Modifying key: value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, del Statement.
Tuples and Sets: Creating Tuples, Basic Tuple Operations, tuple () Function, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, using zip () Function, Sets, Set Methods, Frozen set.

Sample Experiments:
13. Write a program to create tuples (name, age, address, college) for at least two members
and concatenate the tuples and print the concatenated tuples.
14. Write a program to count the number of vowels in a string (No control flow allowed).
15. Write a program to check if a given key exists in a dictionary or not.
16. Write a program to add a new key-value pair to an existing dictionary.
17. Write a program to sum all the items in a given dictionary

UNIT IV
Files: Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, Pickle Module, Reading and Writing CSV Files, Python os and so. path Modules.
Object-Oriented Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, Constructor Method, Classes with Multiple Objects, Class Attributes Vs Data Attributes, Encapsulation, Inheritance, Polymorphism.

Sample Experiments:
18. Write a program to sort words in a file and put them in another file. The output file should have only lower-case words, so any upper-case words from source must be lowered.
19. Python program to print each line of a file in reverse order.
20. Python program to compute the number of characters, words and lines in a file.
21. Write a program to create, display, append, insert and reverse the order of the items in the array.
22. Write a program to add, transpose and multiply two matrices.
23. Write a Python program to create a class that represents a shape. Include methods to calculate its area and perimeter. Implement subclasses for different shapes like circle, triangle, and square.

UNIT V
Introduction to Data Science: Functional Programming, JSON and XML in Python, NumPy with Python, Pandas.

Sample Experiments:
24. Python program to check whether a JSON string contains complex object or not.
25. Python Program to demonstrate NumPy arrays creation using array () function.
26. Python program to demonstrate use of ndim, shape, size, dtype.
27. Python program to demonstrate basic slicing, integer and Boolean indexing.
28. Python program to find min, max, sum, cumulative sum of array
29. Create a dictionary with at least five keys and each key represent value as a list where this list contains at least ten values and convert this dictionary as a pandas data frame and explore the data through the data frame as follows:

a) Apply head () function to the pandas data frame
b) Perform various data selection operations on Data Frame
30. Select any two columns from the above data frame, and observe the change in one
attribute with respect to other attribute with scatter and plot operations in matplotlibe.

Text Books:
1. ArsheepBahga&Vijay Madisetti, Internet of Things - A Hands-on Approach, 1/e, Orient Blackswan Private Limited - New Delhi, 2015.
2. Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015.
3. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014.

Reference Books:
1. Gowrishankar S, Veena A., Introduction to Python Programming, CRC Press. 2. Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2ndEdition, Pearson, 2024 3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.
2. Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015.
3. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014.

Online Learning Resources/Virtual Labs:
1. https://www.coursera.org/learn/python-for-applied-data-science-ai
2. https://www.coursera.org/learn/python?specialization=python#syllabus

Online Learning Sources

1.https://onlinecourses.nptel.ac.in/noc20_ee98/preview

2.https://archive.nptel.ac.in/courses/108/105/108105057/

3.Virtual Labs - http://vlabs.iitkgp.ac.in/rtes/

4. Virtual Labs -https://cse02-iiith.vlabs.ac.in/

5. Virtual Labs - https://iotvirtuallab.github.io/vlab/Experiments/index.html

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II B.Tech - II Semester (ME)

23AHS18   ENVIRONMENTAL SCIENCE

UNIT I
Multidisciplinary Nature of Environmental Studies: – Definition, Scope and Importance – Need for Public Awareness.
Natural Resources : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resource.

UNIT II
Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:
 a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem.
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)
Biodiversity and its Conservation : Introduction 0 Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT III
Environmental Pollution: Definition, Cause, effects and control measures of :
 a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT IV
Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT V
Human Population and the Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.
Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted Site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc.

Text Books:
   1. Textbook of Environmental Studies for Undergraduate Courses Erach Bharucha for University Grants Commission, Universities Press.
   2. Palaniswamy, "Environmental Studies", Pearson education
   3. S.Azeem Unnisa, "Environmental Studies" Academic Publishing Company
   4. K.Raghavan Nambiar, "Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus", Scitech Publications (India), Pvt. Ltd.

Reference Books:
   1. Deeksha Dave and E.Sai Baba Reddy, "Textbook of Environmental Science", Cengage Publications.
   2. M.Anji Reddy, "Text book of Environmental Sciences and Technology", BS Publication.
   3. J.P.Sharma, Comprehensive Environmental studies, Laxmi publications.
   4. J. Glynn Henry and Gary W. Heinke, "Environmental Sciences and Engineering", Prentice hall of India Private limited
   5. G.R.Chatwal, "A Text Book of Environmental Studies" Himalaya Publishing House
   6. Gilbert M. Masters and Wendell P. Ela, "Introduction to Environmental Engineering and Science, Prentice hall of India Private limited.

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II B.Tech - II Semester (ME)

23AME07   INDUSTRIAL MANAGEMENT

Course Outcomes:
1. Learn about how to design the optimal layout.
2. Demonstrate work study methods.
3. Explain Quality Control techniques.
4. Discuss the financial management aspects.
5. Understand the human resource management methods.

UNIT I
Introduction: Definition of industrial engineering (I.E), development, applications, role of an industrial engineer, Quantitative tools of IE and productivity measurement. Concepts of management, importance, function so management, scientific management, Taylor's principles, Fayal's principles of management.
Plant layout: Factors governing plant location, types of production layouts, advantages and disadvantages of process layout and product layout, applications, quantitative techniques for optimal design of layouts.

UNIT II
Work Study: Importance, types of production, applications, work study, method study and Time study, work sampling, PMTS, micromotion study, rating techniques, MTM, work factor system, principles of Ergonomics, flow process charts, string diagrams and Therbligs.

UNIT III
Statistical Quality Control: Quality control, Queuing assurance and its importance, SQC, attribute sampling inspection with single and double sampling, Control charts – X and R –charts X and S charts and their applications, simple numerical examples.
Total Quality Management: Elements of TQM – Continuous Improvement – zero defect concept, quality circles, implementation, applications, ISO quality systems. Six Sigma– definition, basic concepts.

UNIT IV
Financial Management: Scope and nature of financial management, Sources of finance, Management of working capital, estimation of working capital requirements, budget and budgetary control, Capital budgeting – Nature of Investment Decisions– Investment Evaluation criteria-NPV, IRR, PI, Payback Period, and ARR, numerical problems.

UNIT V
Human Resource Management: Concept of human resource management, per sonnet management and industrial relations, functions of personnel management, Job evaluation, its importance and types, merit rating, quantitative methods, wage incentive plans, and types.
Value Analysis: Value engineering, implementation procedure, enterprise resource planning and supply chain management.

Text Books:
  1. O. P Khanna, Industrial Engineering and Management, Dhanpat Rai Publications (P)Ltd.
  2. Martand Telsang, Industrial Engineering and Production Management, S. Chand & Company Ltd. New Delhi.

Reference Books:
  1. Bhattacharya DK, Industrial Management, S.Chand, publishers.
   2. J.G Monks, Operations Management, 3/e, McGraw Hill Publishers.
  3. T.R. Banga, S.C. Sharma, N. K. Agarwal, Industrial Engineering and Management Science, Khanna Publishers. 4. Koontz O'Donnell, Principles of Management, McGraw Hill Publishers.
  5. R.C. Gupta, Statistical Quality Control, Khanna Publishers.
  6. NVS Raju, Industrial Engineering and Management, Cengage India Private Limited.

Online Learning Sources
- https://onlinecourses.nptel.ac.in/noc21_me15/preview
- https://onlinecourses.nptel.ac.in/noc20_mg43/preview
- https://www.edx.org/learn/industrial-engineering
- https://youtube.com/playlist?list=PL299B5CC87110A6E7&si=TghLCbEobuxjEaXi
- https://youtube.com/playlist?list=PLbjTnjt5Gkl0z3OHOGK5RB9mvNYvnImW&si=oaX_5RG69hS3v2ll

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

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II B.Tech - II Semester (ME)

23AHS19   COMPLEX VARIABLES, PROBABILITY AND STATISTICS

Course Outcomes:
1. Analyze limit, continuity and differentiation of functions of complex variables and Understand Cauchy-Riemann equations, analytic functions and various properties of analytic functions.
2. Understand Cauchy theorem, Cauchy integral formulas and apply these to evaluate complex contour integrals. Classify singularities and poles; find residues and evaluate complex integrals using the residue theorem.
3. Apply Probability theory to find the chances of happening of events.
4 Understand various probability distributions and calculate their statistical constants.

UNIT I
Complex Variable – Differentiation
Introduction to functions of complex variable-concept of Limit & continuity- Differentiation, Cauchy-Riemann equations, analytic functions harmonic functions, finding harmonic conjugate-construction of analytic function by Milne Thomson method.

UNIT II
Complex Variable – Integration
Line Integral-Contour integration, Cauchy's integral theorem (Simple Case), Cauchy Integral formula, Power series expansions: Taylor's series, zeros of analytic functions, singularities, Laurent's series, Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine.

UNIT III
Probability theory
Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

UNIT IV
Random variables & Distributions
Random variables (discrete and continuous), probability density functions, properties, mathematical expectation Probability distribution - Binomial, Poisson approximation to the binomial distribution, Normal distribution and their properties.

UNIT V
Estimation and Testing of hypothesis, large sample tests
Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test. Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems.

Text Books:
1. B.S. Grewal, Higher Engineering Mathematics, KhannaPublishers,2017, 44th Edition.
2. Miller and Freunds, Probability and Statistics for Engineers,7/e, Pearson, 2008.

Reference Books:

1. R.K. JainandS.R.K. Iyengar, Advanced Engineering Mathematics, Alpha Science Internatio nalLtd.,2021 5th Edition (9th reprint).

2. B.V. Ramana, Higher Engineering Mathematics, Mc Graw Hill publishers

3. W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968.

Online Learning Resources:

1. https://onlinecourses.nptel.ac.in/noc20_ma50/preview
2. https://archive.nptel.ac.in/courses/111/106/111106111

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II B.Tech - II Semester (ME)

23AME08   MANUFACTURING PROCESSES

Course Outcomes:
1. Design the patterns and core boxes for metal casting processes.
2. Design the patterns and core boxes for metal casting processes.
3. Demonstrate the different types of bulk forming processes
4. Understand sheet metal forming processes.
5. Learn about the different types of additive manufacturing processes

UNIT I
Casting: Steps involved in making a casting – Advantage of casting and its applications. Patterns and Pattern making – Types of patterns – Materials used for patterns, pattern allowances and their construction, Molding, different types of cores, Principles of Gating, Risers, casting design considerations. Methods of melting and types of furnaces, Solidification of castings and casting defects- causes and remedies. Basic principles and applications of special casting processes - Centrifugal casting, Die casting, Investment casting and shell molding.

UNIT II
Welding: Classification of welding processes, types of welded joints and their characteristics, Gas welding, Different types of flames and uses, Oxy – Acetylene Gas cutting. Basic principles of Arc welding, power characteristics, Manual metal arc welding, submerged arc welding, TIG & MIG welding. Electro–slag welding. Resistance welding, Friction welding, Friction stir welding, Forge welding, Explosive welding; Thermit welding, Plasma Arc welding, Laser welding, electron beam welding, Soldering &Brazing. Heat affected zones in welding; pre & post heating, welding defects –causes and remedies.

UNIT III
Bulk Forming: Plastic deformation in metals and alloys-recovery, recrystallization and grain growth. Hot working and Cold Working-Strain hardening and Annealing. Bulk forming processes: Forging-Types of Forging, forging defects and remedies; Rolling – fundamentals, types of rolling mills and products, Forces in rolling and power requirements. Extrusion and its characteristics. Types of extrusion, Impact extrusion, Hydrostatic extrusion; Wire drawing and Tube drawing.

UNIT IV
Sheet metal Forming: Blanking and piercing, Forces and power requirement in these operations, Deep drawing, Stretch forming, Bending, Spring back and its remedies, Coining, Spinning, Types of presses and press tools. High energy rate forming processes: Principles of explosive forming, electromagnetic forming, Electrohydraulic forming, rubber pad forming, advantages and limitations.

UNIT V
Additive manufacturing: Steps in Additive Manufacturing (AM), Classification of AM processes, Advantages of AM, and types of materials for AM, VAT photo polymerization AM Processes, Extrusion - Based AM Processes, Powder Bed Fusion AM Processes, Direct Energy Deposition AM Processes, Post Processing of AM Parts, Applications.

Text Books:

1. Kalpakjain S and Steven R Schmid, Manufacturing Processes for Engineering Materials, 5/e, Pearson Publications, 2007.
2. P.N. Rao, Manufacturing Technology -Vol I, 5/e, McGraw Hill Education, 2018.

Reference Books:

1. A.Ghosh & A.K.Malik, Manufacturing Science, East West Press Pvt. Ltd, 2010.
2. Lindberg and Roy, Processes and materials of manufacture, 4/e, Prentice Hall India Learning Private Limited, 1990.
3. R.K. Jain, Production Technology, Khanna Publishers, 2022.
4. Sharma P.C., A Text book of Production Technology, 8/e, S Chand Publishing, 2014.
5. H.S. Shaun, Manufacturing Processes, 1/e, Pearson Publishers, 2012.
6. WAJ Chapman, Workshop Technology, 5/e, CBS Publishers & Distributors Pvt. Ltd, 2001.
7. Hindustan Machine Tools, Production Technology, Tata McGraw Hill Publishers, 2017.
8. Ian Gibson, David W Rosen, Brent Stucker., Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing, 2/e, Springer, 2015

Online Learning Resources:

1. https://www.edx.org/learn/manufacturing/massachusetts-institute-of-technologyfundamentals-of-manufacturing-processes
2. https://onlinecourses.nptel.ac.in/noc21_me81/preview
3. www.coursera.org/learn/introduction-to-additive-manufacturing-processessera
4. https://archive.nptel.ac.in/courses/112/103/112103263/
5. https://elearn.nptel.ac.in/shop/nptel/principles-of-metal-formingtechnology/?v=c86ee0d9d7ed

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II B.Tech - II Semester (ME)

23ACE17   FLUIDMECHANICS & HYDRAULIC MACHINES

Course Outcomes:
1. Understand the basic concepts of fluid properties.
2. Estimate the mechanics of fluids in static and dynamic conditions.
3. Apply the Boundary layer theory, flow separation and dimensional analysis.
4. Estimate the hydrodynamic forces of jet on vanes in different positions.
5. Understand the workingPrinciplesandperformanceevaluationofhydraulicpumpandturbine.

UNIT I
Fluid statics: Dimensions and units: physical properties of fluids - specific gravity, viscosity and itS significance, surface tension, capillarity, vapor pressure. Atmospheric, gauge and vacuum pressure, Measurement of pressure – Manometers - Piezometer, U-tube, inverted and differential manometers. Pascal's & hydrostatic laws.
Buoyancy and floatation: Meta center, stability of floating body. Submerged bodies. Calculation of metacenter height. Stability analysis and applications.

UNIT II
Fluid kinematics: Introduction, flow types. Equation of continuity for one dimensional flow, circulation and vorticity, Stream line, path line and streak lines and stream tube. Stream function and velocity potential function, differences and relation between them. Condition for irrational flow, flow net, source and sink, doublet and vortex flow.
Fluid dynamics: surface and body forces –Euler's and Bernoulli's equations for flow along a streamline, momentum equation and its applications, force on pipe bend.
Closed conduit flow: Reynold's experiment- Darcy Weisbach equation- Minor losses in pipes-pipesinseriesandpipesinparallel-totalenergyline-hydraulicgradientline.

UNIT III
Boundary Layer Theory: Introduction, momentum integral equation, displacement, momentum and energy thickness, separation of boundary layer, control of flow separation, Stream lined body, Bluff body and its applications, basic concepts of velocity profiles.
Dimensional Analysis: Dimensions and Units, Dimensional Homogeneity, Non dimensionalization of equations, Method of repeating variables and Buckingham Pi Theorem.

UNIT IV
Basics of turbo machinery: hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jets tricking centrally and at tip, velocity diagrams, work done a deficiency, flow Over radial vanes.
Hydraulic Turbines: classification f turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies, hydraulic design – draft tube-theory-functions and efficiency.

UNIT V
Performance of hydraulic turbines: Geometric similarity, Unit and specific quantities, characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer. Hydraulic systems- hydraulic ram, hydraulic lift, hydraulic coupling. Fluidics – amplifiers, sensors and oscillators. Advantages, limitations and applications.

Centrifugal pumps: classification, working, work done – monomeric head- losses and efficiencies-specific speed- pumps in series and parallel-performance characteristic curves, cavitation & NPSH.

Reciprocating pumps: Working, Discharge, slip, Indicator diagram.

Text Books:

1. Y.A. Cengel, J.M. Cimbala, Fluid Mechanics, Fundamentals and Applications,6/e, McGraw Hill Publications, 2019.

2. Dixon, Fluid Mechanics and Thermodynamics of Turbomachinery,7/e, Elsevier Publishers, 2014

Reference Books:

1. P N Modi and S M Seth, Hydraulics & Fluid Mechanics including Hydraulics Machines, Standard Book House, 2017.

2. RK Bansal, Fluid Mechanics and Hydraulic Machines, 10/e, Laxmi Publication s(P)Ltd, 2019.

3. Rajput, Fluid Mechanics and Hydraulic Machines, S Chand & Company, 2016.

4. D.S. Kumar, Fluid Mechanics and Fluid Power Engineering, S K Kataria &Sons, 2013.

5. D.Rama Durgaiah,FluidMechanicsandMachinery,1/e, New Age International, 2002.

Online Learning Resources:

1. https://archive.nptel.ac.in/courses/112/105/112105206/
2. https://archive.nptel.ac.in/courses/112/104/112104118/
3. https://www.edx.org/learn/fluid-mechanics
4. https://onlinecourses.nptel.ac.in/noc20_ce30/previewnptel.ac.in
5. www.coursera.org/learn/fluid-powerer

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II B.Tech - II Semester (ME)

23AME09   THEORY OF MACHINES

Course Outcomes:
1. Understand different mechanisms and their inversions.
2. Calculate velocity and acceleration of different links in a mechanism.
3. Apply the effects of gyroscopic couple in ships, aero planes and road vehicles.
4. Evaluate unbalance mass in rotating machines.
5. Analyze free and forced vibrations of single degree freedom systems.

UNIT I
Simple Mechanisms: Classification of mechanisms – Basic kinematic concepts and definitions – Degree of freedom, mobility – Grashof's law, kinematic inversions of four bar chain and slider crank chains- Limit positions – Mechanical advantage- Transmission angle- Description of some common mechanisms- Quick return mechanism, straight line mechanisms – Universal Joint – Rocker mechanisms.

UNIT II
Plane and motion analysis: Displacement, velocity and acceleration analysis of simple mechanisms, graphical velocity analysis using instantaneous centers, velocity and acceleration analysis using loop closure equations – kinematic analysis of simple mechanisms – slider crank mechanism dynamics – Coincident points – Coriolis component of acceleration.

UNIT III
Gyroscope & Gear Profile
Gyroscope: Principle of gyroscope, gyroscopic effect in an aero plane, ship, car and two wheeler, simple problems
Gear Profile: Involute and cycloidal gear profiles, gear parameters, fundamental law of gearing and conjugate action, spur gear contact ratio and interference/undercutting – helical, bevel, worm, rack & pinion gears, epicyclic and regular gear train kinematics.

UNIT IV
Balancing of Rotating masses & Cams
Balancing of Rotating masses: Need for balancing, balancing of single mass and several masses in different planes, using analytical and graphical methods.
Cams: Classification of cams and followers- Terminology and definitions – Displacement diagrams –Uniform velocity, parabolic, simple harmonic and cycloidal motions – derivatives of follower motions- specified contour cams- circular and tangent cams –pressure angle and undercutting.

UNIT V
Vibrations & Turning Moment Diagrams and Flywheels
Vibrations: Introduction, degree of freedom, types of vibrations, free natural vibrations, Newton method and energy method for single degree of freedom. Damped vibrations- under damped, critically damped; and over damped systems, forced vibrations with and without damping in single degree of freedom; Vibration isolation and transmissibility.
Turning Moment Diagrams and Flywheels: Turning moment diagrams for steam engine, I.C engine and Multi Cylinder Engine. Crank effort – coefficient of fluctuation of energy, coefficient of fluctuation of speed – Fly Wheel and their design, fly wheels for punching press.

Text Books:

1. S.S. Rattan, Theory of Machines, 4/e, Tata Mc-Graw Hill, 2014.
2. P.L. Ballaney, Theory of Machines & Mechanisms, 25/e, Khanna Publishers, Delhi, 2003.

Reference Books:

1. F. Haidery, Dynamics of Machines, 5/e, NiraliPrakashan, Pune, 2003.
2. J.E.Shigley, Theory of Machines and Mechanisms, 4/e, Oxford, 2014.
3. G.K.Groover, Mechanical Vibrations, 8/e, Nemchand Bros, 2009.
4. Norton, R.L., Design of Machinery – An Introduction to Synthesis and Analysis of Mechanisms and Machines, 2/e, McGraw Hill, New York, 2000.
5. William T. Thomson, Theory of vibration with applications, 4/e, Englewood Cliffs, N.J.: Prentice Hall, 1993.

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II B.Tech - II Semester (ME)

23ACE20   FLUID MECHANICS & HYDRAULIC MACHINERY LAB

Course Outcomes:
1. Demonstrate the devices used for measuring flow.
2. Compute major losses in pipes.
3. Illustrate the operating parameters of turbines.
4. Explain the working of different types of pumps
5. Explain the devices used for measuring flow

List of Experiments
1. Impact of jets on Vanes.
2. Performance Test on Pelton Wheel.
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Multi Stage Centrifugal Pump.
7. Performance Test on Reciprocating Pump.
8. Calibration of Venturi meter.
9. Calibration of Orifice meter.
10. Determination of friction factor for a given pipeline.
11. Determination of loss of head due to sudden contraction in a pipeline.
12. Turbine flow meter.

Virtual Lab:
1. To study different patterns of a flow through a pipe and correlate them with the Reynolds number of the flow.
(https://me.iitp.ac.in/Virtual-FluidLaboratory/reynolds/introduction.html)
2. To calculate Total Energy at different points of venture meter.
(https://me.iitp.ac.in/Virtual-Fluid-Laboratory/bernoulli/introduction.html).
3. To calculate the flow (or point) velocity at center of the given tube using different flow rates.
 (https://me.iitp.ac.in/Virtual-FluidLaboratory/pitot/introduction.html)
4. To determine the hydrostatic force on a plane surface under partial submerge and full submerge condition.
(https://me.iitp.ac.in/Virtual-FluidLaboratory/cop/introduction.html).
5. To determine the discharge coefficient of a triangular notch.
(https://me.iitp.ac.in/Virtual-Fluid-Laboratory/notch/introduction.html)
6.To determine the coefficient of impact of jet on vanes.
    (https://fmnitk.vlabs.ac.in/exp/impact-of-jet).
7.To determine friction in pipes.
    (https://fm-nitk.vlabs.ac.in/exp/friction-inpipes/index.html).

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II B.Tech - II Semester (ME)

23AME10   MANUFACTURING PROCESSESLAB

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Course Outcomes:
1. Make moulds for sand casting.
2. Fabricate different types of components using various manufacturing techniques.
3. Adapt unconventional manufacturing methods.
4. Develop Different Weld joints
5. Explain different types of 3d Printing techniques.

List of Experiments
1. Design and making of pattern
i. Single piece pattern
ii. Split pattern
2. Sand properties testing
i. Sieve analysis (dry sand)
ii. Clay content test
iii. Moisture content test
iv. Strength test (Compression test & Shear test)
v. Permeability test
3. Mould preparation
i. Straight pipe
ii. Bent pipe
iii. Dumble
iv. Gear blank
4. Gas cutting and welding
5. Manual metal arc welding
i. Lap joint
ii. Butt joint
6. Injection Molding
7. Blow Molding
8. Simple models using sheet metal operations
9. Study of deep drawing and extrusion operations
10. To make weldments using TIG/MIG welding
11. To weld using Spot welding machine
12. To join using Brazing and Soldering
13. To make simple parts on a 3D printing machine
14. Demonstration of metal casting.

Virtual Lab:
1. To study and observe various stages of casting through demonstration of casting process.
(https://virtual-labs.github.io/exp-sand-casting-processdei/theory.html)
  2To weld and cut metals using an oxyacetylene welding setup.
  (https://virtuallabs.github.io/exp-gas-cutting-processes-iitkgp/index.html).
3. To simulate Fused deposition modelling process (FDM)
 (https://3dpdei.vlabs.ac.in/exp/simulation-modelling-process)

4. https://altair.com/inspire-mold/
5. https://virtual-labs.github.io/exp-simulation-cartesian-system-dei/theory.htm

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II B.Tech - II Semester (ME)

23AHS20   SOFT SKILLS

Course Outcomes:
1. List out various elements of soft skills
2. Describe methods for building professional image
3. Apply critical thinking skills in problem solving
4. Analyse the needs of an individual and team for well-being
5. Assess the situation and take necessary decisions
6. Create a productive workplace atmosphere using social and work-life skills ensuring personal and emotional well-being.

UNIT I
Soft Skills & Communication Skills
Soft Skills - Introduction, Need - Mastering Techniques of Soft Skills – Communication Skills - Significance, process, types - Barriers of communication - Improving techniques.

Activities:
Intrapersonal Skills- Narration about self- strengths and weaknesses- clarity of thought – self-expression – articulating with felicity.
(The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes and literary sources)
Interpersonal Skills- Group Discussion – Debate – Team Tasks - Book and film Reviews by groups - Group leader presenting views (non- controversial and secular) on contemporary issues or on a given topic.
Verbal Communication- Oral Presentations- Extempore- brief addresses and speeches convincing- negotiating- agreeing and disagreeing with professional grace.
Non-verbal communication – Public speaking – Mock interviews – presentations with an objective to identify non- verbal clues and remedy the lapses on observation.

UNIT II
Critical Thinking
Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open mindedness – Creative Thinking - Positive thinking - Reflection.

Activities:
Gathering information and statistics on a topic - sequencing – assorting – reasoning – critiquing issues –placing the problem – finding the root cause - seeking viable solution – judging with rationale – evaluating the views of others - Case Study, Story Analysis.

UNIT III
Problem Solving & Decision Making
Meaning & features of Problem Solving – Managing Conflict – Conflict resolution – Team building - Effective decision making in teams – Methods & Styles.

Activities:

Placing a problem which involves conflict of interests, choice and views – formulating the problem – exploring solutions by proper reasoning – Discussion on important professional, career and organizational decisions and initiate debate on the appropriateness of the decision. Case Study & Group Discussion

UNIT IV
Emotional Intelligence & Stress Management

Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – Self-Regulation – Stress factors – Controlling Stress – Tips.

Activities:

Providing situations for the participants to express emotions such as happiness, enthusiasm, gratitude, sympathy, and confidence, compassion in the form of written or oral presentations. Providing opportunities for the participants to narrate certain crisis and stress –ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates.

UNIT V
Corporate Etiquette

Etiquette- Introduction, concept, significance - Corporate etiquette - meaning, modern etiquette, benefits - Global and local culture sensitivity - Gender Sensitivity - Etiquette in interaction- Cell phone etiquette - Dining etiquette - Netiquette - Job interview etiquette - Corporate grooming tips -Overcoming challenges.

Activities

Providing situations to take part in the Role Plays where the students will learn about bad and good manners and etiquette - Group Activities to showcase gender sensitivity, dining etiquette etc. - Conducting mock job interviews - Case Study - Business Etiquette Games.

NOTE-:

1. The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes, epics, scriptures, autobiographies and literary sources which bear true relevance to the prescribed skill.
2. Case studies may be given wherever feasible for example for Decision Making- The decision of King Lear.

Text Books:

1. Mitra Barun K, Personality Development and Soft Skills, Oxford University Press, Pap/Cdr edition 2012 2. Dr Shikha Kapoor, Personality Development and Soft Skills: Preparing for Tomorrow, I K International Publishing House, 2018.

Reference Books:

1. Sharma, Prashant, Soft Skills: Personality Development for Life Success, BPB Publications 2018.
2. Alex K, Soft Skills S.Chand& Co, 2012 (Revised edition)
3. Gajendra Singh Chauhan & Sangeetha Sharma, Soft Skills: An Integrated Approach to Maximise Personality Published by Wiley, 2013
4. Pillai, Sabina & Fernandez Agna, Soft Skills and Employability Skills, Cambridge University Press, 2018
5.Soft Skills for a Big Impact (English, Paperback, Renu Shorey) Publisher: Notion Press
6. Dr. Rajiv Kumar Jain, Dr. Usha Jain, Life Skills (Paperback English) Publisher: Vayu Education of India, 2014.

Online Learning Resources:
1. https://youtu.be/DUlsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q
2. https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KlJ
3. https://youtu.be/-Y-R9hDl7lU
4. https://youtu.be/gkLsn4ddmTs
5. https://youtu.be/2bf9K2rRWwo
6. https://youtu.be/FchfE3c2jzc
7. https://onlinecourses.nptel.ac.in/noc24_hs15/preview
8. https://onlinecourses.nptel.ac.in/noc21_hs76/preview

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II B.Tech - II Semester (ME)

23AMB05   DESIGN THINKING & INNOVATION

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Course Outcomes:
1. Define the concepts related to design thinking.
2. Explain the fundamentals of Design Thinking and innovation.
3. Apply the design thinking techniques for solving problems in various sectors.
4. Analyse to work in a multidisciplinary environment.
5. Evaluate the value of creativity.
6. Formulate specific problem statements of real time issues.

UNIT I
Introduction to Design Thinking
Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.

UNIT II
Design Thinking Process
Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brainstorming, product development.

Activity: Every student presents their idea in three minutes, every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

UNIT III
Innovation
Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations- Creativity to Innovation- Teams for innovation- Measuring the impact and value of creativity.

Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

UNIT IV
Product Design
Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications- Innovation towards product design- Case studies
Activity: Importance of modelling, how to set specifications, Explaining their own product design.

UNIT V
Design Thinking in Business Processes
Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs Design thinking for Startups- Defining and testing Business Models and Business Cases Developing & testing prototypes.

Activity: How to market our own product, About maintenance, Reliability and plan for startup.

Text Books:
1. Tim Brown,Change by design, Harper Bollins (2009)
2. Idris Mootee, Design Thinking for Strategic Innovation, 2013, John Wiley & Sons.

Reference Books:
1. David Lee, Design Thinking in the Classroom, Ulysses press
2. Shrutin N Shetty, Design the Future, Norton Press
3. William Lidwell,Universal Principles of Design- Kritinaholden, Jill Butter.
4. Chesbrough.H, The Era of Open Innovation – 2013.

Online Learning Resources:
- https://nptel.ac.in/courses/110/106/110106124/
- https://nptel.ac.in/courses/109/104/109104109/
- https://swayam.gov.in/nd1_noc19_mg60/preview

<div align="center">**COMMUNITY SERVICE PROJECT**
……Experiential learning through community engagement</div>

Introduction
- Community Service Project is an experiential learning strategy that integrates meaningful community service with instruction, participation, learning and community development.
- Community Service Project involves students in community development and service activities and applies the experience to personal and academic development.
- Community Service Project is meant to link the community with the college for mutual benefit. The community will benefit with the focused contribution of the college students for the village/ local development. The college finds an opportunity to develop social sensibility and responsibility among students and emerge as a socially responsible institution.

Objective
Community Service Project should be an integral part of the curriculum, as an alternative to the 2 months of Summer Internships / Apprenticeships / On the Job Training, whenever there is an exigency when students cannot pursue their summer internships. The specific objectives are;

- To sensitize the students to the living conditions of the people who are around them,
- To help students to realize the stark realities of society.
- To bring about an attitudinal change in the students and help them to develop societal consciousness, sensibility, responsibility and accountability
- To make students aware of their inner strength and help them to find new /out of box solutions to social problems.
- To make students socially responsible citizens who are sensitive to the needs of the disadvantaged sections.
- To help students to initiate developmental activities in the community in coordination with public and government authorities.
- To develop a holistic life perspective among the students by making them study culture, traditions, habits, lifestyles, resource utilization, wastages and its management, social problems, public administration system and the roles and responsibilities of different persons across different social systems.

Implementation of Community Service Project
- Every student should put in 6 weeks for the Community Service Project during the summer vacation.
- Each class/section should be assigned with a mentor.
- Specific Departments could concentrate on their major areas of concern. For example, Dept. of Computer Science can take up activities related to Computer Literacy to different sections of people like - youth, women, housewives, etc.
- A logbook must be maintained by each of the students, where the activities undertaken/involved to be recorded.
- The logbook has to be countersigned by the concerned mentor/faculty in charge.
- An evaluation to be done based on the active participation of the student and grade could be awarded by the mentor/faculty member.
- The final evaluation to be reflected in the grade memo of the student.
- The Community Service Project should be different from the regular programs of NSS/NCC/Green Corps/Red Ribbon Club, etc.
- Minor project reports should be submitted by each student. An internal Viva shall also be conducted by a committee constituted by the principal of the college.
- Award of marks shall be made as per the guidelines of Internship/apprentice/ on the job training.

Procedure
- A group of students or even a single student could be assigned for a particular

habitation or village or municipal ward, as far as possible, in the near vicinity of their place of stay, to enable them to commute from their residence and return back by evening or so.

- The Community Service Project is a twofold one –
  - First, the student/s could conduct a survey of the habitation, if necessary, in terms of their own domain or subject area. Or it can even be a general survey, incorporating all the different areas. A common survey format could be designed. This should not be viewed as a duplication of work by the Village or Ward volunteers, rather, it could be another primary source of data.

  - Secondly, the student/s could take up a social activity, concerning their domain or subject area. The different areas, could be like

    - Agriculture
    - Health
    - Marketing and Cooperation
    - Animal Husbandry
    - Horticulture
    - Fisheries
    - Sericulture
    - Revenue and Survey
    - Natural Disaster Management
    - Irrigation
    - Law & Order
    - Excise and Prohibition
    - Mines and Geology
    - Energy
    - Internet
    - Free Electricity
    - Drinking Water

EXPECTED OUTCOMES
BENEFITS OF COMMUNITY SERVICE PROJECT TO STUDENTS

Learning Outcomes
- Positive impact on students' academic learning
- Improves students' ability to apply what they have learned in "the real world"
- Positive impact on academic outcomes such as demonstrated complexity of understanding, problem analysis, problem-solving, critical thinking, and cognitive development.
- Improved ability to understand complexity and ambiguity

Personal Outcomes
- Greater sense of personal efficacy, personal identity, spiritual growth, and moral development.
- Greater interpersonal development, particularly the ability to work well with others, and build leadership and communication skills.

Social Outcomes
- Reduced stereotypes and greater inter-cultural understanding
- Improved social responsibility and citizenship skills
- Greater involvement in community service after graduation

Career Development
- Connections with professionals and community members for learning and career opportunities
- Greater academic learning, leadership skills, and personal efficacy can lead to greater opportunity.

Relationship with the Institution
- Stronger relationships with faculty
- Greater satisfaction with college
- Improved graduation rates

BENEFITS OF COMMUNITY SERVICE PROJECT TO FACULTY MEMBERS
- Satisfaction with the quality of student learning
- New avenues for research and publication via new relationships between faculty and community
- Providing networking opportunities with engaged faculty in other disciplines or institutions
- A stronger commitment to one's research.

BENEFITS OF COMMUNITY SERVICE PROJECT TO COLLEGES AND UNIVERSITIES
- Improved institutional commitment.
- Improved student retention
- Enhanced community relations

BENEFITS OF COMMUNITY SERVICE PROJECT TO COMMUNITY
- Satisfaction with student participation
- Valuable human resources needed to achieve community goals.
- New energy, enthusiasm and perspectives applied to community work.
- Enhanced community-university relations.

SUGGESTIVE LIST OF PROGRAMMES UNDER COMMUNITY SERVICE PROJECT

The following the recommended list of projects for Engineering students. The lists are not exhaustive and open for additions, deletions, and modifications. Colleges are expected to focus on specific local issues for this kind of project. The students are expected to carry out these projects with involvement, commitment, responsibility, and accountability. The mentors of a group of students should take the responsibility of motivating, facilitating, and guiding the students. They have to interact with local leadership and people and appraise the objectives and benefits of this kind of project. The project reports shall be placed in the college website for reference. Systematic, Factual, methodical and honest reporting should be ensured.

For Engineering Students
1. Water facilities and drinking water availability
2. Health and hygiene
3. Stress levels and coping mechanisms
4. Health intervention programmes
5. Horticulture
6. Herbal plants
7. Botanical survey
8. Zoological survey
9. Marine products
10. Aqua culture
11. Inland fisheries
12. Animals and species
13. Nutrition
14. Traditional health care methods
15. Food habits
16. Air pollution
17. Water pollution
18. Plantation
19. Soil protection
20. Renewable energy
21. Plant diseases
22. Yoga awareness and practice
23. Health care awareness programmes and their impact

24. Use of chemicals on fruits and vegetables
25. Organic farming
26. Crop rotation
27. Floury culture
28. Access to safe drinking water
29. Geographical survey
30. Geological survey
31. Sericulture
32. Study of species
33. Food adulteration
34. Incidence of Diabetes and other chronic diseases
35. Human genetics
36. Blood groups and blood levels
37. Internet Usage in Villages
38. Android Phone usage by different people
39. Utilisation of free electricity to farmers and related issues
40. Gender ration in schooling level- observation.

Complementing the community service project, the students may be involved to take up some awareness campaigns on social issues/special groups. The suggested list of programs

Programs for School Children
1. Reading Skill Program (Reading Competition)
2. Preparation of Study Materials for the next class.
3. Personality / Leadership Development
4. Career Guidance for X class students
5. Screening Documentary and other educational films
6. Awareness Program on Good Touch and Bad Touch (Sexual abuse)
7. Awareness Program on Socially relevant themes.
Programs for Women Empowerment
1. Government Guidelines and Policy Guidelines
2. Women's Rights
3. Domestic Violence
4. Prevention and Control of Cancer
5. Promotion of Social Entrepreneurship
General Camps
1. General Medical camps
2. Eye Camps
3. Dental Camps
4. Importance of protected drinking water
5. ODF awareness camp
6. Swatch Bharath
7. AIDS awareness camp
8. Anti-Plastic Awareness
9. Programs on Environment
10. Health and Hygiene
11. Hand wash programmers
12. Commemoration and Celebration of important days
Programs for Youth Empowerment
1. Leadership
2. Anti-alcoholism and Drug addiction
3. Anti-tobacco
4. Awareness on Competitive Examinations
5. Personality Development
Common Programs
1. Awareness on RTI
2. Health intervention programmes

3. Yoga

4. Tree plantation

5. Programs in consonance with the Govt. Departments like –

i. Agriculture

ii. Health

iii. Marketing and Cooperation

iv. Animal Husbandry

v. Horticulture

vi. Fisheries

vii. Sericulture

viii. Revenue and Survey

ix. Natural Disaster Management

x. Irrigation

xi. Law & Order

xii. Excise and Prohibition

xiii. Mines and Geology

xiv. Energy

Role of Students

- Students may not have the expertise to conduct all the programmes on their own. The students then can play a facilitator role.
- For conducting special camps like Health related, they will be coordinating with the Governmental agencies.
- As and when required the College faculty themselves act as Resource Persons.
- Students can work in close association with Non-Governmental Organizations like Lions Club, Rotary Club, etc or with any NGO actively working in that habitation.
- And also, with the Governmental Departments. If the program is rolled out, the District Administration could be roped in for the successful deployment of the program.
- An in-house training and induction program could be arranged for the faculty and participating students, to expose them to the methodology of Service Learning.

Timeline for the Community Service Project Activity

Duration: 8 weeks

1. Preliminary Survey (One Week)

- A preliminary survey including the socio-economic conditions of the allotted habitation to be conducted.
- A survey form based on the type of habitation to be prepared before visiting the habitation with the help of social sciences faculty. (However, a template could be designed for different habitations, rural/urban.
- The Governmental agencies, like revenue administration, corporation and municipal authorities and village secretariats could be aligned for the survey.

2. Community Awareness Campaigns (One Week)

- Based on the survey and the specific requirements of the habitation, different awareness campaigns and programmes to be conducted, spread over two weeks of time. The list of activities suggested could be taken into consideration.

3. Community Immersion Programme (Three Weeks)

- Along with the Community Awareness Programmes, the student batch can also work with any one of the below-listed governmental agencies and work in tandem with them. This community involvement programme will involve the students in exposing themselves to experiential learning about the community and its dynamics. Programs could be in consonance with the Govt. Departments.

4. Community Exit Report (One Week)

- During the last week of the Community Service Project, a detailed report of the outcome of the 8 weeks' works to be drafted and a copy shall be submitted to the local administration. This report will be a basis for the next batch of students visiting that habitation. The same report submitted to the teacher-mentor will be evaluated by the mentor and suitable marks are awarded for onward submission to the University.

Throughout the Community Service Project, a daily logbook need to be maintained by the student's batch, which should be countersigned by the governmental agency representative and the teacher-mentor, who is required to periodically visit the students and guide them

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

II B.Tech - II Semester (Common to All Branches)

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23AHS25   QUANTITATIVE APTITUDE AND REASONING - II

Course Outcomes:

After successful completion of the course, the student will be able to

1. Develop the thinking ability to meet the challenges in solving Logical Reasoning problems.

2. Solve campus placements aptitude papers covering Quantitative Ability and Verbal Ability.

3. Apply different placement practice techniques.

UNIT-I   6 Hours

QUANTITATIVE ABILITY III: Percentage [Percentage values from ½ to 1/30 , Successive increase / Decrease, Increased / Decreased percentage, How much % more / less, Population Problems, Election Problems, Application type of problems] – Profit & Loss[Cost Price , Selling Price , Retail Price , Marked Price / List Price / Printed price, Discounts, Error problems, Application type of problems] –Simple Interest[Principle, Time period, Rate of interest, Interest, Amount, Annual Payment, Application type of problems]- Compound Interest[Principle, Time period, Rate of interest, Interest, Different formulae of amount, Annual Payment, Differences between C.I & S.I for 1 year, 2years & 3years]

UNIT-II   6 Hours

QUANTITATIVE ABILITY IV: Time and Work [One person is working, 2 persons are working, 3 persons are working, Relation among Men, days, hours & Work, Alternate days, Graphical method, Application type of problems] – Pipes & Cisterns[Inlet, Outlet or leakage, Alternate hours, Application type of problems] – Time, Speed and Distance[Relation among time, speed & distance, Relative Speed, Average Speed, Problems on trains, Application type of problems] –Boats and Streams[Still water, Stream, Current rate, Boat's rate, Downstream, Upstream, Downstream Speed, Upstream speed, Application type of problems] – Races & Circular Tracks [2 persons are running around a circular track, 3 persons are running around a circular track]

UNIT-III   6 Hours

REASONING ABILITY II: Alphabet - Coding & Decoding - Directions - Ranking Test – Blood Relations - Inserting the missing number – Venn diagrams – Symbols and Notations - Syllogism – Statement and Conclusion– Data Arrangement – Linear and Circular arrangement

UNIT-IV   6 Hours

VERBAL II: Tense – Present Tense, Past Tense, Future Tense - Voice – Active voice, Passive voice and Active to Passive Voice Conversion Rules – Speech – Direct Speech, Indirect Speech and Direct to Indirect Speech Conversion Rules –Essay Writing – Types, Steps, Format.

UNIT V   **6 Hours**

SOFT SKILL II: Time Management - Stress Management - Team Work - Accent and Voice Communication - Interview Skills.

Text Books:

1. Quantitative Aptitude, Logic Reasoning & Verbal Reasoning, R S Agarwal, S.ChandPublications-2022.

2. Quantitative Aptitude for Competitive Examinations, R S Agarwal, S.ChandPublications-2022.

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

II B.Tech - I Semester (Common to All Branches)

L T P C

2 0 0 0

23AHS24   QUANTITATIVE APTITUDE AND REASONING - I

Course Outcomes:

After successful completion of the course, the student will be able to

1. Develop the thinking ability to meet the challenges in solving Logical Reasoning
    problems.
2. Solve campus placements aptitude papers covering Quantitative Ability and VerbalAbility.
3. Apply different placement practice techniques.

UNIT- I   **6**

Hours

QUANTITATIVE ABILITY – I: Vedic Maths – Square - Square root – Cube - Cube root –Higher Roots - Fractions (+, -, ×, ÷)– Decimal Fractions(+, -, ×, ÷) –LCM and HCF – VBODMAS Rule - Simplifications - Number System [Introduction –p/q forms –Factors – Multiples – Prime Numbers – Composite Numbers – Twin Primes – Co-Primes,Different Types of Numbers, Number of factors – Sum of factors – Unit's place value – Remainder theorem – Number of Zeros at the end of the product - Divisibility Rules –Prime Number Checking –Relation among Quotient, Divident, Divisor & Remainder - Formulae, Application type of problems]

UNIT-II   **6**

Hours

QUANTITATIVE ABILITY – II: Ratio, Proportion & Variation [Definition of ratio, Types of Ratios, Principles of Ratios, Comparison of Ratios, Definition of Proportion, Types of Proportion, Principle of Proportion, Properties of Proportion, Variation & Types of variations]– Partnership & Share[Definition of partnership, Types of partnership, Simple Partnership & Compound Partnership, profits ratio, Application type of problems] – Average & Ages[Definition of Average, Average of Natural Numbers, Even Numbers, Odd Numbers, Prime Numbers, Application type of problems] – Mixture & Alligation [Definition of Mixture & Alligation, Mixture Formula, Alligation Rule, Application type of Problems]

UNIT-III   **6**

Hours

   REASONING ABILITY I: Number Series – Number Analogy – Number Odd Man Out – Wrong Number – Letter Series – Letter Analogy – Letter Odd Man

UNIT-IV   **6**

Hours

VERBAL I: Verbal analogy - Types - Parts of Speech – Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction and Interjection - Prepositions –Preposition of Place, Preposition of Placement, Preposition of Time and Preposition of Duration - Articles – Usage of a, an, the, Omission of articles - Sentences - Pattern and Types.

UNIT-V

    6Hours

SOFT SKILL I: Communication Skills - Self-Confidence - Introductions & Greetings - Presentation Skills - Self- Motivation

Text Books:

1.   Quantitative Aptitude, Logic Reasoning & Verbal Reasoning, R S Agarwal, S.Chand Publications-2022

2.   Quantitative Aptitude for Competitive Examinations, R S Agarwal, S.Chand Publications-2022