JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

COLLEGE OF ENGINEERING (AUTONOMOUS)
ANANTHAPURAMU–515002(A.P) INDIA

B. Tech (Regular-Full time)

(Effective for the students admitted into I year from the Academic Year **2023-24** onwards)

COMPUTER SCIENCE AND ENGINEERING

I YEAR COURSE STRUCTURE AND SYLLABUS

B. TECH.-CSE-COURSE STRUCTURE & SYLLABUS–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 Counseling	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

B. Tech. – I Year I Semester (Computer Science &Engineering)

S. No.	Subject Code	Subject	L/D	T	P	Credits
1	23A15501	Communicative English Common to EEE, ECE, CSE	2	0	0	2
2	23A15301	Chemistry Common to EEE, ECE, CSE	3	0	0	3
3	23A15101	Linear Algebra & Calculus Common to All Branches	3	0	0	3
4	23A11301	Basic Civil & Mechanical Engineering Common to EEE, ECE, CSE	3	0	0	3
5	23A10501	Introduction to Programming Common to All Branches	3	0	0	3
6	23A15502	Communicative English Lab Common to EEE, ECE, CSE	0	0	2	1
7	23A15302	Chemistry Lab Common to EEE, ECE, CSE	0	0	2	1
8	23A10302	Engineering Workshop Common to EEE, ECE, CSE	0	0	3	1.5
9	23A10502	Computer Programming Lab Common to All Branches	0	0	3	1.5
10	23A15901	Health and wellness, Yoga and sports Common to EEE, ECE, CSE	-	-	1	0.5
		Total	14	00	11	19.5

B. Tech. – I Year II Semester

S. No.	Subject Code	Subject	L/D	T	P	Credits
1	23A25201	Engineering Physics Common to EEE, ECE, CSE	3	0	0	3
2	23A25101	Differential Equations and Vector Calculus (Common to All Branches)	3	0	0	3
3	23A22401	Basic Electrical and Electronics Engineering Common to EEE, ECE, CSE	3	0	0	3
4	23A20302	Engineering Graphics Common to EEE, ECE, CSE	1	0	4	3
5	23A20501	Data Structures	3	0	0	3
6	23A25202	Engineering Physics Lab Common to EEE, ECE, CSE	0	0	2	1
7	23A20501	IT Work Shop Common to EEE, ECE, CSE	0	0	2	1
8	23A22402	Electrical and Electronics Engineering Workshop Common to EEE, ECE, CSE	0	0	3	1.5
9	23A20503	Data Structures -Lab	0	0	3	1.5
10	23A25902	NSS/NCC /SCOUTS and Guides/ Community Service Common to EEE, ECE, CSE	-	-	1	0.5
		Total	13	00	15	20.5

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B. Tech. – I Year I Semester
(Common to EEE, ECE, CSE)

Subject Code	Title of the Subject	L	T	P	C
23A15501	Communicative English	2	0	0	2

Course Objectives:
- The main objective of introducing this course, Communicative English, is to facilitate effective Listening, Reading, Speaking and Writing skills among the students.
- It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary.
- This course helps the students to make them effective in speaking and writing skills and to make them industry-ready.

Course Outcomes:
- **CO1**: Understand the context, topic, and pieces of specific information from social or Transactional dialogues.
- **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 **c**omprehension of these texts.
- **CO5:** Create a coherent paragraph, essay, and resume.
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SYLLABUS

UNIT I

Lesson: HUMANVALUES: Gift of Magi **(Short Story)**

Listening:	Identifying the topic, the context and specific pieces of information by listening to short 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 one self and others.
Reading:	Skimming to get the main idea of a text; scanning to look for specific pieces of information.
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 after listening to audiotexts.
Speaking:	Discussion in pairs/small groups on specific topics followed by short structured talks.

Reading:	Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas 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

UNITIII

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 what is discussed
Reading:	Reading a text in detail by making basic inferences-recognizing and interpreting specific context clues; strategies to use text clues for comprehension.
Writing:	Summarizing, Note-making, paraphrasing
Grammar:	Verbs-tenses; subject-verb agreement;
Vocabulary:	Compound words, Collocations

UNITIV

Lesson: INSPIRATION: The Toys of Peace by Saki

Listening: Making predictions while listening to conversations/ transactional dialogues Without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal)– 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: Academic Writing (Letter Writing, Letter writing, creative writing, critical thinking)

Grammar: Reporting verbs, Direct &Indirect speech, Active &Passive Voice

Vocabulary: Words often confused, Jargons

UNITV

Lesson: MOTIVATION: The Power of Intrapersonal Communication **(An Essay)**

Listening:	Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.
Speaking:	Formal oral presentations on topics from academic contexts
Reading:	Reading comprehension.
Writing:	Writing structured essays on specific topics.
Grammar:	Editing short texts–identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)
Vocabulary:	Technical Jargons

Textbooks:
1. Path finder: *Communicative English for UndergraduateStudents*,1st Edition, OrientBlackSwan,2023(Units 1,2&3)
2. *Empowering with Language* byCengagePublications,2023(Units4 &5)

Reference Books:
1. Dubey, ShamJi & Co. *English for Engineers*, VikasPublishers,2020
2. Bailey, Stephen. *Academic writing: A Handbook for International Students*.Routledge,2014.
3. Murphy, Raymond. *English Grammar in Use*, Fourth Edition, Cambridge University Press, 2019.
4. Lewis, Norman. *Word Power Made Easy-The Complete Handbook for Building a Superior Vocabulary.*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

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B. Tech. – I Year I Semester
(Common to EEE, ECE, CSE)

Subject code	Title of the Subject	L	T	P	C
23A15301	Chemistry	3	0	0	3

Course Objectives:
- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry and polymers
- To introduce instrumental methods, molecular machines and switches.

Course Outcomes:
- **CO1:** Apply Schrodinger wave equation to hydrogen atom, Illustrate the molecular orbital energy level diagram of different molecular species, Explain the band theory of solids for conductors, semiconductors and insulators Discuss the magnetic behavior and colour of complexes.
- **CO2:** Explain the band theory of solids for conductors, semiconductors and insulators. Explain Basic concept and application of Super Conductors Super Capacitors Demonstrate the application of Fullerenes, carbon nano tubes and Graphines nanoparticles
- **CO3:** Apply Nernst equation for calculating electrode and cell potentials, differentiate between potentiometric and conductometric titrations, Explain the theory of construction of battery and fuel cells, solve problems based on cell potential
- **CO4:** Explain the different types of polymers and their applications, Explain the preparation, properties and applications of PVC, Bakelite Describe the mechanism of conduction in conducting polymers, Discuss Buna-S and Buna-N elastomers and their applications
- **CO5:** Explain the different types of spectral series in electromagnetic spectrum, Understand the principles of different

MAPPING BETWEEN COURSE OUTCOMES AND PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

UNIT I: Structure and Bonding Models: (10 hrs.)

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2, particle in one dimensional box, molecular orbital theory – bonding in homo- and hetero nuclear diatomic molecules – energy level diagrams of O_2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

Learning Outcomes:
At the end of this unit, the students will be able to
- **apply** Schrodinger wave equation to hydrogen atom (L3)
- **illustrate** the molecular orbital energy level diagram of different molecular species (L2)
- **explain** the calculation of bond order of O_2 and CO molecules (L2)
- **Discuss** the basic concept of molecular orbital theory (L3)

UNIT II: Modern Engineering materials (8hrs)

Semiconductors – Introduction, basic concept, application
Super conductors-Introduction, basic concept, applications.
Super capacitors: Introduction, Basic Concept-Classification – Applications.
Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon
nano tubes and Graphines nanoparticles.

Learning Outcomes:
At the end of this unit, the students will be able to
- **Explain** the Applications of Super Capacitors (L2).
- **Discuss** the Basic concept of Super Conductors (L3).
- **Explain** the band theory of solids for conductors, semiconductors and insulators (L2)
- **Demonstrate** the application of Fullerenes, carbon nanotubes and Graphines nanoparticles (L2).

UNIT III: Electrochemistry and Applications (10hrs)

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry-
potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric
titrations (acid-base titrations), pH metry.
Electrochemical sensors – potentiometric sensors with examples, amperometry sensors with examples.
Primary cells – Zinc-air battery, Sodium-Air battery Secondary cells –lithium-ion batteries- working of the
batteries including cell reactions;
 Fuel cells, hydrogen-oxygen fuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells
(PEMFC).

Learning Outcomes:
At the end of this unit, the students will be able to
- **apply** Nernst equation for calculating electrode and cell potentials (L3)
- **differentiate** between potentiometric and conduct metric titrations (L2)
- **explain** the theory of construction of battery and fuel cells (L2)
- **solve** problems based on cell potential (L3)

UNIT IV: Polymer Chemistry (10hrs)

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization,
coordination polymerization, with specific examples and mechanisms of polymer formation, Polydispersity
index (PDI)-significance
Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon,
Bakelite, Nylon-6, 6, carbon fibers.
Elastomers–Buna-S, Buna-N–preparation, properties and applications.
Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio-
Degradable polymers - Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA).

Learning Outcomes:
At the end of this unit, the students will be able to
- **explain** the different types of polymers and their applications (L2)
- **explain** the preparation, properties and applications of Bakelite, Nylon-6,6, and carbon fibers (L2)
- **describe** the mechanism of conduction in conducting polymers (L2)
- **discuss** Buna-S and Buna-N elastomers and their applications (L2)

UNIT V: Instrumental Methods and Applications (10 hrs.)

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Principle, Instrumentation and Applications, IR spectroscopy, fundamental modes and selection rules, Principle, Instrumentation and Applications. Chromatography-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications.

Learning outcomes:
After completion of this unit, students will be able to:
- **explain** the different types of spectral series in electromagnetic spectrum (L2)
- **understand** the principles of different analytical instruments (L2)
- **explain** the different applications of analytical instruments (L2)

Textbooks:
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. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Textbook of Polymer Science, Fred W. Bill mayer Jr, 3rd Edition

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

Subject code	Title of the Subject	L	T	P	C
23A15101	Linear Algebra & Calculus	3	0	0	3

Course Objectives:

- To equip the students with standard concepts and tools at an intermediate to advanced level mathematics
- To develop the confidence and ability among the students to handle various real-world problems and their applications.

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 using Cartesian 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, consistency of linear system of equations Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT II: Eigen values, Eigenvectors and Orthogonal Transformation
Eigenvalues, 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 similarity transformation, Lagrange's reduction and Orthogonal Transformation, types of complex matrices (Hermition skew Hermition & unitary)

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.
Radius of curvature, centre of curvature and circle of curvature.

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 functions of two variables, method of Lagrange multipliers, Differentiation under the integral sign (Liebntiz's rule)

UNIT V: Multiple Integrals (Multi variable Calculus)

Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

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

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, Alpha Science International Ltd., 2021 5th Edition(9th reprint).
3) Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4) Advanced Engineering Mathematics, Micheael Greenberg, Pearson publishers, 9th edition
5) Higher Engineering Mathematics, H. K Das, Er. Rajnish Verma, S. Chand Publications,2014, Third Edition (Reprint 2021

B. Tech. – I Year I Semester
(Common to EEE, ECE, CSE)

Subject code	Title of the Subject	L	T	P	C
23A11301	Basic Civil & Mechanical Engineering	3	0	0	3

Course Objectives:

- Get familiarized with the scope and importance of Civil Engineering sub-divisions.
- Introduce the preliminary concepts of surveying.
- Acquire preliminary knowledge on Transportation and its importance in nation's economy.
- Get familiarized with the importance of quality, conveyance and storage of water.
- Introduction to basic civil engineering materials and construction techniques.

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

- **CO1:** Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.
- **CO2:** Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
- **CO3:** Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.
- **CO4:** UnderstandtheimportanceofWaterStorageandConveyanceStructuressothatthe social responsibilities of water conservation will be appreciated.
- **CO5:** Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.

(PART A) BASIC CIVIL ENGINEERING

UNIT I
Basics of Civil Engineering: Role of Civil Engineers in Society- Various Disciplines of Civil Engineering-Structural Engineering Geo-Technical Engineering- Transportation Engineering-Hydraulics and Water Resources Engineering - Environmental Engineering-Scope of each discipline-Building Construction and Planning-Construction Materials-Cement-Aggregate- Bricks- Cement concrete- Steel. Introduction to Prefabricated construction Techniques.

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

UNIT III
Transportation Engineering Importance of Transportation in Nation's economic development- Types of Highway Pavements- Flexible Pavements and Rigid Pavements - Simple Differences. Basics of Harbour, Tunnel, Airport, and Railway Engineering.

Water Resources and Environmental Engineering: Introduction, Sources of water- Quality of water-
Specifications- Introduction to Hydrology–Rainwater Harvesting-Water Storage and Conveyance Structures
(Simple introduction to Dams and Reservoirs).

Textbooks:
1. Basic Civil Engineering, M.S. Palanisamy, Tata McGraw Hill publications (India) Pvt. Ltd. Fourth Edition.
2. Introduction to Civil Engineering, S.S. Bhavikatti, New Age International Publishers. 2022. First Edition.
3. Basic Civil Engineering, Satheesh Gopi, Pearson Publications, 2009, First Edition.

Reference Books:
1. Surveying, Vol- I and Vol-II, S.K. Duggal, Tata McGraw Hill Publishers 2019. Fifth Edition.
2. Hydrology and Water Resources Engineering, Santosh Kumar Garg, Khanna Publishers, Delhi.2016
3. Irrigation Engineering and Hydraulic Structures - Santosh Kumar Garg, Khanna Publishers, Delhi 2023. 38th Edition.
4. Highway Engineering, S.K. Khanna, C.E.G. Justo and Veeraraghavan, Nemchandand Brothers Publications 2019. 10th Edition.
5. Indian Standard DRINKING WATER — SPECIFICATION IS10500-2012.

PART B: BASIC MECHANICAL ENGINEERING

Course Objectives: The students after completing the course are expected to

- Get familiarized with the scope and importance of Mechanical Engineering in different sectors and industries.
- Explain different engineering materials and different manufacturing processes.
- Provide an overview of different thermal and mechanical transmission systems and introduce basics of robotics and its applications.

Course Outcomes: On completion of the course, the student should be able to
- **CO1:** Understand the different manufacturing processes.
- **CO2:** Explain the basics of thermal engineering and its applications.
- **CO3:** Describe the working of different mechanical power transmission systems.
- **CO4:** Describe the working of different power plants.
- **CO5:** Describe the basics of robotics and its applications.

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 oilers, Otto cycle, Diesel cycle, Refrigeration and air-conditioning cycles, IC engines, 2-Stroke and 4-Stroke engines, SI/CI Engines, Components of Electric and Hybrid 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 their applications.
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 India Pvt.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 M Pandey, 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, Tata McGraw Hill publications (India) Pvt. Ltd.

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓				✓						✓	
CO2	✓						✓				✓	
CO3	✓						✓				✓	
CO4	✓				✓						✓	
CO5	✓										✓	

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

Subject code	Title of the Subject	L	T	P	C
23A10501	Introduction to Programming	3	0	0	3

Course Objectives:
- To introduce students to the fundamentals of computer programming.
- To provide hands-on experience with coding and debugging.
- To foster logical thinking and problem-solving skills using programming.
- To familiarize students with programming concepts such as data types, control structures, functions, and arrays.
- To encourage collaborative learning and teamwork in coding projects.

Course Outcomes: A student after completion of the course will be able to
- **CO1:** Understand basics of computers, the concept of algorithm and algorithmic thinking.
- **CO2:** Analyze a problem and develop an algorithm to solve it.
- **CO3:** Implement various algorithms using the C programming language.
- **CO4:** Understand more advanced features of C language.
- **CO5:** Develop problem-solving skills and the ability to debug and optimize the code.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1									1	1	1	
CO2	1	2	1										1	1	
CO3	2	2	1										1	1	
CO4	2	1	1										1	1	
CO5	2	2	1										1	1	

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 Dia Tool), pseudo code. Introduction to Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output, Operations, Type Conversion, and Casting.
Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

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
Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Introduction to Strings.

UNIT IV: Pointers & User Defined Data types
Pointers, dereferencing and address operators, pointer and address arithmetic, Dynamic memory allocation, array manipulation using pointers, User-defined data types-Structures and Unions.

UNIT V: Functions & File Handling
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, Command line arguments,
Basics of File Handling: why files, file opening and closing a data files, reading and writing a data file, processing data files.

Note: The syllabus is designed with C Language as the fundamental language of implementation**.**

Textbooks:
1. "The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, 1988
2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996

Reference Books:
1. Computing fundamentals and C Programming, Balagurusamy, E., McGraw-Hill Education, 2008.
2. Programming in C, RemaTheraja, Oxford, 2016, 2nd edition
3. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE, 3rd edition

B. Tech. – I Year I Semester
(Common to EEE, ECE, CSE)

Subject code	Title of the Subject	L	T	P	C
23A15502	Communicative English Lab	0	0	2	1

Course Objectives:
- The main objective of introducing this course, *Communicative English Laboratory*, is to expose the students to a variety of self-instructional, learner friendly modes of language learning.
- The students will get trained in the basic communication skills and also make them ready to face job interviews.

Course Outcomes:
- **CO1:** Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
- **CO2:** Apply communication skills through various language learning activities.
- **CO3**: Analyze the English speech sounds, stress, rhythm, intonation and syllable division for Better listening and speaking comprehension.
- **CO4:** Evaluate and exhibit professionalism in participating in debates and group discussions.
- **CO5:** Create effective resume and prepare themselves to face interviews in future.

List of Topics:

1. Vowels & Consonants
2. Neutralization/Accent Rules/Syllable division
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP (Statement of Purpose)
7. Group Discussions – Methods &Practice
8. Debates-Methods & Practice
9. PPT Presentations/Poster Presentation
10. Interviews Skills

Suggested Software:
- Walden Infotech
- Young India Films
- K-Van Solutions

Reference Books:

1. Raman Meenakshi, Sangeeta-Sharma. *Technical Communication*.OxfordPress.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
4. https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

B. Tech. – I Year I Semester
(Common to EEE, ECE, CSE)

Subject code	Title of the Subject	L	T	P	C
23A15302	Chemistry Lab	0	0	2	1

Course Objectives: Verify the fundamental concepts with experiments

Course Outcomes: At the end of the course, the students will be able to
- **CO1:** Determine the cell constant and conductance of solutions.
- **CO2:** Prepare advanced polymer Bakelite materials.
- **CO3:** Measure the strength of an acid present in secondary batteries.
- **CO4:** Analyze the IR spectra of some organic compounds.
- **CO5:** Calculate strength of acid in Pb-Acid battery.

List of Experiments:

1. Measurement of 10Dq by spectrophotometric method
2. Conductometric titration of strong acid vs. strong base
3. Conductometric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. Potentiometry-determination of redox potential sandemfs
6. Determination of Strength of an acid in Pb-Acid battery
7. p^H metric titration of strong Acid Vs Strong Base
8. Preparation of a Bakelite
9. Verify Lambert-Beer's law
10. Wavelength measurement of sample through UV-Visible Spectro's copy
11. Identification of simple organic compounds by IR
12. Preparation of nano materials by precipitation method
13. Estimation of Ferrous Iron by Dichrometry

Learning outcomes:
At the end of the course, the students will be able to
- **Determine** the cell constant and conductance of solutions(L3)
- **Prepare** advanced polymer Bakelite materials(L2)
- **Measure** the strength of an acid present in secondary batteries(L3)
- **Analyze** the IR of some organic compounds(L3)

Reference:
- "Vogel'sQuantitativeChemicalAnalysis6thEdition6thEdition"Pearson Publications by J. Mendham, R. C. Denney, J. D. Barnes and B. Sivasankar

B. Tech. – I Year I Semester
(Common to EEE, ECE, CSE)

Subject code	Title of the Subject	L	T	P	C
23A10302	Engineering Workshop	0	0	3	1.5

Course Objectives: To familiarize students with wood working, sheet metal operations, fitting and Electrical house wiring skills

Course Outcomes:
- **CO1:** Identify works hop tools and their operational capabilities.
- **CO2**: Practice on manufacturing of components using works hop trades including fitting, carpentry, foundry and welding.
- **CO3:** Apply fitting operations in various applications.
- **CO4**: Apply basic electrical engineering knowledge for House Wiring Practice.
- **CO5:** Demonstration and Practice of plumbing and welding.

SYLLABUS

1. **Demonstration**: Safety practices and precautions to be observed in workshop.
2. **Wood Working:** Familiarity with different types of wood sand tools used in wood working and make following joints.
   a) Half–Lap joint   b) Mortise and Ten on joint   c) Corner Dovetail joint or bridle joint d) Demonstration of Power tools
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 tire puncture and change of two-wheeler tire
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
   b) d)Tube light   e) Three phase motor   f) Soldering of wires
6. **Foundry Trade:** Demonstration and practice on Molding tools and processes, Preparation of Green Sand Molds forgiven 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 diameter

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.2007,14thedition
2. Workshop Practice by H.S. Bawa, Tata-McGrawHill,2004.
3. Wiring Estimating, Costing and Contracting; Soni P.M. &Upadhyay P.A.; Atul Prakashan, 2021-22.

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1					✓	✓	✓		✓			
CO2					✓						✓	✓
CO3						✓					✓	✓
CO4						✓			✓		✓	✓
CO5						✓			✓		✓	✓

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

Subject code	Title of the Subject	L	T	P	C
23A10502	Computer Programming Lab	0	0	3	1.5

Course Objectives:
- The course aims to give students hands – on experience and train them on the concepts of the C- programming language.

Course Outcomes:
- **CO1:** Read, understand, and trace the execution of programs written in C language.
- **CO2:** Select the right control structure for solving the problem.
- **CO3:** Develop C programs which utilize memory efficiently using programming constructs like pointers.
- **CO4:** Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1									1	1	1	
CO2	1	2	1										1	1	
CO3	2	2	1										1	1	
CO4	2	1	1										1	1	
CO5	2	2	1										1	1	

UNIT I
WEEK 1
Objective: Getting familiar with the programming environment on the computer and writing the first program.
Suggested Experiments/Activities:
Tutorial 1: Problem-solving using Computers.
Lab1: 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 steps both using textual notation and graphic notation.
Suggested Experiments /Activities:
Tutorial 2: Problem-solving using Algorithms and Flow charts.
Lab 1: 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 values and how arithmetic operators can be used with variables and constants.
Suggested Experiments/Activities:
Tutorial 3: Variable types and type conversions:
Lab 3: 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

UNIT II
WEEK 4
Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.
Suggested Experiments/Activities:
Tutorial4: Operators and the precedence and as associativity:
Lab4: 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:
Lab 5: 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 in addition 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
Lab 6: 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.

UNIT III

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.
Lab 7: 1D 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 by using 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.

Lab 8: 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

UNIT IV
WEEK9:
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 9: Pointers, structures and dynamic memory allocation
Lab 9: Pointers and structures, memory dereference.
  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 along with the total.
  v) Write a C program to implement realloc ()

WEEK 10:
Objective: Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linked lists) and nested structures
Suggested Experiments/Activities:
Tutorial 10: Bitfields, Self-Referential Structures, Linked lists
Lab10: Bitfields, linked lists

Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- 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.

UNIT V
WEEK 11:
Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments parameter passing using call by value. Basic methods of numerical integration

Suggested Experiments/Activities:
Tutorial 11: Functions, call by value, scope and extent,
Lab 11: 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 12:
Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.
Suggested Experiments/Activities:
Tutorial 12: Recursion, the structure of recursive calls
Lab 12: Recursive 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 13:
Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations Using pointers and passing variables to functions using pointers
Suggested Experiments/Activities:
Tutorial 13: Call by reference, dangling pointers
Lab 13: 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 using pointers.

WEEK14:
Objective: To understand data files and file handling with various file I/O functions. Explore the differences between text and binary files.
Suggested Experiments/Activities:
Tutorial 14: File handling
Lab 14: File 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.

Textbooks:
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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (AUTONOMOUS)ANANTHAPURAMU– 515 002 (A.P)
INDIA

B. Tech. – I Year I Semester
(Common to EEE, ECE, CSE)

Subject code	Title of the Subject	L	T	P	C
23A15901	Health and Wellness Yoga and Sports	0	0	1	0.5

Course Objectives:
- The main objective of introducing this course is to make the students maintain their mental and physical wellness by balancing emotions in their life. It mainly enhances the essential traits required for development of the personality.

Course Outcomes: After completion of the course the student will be able to
- **CO1**: Understand the importance of yoga and sports for Physical fitness and sound health
- **CO2:** Demonstrate an understanding of health-related fitness components
- **CO3:** Compare and contrast various activities that help enhance their health
- **CO4:** Assess current personal fitness levels.
- **CO5:** Develop Positive Personality

SYLLABUS

UNIT I
Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship Between diet and fitness, Globalization and its impact on health, Body Mass Index (BMI) of all age groups.

Activities:
i) Organizing health awareness programmes in community
ii) Preparation of health profile
iii) Preparation of chart for balanced diet for all age groups

UNITII
Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas- Pranayama and meditation, stress management and yoga, Mental health and yoga practice.

Activities:
Yoga practices–Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

UNITIII

Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Common wealth games.

Activities:

i)   Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc. -Practicing general and specific warm up, aerobics

ii) Practicing cardio respiratory fitness, treadmill, run test, 9minwalk, skipping and running.

Reference Books

1. Gordon Edlin, EricGolanty.*HealthandWellness,*14[th]Edn. Jones & Bartlett Learning,2022
2. T.K.V. Desi achar. The Heart of Yoga: Developing a Personal Practice
3. Archie J. Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993.
4. *Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere* Third Edition, WilliamMorrowPaperbacks,2014

5. *The Sports Rules Book*/ Human Kinetics with Thomas Hanlon. --3rd ed. Human Kinetics, Inc.2014

General Guidelines:

1. Institutes must assign lots in the Timetable for the activities of Health/Sports/Yoga.
2. Institutes must provide field/facility and offer the minimum of five choices of as many as Games/Sports.
3. Institutes are required to provide sports instructor/yoga teacher to mentor the students.

Evaluation Guidelines:

1. Evaluated for a total of 100 marks.
2. A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totaling to 90 marks.
3. A student shall be evaluated by the concerned teacher for 10 marks by conducting viva-voce on the subject.

I B. TECH (R23) – II SEMESTER

(Common to EEE, ECE, & CSE)

Subject Code	Title of the Subject	L	T	P	C
23A25201	ENGINEERING PHYSICS	3	0	0	3

PREAMBLE

There has been an exponential growth of knowledge in the recent past opening up new areas and challenges in the understanding of basic laws of nature. This helped to the discovery of new phenomena in macro, micro and nano scale device technologies. The laws of physics play a key role in the development of science, engineering and technology. Sound knowledge of physical principles is of paramount importance inunderstanding new discoveries, recent trends and latest developments in the field of engineering.

To keep in pace with the recent scientific advancements in the areas of emerging technologies, the syllabi has been thoroughly revised keeping in view of the basic needs of all branches of Engineering by including the topics like Physical Optics, Dielectric and Magnetic materials, Crystallography and X-ray Diffraction, Quantum Mechanics, Free Electron Theory, Semiconductors and superconductors.

	COURSE OBJECTIVES
1	Bridging the gap between the Physics in school at 10+2 level and UG level engineering courses.
2	To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications
3	Enlighten the periodic arrangement of atoms in Crystalline solids by Bragg's law – Learning thestructural analysis through X-ray diffraction techniques.
4	Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of de Broglie matter waves, quantum mechanical wave equation and its application, the importance of free electron theory for metals.
5	To Understand the Physics of Semiconductors and their working mechanism, Concepts utilization of transport phenomenon of charge carriers in semiconductors. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.
6.	To explain the significant concepts of dielectric and magnetic materials that leads to potentialapplications in the emerging micro devices.

	COURSE OUTCOMES
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)
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).
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 theory in the study of electrical conductivity (L3).
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).
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   **12hrs**

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 Bravais Lattices — 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's method.

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 – Extrinsic semiconductors: density of charge carriers - Drift and diffusion currents – Einstein's equation - Hall effect and 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 T_C 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 magnetic materials.

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).

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

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3		1								
CO2	3	3	2	1								
CO3	3	2										
CO4	3	3	3	2	1							
CO5	3	3	2	2	1							

I B. TECH (R23) – II SEMESTER

(Common to All Branches of Engineering)

Subject Code	Title of the Subject	L	T	P	C
23A25101	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**	3	0	0	3

Course Objectives:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them intoadvanced level by handling various real-world applications.

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 orthogonal Trajectories,Electrical circuits.

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,Equations reducibleto Linear Differential equations with constant coefficients (Caushy's equation, Lagendre's equation) 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 LinearPartial differential equations with constant coefficients, Non-linear partial differential equations (Standardforms)

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, physical interpretation, examples and 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) physical interpretation 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, 10th Edition.

Reference Books:

  1) Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018,14th Edition.
  2) Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones and Bartlett, 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 Science InternationalLtd., 2021 5th Edition (9th reprint)

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I B. TECH (R23) – II SEMESTER

(Common to EEE, ECE, CSE)

Subject Code	Title of the Subject	L	T	P	C
23A22401	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	3	0	0	3

PART A: BASIC ELECTRICAL ENGINEERING

Course Objectives:

To expose to the field of electrical engineering, laws and principles of electrical engineering and to acquire fundamental knowledge in the relevant field.

Course Outcomes:

CO1: Remember the fundamental laws, operating principles of motors, generators, MC and MI instruments (L1)

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 (L2)

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 (L3)

CO4: Analyze different electrical circuits, performance of machines and measuring instruments (L4)

CO5: Evaluate different circuit configurations, Machine performance and Power systems operation (L5)

Syllabus

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, Analysis of R-L, R-C, R-L-C Series circuits, 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 Phase Transformer, (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.

Learning Resources:

Textbooks:
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

PART B: BASIC ELECTRONICS ENGINEERING

Course Objectives:

- To teach the fundamentals of semiconductor devices and its applications, principles of digital electronics.

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

CO1: Understand the principle of working of diodes, transistors and their characteristics.
CO2: Understand the fundamental concepts of various semiconductor devices in electronic circuits and instruments.
CO3: Apply the concepts of diodes in rectifiers and regulated power supplies
CO4: Explain the concepts of various number systems and the functionality of logic gates with Boolean functions.
CO5: Understand the simple combinational circuits and sequential circuits.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1			2	1	2				2
CO2	3	2	2	1		3	2				1	2
CO3	2	1	2			2	1					2
CO4	3	1	1			2	1	2				2
CO5	2	1	2			2	1					2

UNIT I: SEMICONDUCTOR DEVICES

Introduction - Evolution of electronics – Vacuum tubes to nano electronics - Characteristics of PN Junction Diode — Zener Effect — Zener Diode and its Characteristics. Bipolar Junction Transistor — CB, CE, CC Configurations and V-I Characteristics, Elementary Treatment of Small Signal CE Amplifier.

UNIT II: BASIC ELECTRONIC CIRCUITS AND INSTRUMENTTAION

Rectifiers and Power supplies: Block diagram description of a dc power supply, working of a full wave bridge rectifier, capacitor filter (no analysis), working of simple zener voltage regulator.
Amplifiers: Block diagram of Public Address system, Circuit diagram and working of common emitter (RC coupled) amplifier with its frequency response.
Electronic Instrumentation: Block diagram of an electronic instrumentation system.

UNIT III: DIGITAL ELECTRONICS

Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adders. Introduction to sequential circuits, Flip flops, Registers and counters (Elementary Treatment only)

Textbooks:
1. SantiramKal, Basic Electronics- Devices, Circuits and IT Fundamentals, Prentice Hall, India, 2002.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata McGraw Hill, 2009

Reference Books:
1. R. L. Boylestad& Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.

2. R. S. Sedha, A Textbook of Electronic Devices and Circuits, S. Chand & Co, 2010.
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

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I B. TECH (R23) – II SEMESTER

(Common to EEE, ECE, CSE)

c	Title of the Subject	L	T	P	C
23A20301	ENGINEERING GRAPHICS	1	0	4	3

Course Objectives:
- To enable the students with various concepts like dimensioning, conventions andstandards related to Engineering Drawing
- To impart knowledge on the projection of points, lines and plane surfaces
- To improve the visualization skills for better understanding of projection of solids
- To develop the imaginative skills of the students required to understand Section of solidsand Developments of surfaces.
- To make the students understand the viewing perception of a solid object in Isometricand Perspective projections.

Course Outcomes:

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: Perpendicular and inclined section planes, Sectional views and True shape of section, Sections of solids in simple position only.

Development of Surfaces: Methods of Development: Parallel line development and radial line development. Development of a cube, prism, cylinder, pyramid andcone.

UNIT V

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

Computer graphics: Creating 2D&3D drawings ofobjects including PCB and Transformations using Auto CAD (*Not for end examination*).

Textbook:
  1. N. D. Bhatt, Engineering Drawing, Charotar Publishing House, 2016.

Reference Books:

1. Engineering Drawing, K.L. Narayana and P. Kannaiah, 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, Tata McGraw Hill, 2017.

Mapping between Course Outcomes and Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	☐				☐						☐	
CO2						☐						
CO3						☐						
CO4		☐										
CO5						☐						

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I B. TECH (R23) – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
23A20502	Data Structures	3	0	0	3

Course Objectives:

- Toprovidetheknowledgeofbasicdatastructuresandtheirimplementations.
- To understand importance of data structures in context of writing efficient programs.
- Todevelopskillstoapplyappropriatedatastructuresinproblemsolving.

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

CO1: Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.

CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.

CO3: Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.

CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply the map appropriately to solve data management challenges.

CO5: Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees.

CO6: Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

	PO1	PO2	P03	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PS02	PS03
CO1	2	2	2	1									2	1	
CO2	2	2	2	1									2	1	
C03	2	2	2	1									2	1	
CO4	2	2	2	1									2	2	
CO5	2	2	1	1									2	1	
CO6	2	1	1	1									2	2	

UNIT I

Introduction to Linear Data Structures: Definition and importance of linear data structures, Abstract data types (ADTs) and their implementation, Overview of time and space complexity analysis for linear data structures. Searching Techniques: Linear & Binary Search, Sorting Techniques: Bubble soi1, Selection sort, Insertion Sort

UNIT II
Linked Lists: Singly linked lists: representation and operations, doubly linked lists and circular linked lists, Comparing arrays and linked lists, Applications of linked lists

UNIT III
Stacks: Introduction to stacks: properties and operations, implementing stacks using arrays and Applications of stacks

UNIT IV
Queues: Introduction to queues: properties and operations, implementing queues using arrays and linked lists, Applications of queues in breadth-first search, scheduling, etc.
Deques: Introduction to deques (double-ended queues), Operations on deques and their applications.

UNIT IV
Graphs: Introduction, Graphs technology, Directed Graphs and Representation of Graphs
Trees: Introduction to Trees, Binary search Tree- Insertion, Deletion &Traversal
Hashing: Brief introduction to hashing and hash functions, Collision resolution techniques: chaining and open addressing, Hash tables: basic implementation and operations, Applications of hashing in unique identifier generation, caching, etc.

Textbooks:
1. Data Structures and algorithm analysis in C, Mark Allen W eiss, Pearson,2ndEdition.
2. Fundamentals of data structures in C, Ellis Horowitz, SartajSahni, Susan Anderson- Freed, Silicon Press, 2008

Reference Books:
1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures "by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas **H.** Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford ·Stein
5. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms "by Robert Sedgewick

I B. TECH (R23) – II SEMESTER
(Common to EEE, ECE &CSE)

Subject Code	Title of the Subject	L	T	P	C
23A25202	ENGINEERING PHYSICS LAB	0	0	2	1

Course Objectives:

- ➤ Understands the concepts of interference, diffraction and their applications.
- ➤ Understand the role of optical fiber parameters in communication.
- ➤ Recognize the importance of energy gap in the study of conductivity and Hall Effect in a semiconductor.
- ➤ Illustrates the magnetic and dielectric materials applications.
- ➤ Apply the principles of semiconductors in various electronic devices.

(Any **TEN** of the following listed experiments)

(Out of which any **TWO** experiments may be conducted in virtual mode)

List of Engineering Physics Experiments

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 usingdiffraction grating 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 Halleffect.
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 acompoundpendulum.
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'sexperiment.

Course Outcomes:

The students will be able to

- **Operate** optical instruments like microscope and spectrometer (L2)
- **Estimate** the wavelength of different colors using diffraction grating and resolvingpower(L2)
- **Plot** the intensity of the magnetic field of circular coil carrying current with distance (L3)
- **Determine** the resistivity of the given semiconductor using four probe method (L3)
- **Identify** the type of semiconductor i.e., n-type or p-type using hall effect (L3)
- **Calculate** the band gap of a given semiconductor (L3)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3			2								
CO2	3	2		2								
CO3	3	1		2								
CO4	3	3		3	2							
CO5	3											

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

- *URL*:*www.vlab.co.in*

I B. TECH (R23) – II SEMESTER

(Common to EEE, ECE, CSE)

Subject Code	Title of the Subject	L	T	P	C
23A20501	IT WORK SHOP	0	0	2	1

Course Objectives:

- To introduce the internal parts of a computer, peripherals, I/O ports, connecting cables
- To demonstrate configuring the system as Dual boot both Windows and other Operating SystemsViz. Linux, BOSS
- To teach basic command line interface commands on Linux.
- To teach the usage of Internet for productivity and self-paced life-long learning
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Wordprocessors, Spread sheets and Presentation tools.

Course Outcomes:

CO1: Perform Hardware troubleshooting.
CO2: Understand Hardware components and inter dependencies.
CO3: Safeguard computer systems from viruses/worms.
CO4: Document/ Presentation preparation. **CO5**: Perform calculations using spreadsheets.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1												
CO2															
CO3		1												2	
CO4			2		2									2	
CO5	1													2	

PC Hardware & Software Installation

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the blockdiagram 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.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructorshould 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 (VMWare) with both Windows and Linux. Labinstructors should verify the installation and follow it up with a Viva

Task 5: Every student should install BOSS on the computer. The system should be configured as dual boot (VMWare) with both Windows and BOSS. Lab instructors should verify the installation and followit up with a Viva

Internet & World Wide Web

Task1: 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 shoulddemonstrate, 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 JREfor applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use thesearch 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) officeor equivalent (FOSS) tool word: Importance of La TeX and MS office or equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using La TeXandword – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter inword.

Task 2: Using La TeX and Word to create a project certificate. Features to be covered:- Formatting Fontsin 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, TrackChanges.

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 Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a 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,

LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditionalformatting

POWER POINT

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 and Numbering, 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, notes etc), 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 brainstorm creative ideas

- Ex: Prompt: "In a world where gravity suddenly stopped working, people started floatingupwards. Write a story about how society adapted to this new reality."

Task 3: 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 fluent the translations are.

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

Reference Books:

2. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dream tech, 2003
3. The Complete Computer upgrade and repair book, Cheryl A Schmidt, WILEY Dream tech, 2013, 3rdedition
4. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education, 2012,2nd edition
5. PC Hardware - A Handbook, Kate J. Chase, PHI (Microsoft)
6. LaTeX Companion, Leslie Lamport, PHI/Pearson.

7. IT Essentials PC Hardware and Software Companion Guide, David Anfins on and Ken Quamme. –CISCO Press, Pearson Education, 3rd edition

IT Essentials PC Hardware and Software Labs and Study Guide, Patrick Regan– CISCO Press, PearsonEducation, 3rd edition

I B. TECH (R23) – II SEMESTER

(Common to EEE, ECE &CSE)

Subject Code	Title of the Subject	L	T	P	C
23A12402	ELECTRICALAND ELECTRONICS ENGINEERING WORK SHOP	0	0	3	1.5

Course Objectives:
To impart knowledge on the fundamental laws & theorems of electrical circuits, functions of electrical machines and energy calculations.

Course Outcomes:
CO1: Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer (L2)
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 and power factor (L3)
CO3: Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and
power factor (L3)
CO4: Analyze various characteristics of electrical circuits, electrical machines and measuring instruments (L4)
CO5: Design suitable circuits and methodologies for the measurement of various electrical parameters; Household and commercial wiring (L5)

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

Learning Resources:
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

PART B: ELECTRONICS ENGINEERING LAB

Course Objectives:
- To impart knowledge on the principles of digital electronics and fundamentals of electron devices& its applications.

Course Outcomes: At the end of the course, the student will be able to
CO1: Identify and testing of various electronic components.
CO2: Understand the usage of electronic measuring instruments.
CO3: Plot and discuss the characteristics of various electron devices.
CO4: Explain the operation of a digital circuit.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	1	2	1					1	
CO2	2		2	2	1				1		2	
CO3	2	2		3	1						1	
CO4		2	1	2	2	1						

List of Experiments:

1. Determine and Demonstrate V-I characteristics of PN Junction diode:
   (a) Forward bias (b) Reverse bias.
2. Determine and Demonstrate V – I characteristics of Zener Diode and its application as voltage Regulator.
3. Implementation of half wave and full wave rectifiers
4. Determine and Demonstrate Input & Output characteristics of BJT in CE& CB configurations
5. Frequency response of CE amplifier.
6. Simulation of RC coupled amplifier with the design supplied
7. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR Gatesusing ICs.
8. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters,

DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

References:
1. R. L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2021.
2. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata McGraw Hill, 2009
3. R. T. Paynter, Introductory Electronic Devices & Circuits – Conventional Flow Version, Pearson Education,2009.

Note: a. Minimum Six Experiments to be performed.
b. All the experiments shall be implemented using both Hardware and Software.

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I B. TECH (R23) – II SEMESTER

Subject Code	Title of the Subject	L	T	P	C
23A20503	DATA STRUCTURES LAB	0	0	3	1.5

Course Objectives:
The course aims to strength then the ability of the students to identify and apply the suitable data structure for the given real-world problem. It enables them to gain knowledge in practical applications of data structures.

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

CO1: Explain the role of linear data structures inorganizing and accessing data efficiently in algorithms.

CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.

CO3: Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.

CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues and apply the map appropriately to solve data management challenges.

CO5: Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

	POI	P02	P03	PO4	PO5	PO6	PO7	PO8	PO9	POI0	POII	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	1						.			2	1	
CO2	2	2	2	I									2	I	
CO2	2	2	2	1									2	]	
CO4	2	2	2	]									2	2	
CO5	2	2	2	1									2	2	

List of Experiments:
Exercise1:ArrayManipulation
i)   Write a program to reverse an array.
ii) C Programs to implement the Searching Techniques -Linear &Binary Search
iii) C Programs to implement Sorting Techniques-Bubble, Selection and Insertion Sort
Exercise2: Linked List Implementation
i)   Implement a singly linked list and perform insertion and deletion operations.
ii) Develop a program to reverse a linked list iteratively and recursively.
iii) Solve problems involving linked list traversal and manipulation.

Exercise3: Linked List Applications
i)   Create a program to detect and remove duplicates from a linked list.

ii) Implement a linked list to represent polynomials and perform addition.

iii) Implement a double-ended queue(deque)with essential operations.

Exercise4: Double Linked List Implementation

i) Implement a doubly linked list and perform various operations to understand its properties and applications.

ii) Implement a circular linked list and perform insertion, deletion, and traversal.

Exercise5: Stack Operations

i) Implement a stack using arrays and linked lists.

ii) Write a program to evaluate a postfix expression using a stack.

iii) Implement a program to check for balanced parentheses using a stack.

Exercise6: Queue Operations

i) Implement a queue using array sand linked lists.

ii) Develop a program to simulate a simple printer queue system.

iii) Solve problems involving circular queues.

Exercise7: Stack and Queue Applications

i) Use a stack to evaluate an infix expression and convert it to postfix.

ii) Create a program to determine whether a given string is a palindrome or not.

iii) Implement a stack or queue to perform comparison and check for symmetry.

Exercises: Binary Search Tree

i) Implementing a BST using Linked List.

ii) Traversing of BST.

Exercise9: Hashing

i) Implement a hash table with collision resolution techniques.

ii) Write a program to implement a simple cache using hashing.

Textbooks:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson,2ndEdition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Silicon Press, 2008

Reference Books:

1. Algorithms and Data Structures: The Basic Tool box by Kurt Mehlhorn and Peter Sanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft
3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
5. Algorithms in C, Parts 1-5(Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms by Robert Sedgewick.

I B. TECH (R23) – II SEMESTER
(Common to EEE, ECE &CSE)

Subject Code	Title of the Subject	L	T	P	C
23A25902	NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE	0	0	1	0.5

Course Objectives:

The objective of introducing this course is to impart discipline, character, fraternity, teamwork, socialconsciousness among the students and engaging them in selfless service.

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

CO1: Understand the importance of discipline, character and service motto.

CO2: Solve some societal issues by applying acquired knowledge, facts, and techniques

CO3: Explore human relationships by analysing social problems

CO4: Determine to extend their help for the fellow beings and downtrodden people

CO5: Develop leadership skills and civic responsibilities.

SYLLABUS

UNIT   I Orientation

General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, Career guidance.

Activities:

  i)   Conducting –ice breaking sessions-expectations from the course-knowing personal talents andskills
  ii) Conducting orientation programs for the students –future plans-activities-releasing road mapetc.
  iii) Displaying success stories-motivational biopics- award winning movies on societal issues etc.
  iv) Conducting talent show in singing patriotic songs-paintings- any other contribution.

UNIT   II Nature & Care

Activities:

i)   Best out of waste competition.
ii) Poster and signs making competition to spread environmental awareness.
iii) Recycling and environmental pollution article writing competition.
iv) Organizing Zero-waste day.
v)   Digital Environmental awareness activity via various social media platforms.
vi) Virtual demonstration of different eco-friendly approaches for sustainable living.
vii) Write a summary on any book related to environmental issues.

UNIT   III Community Service

Activities:
i)   Conducting One Day Special Camp in a village contacting village-area leaders-Surveyin the village, identification of problems- helping them to solve via media-authorities-experts-etc.
ii) Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS,
iii) Conducting consumer Awareness. Explaining various legal provisions etc.
iv) Women Empowerment Programmes- Sexual Abuse, Adolescent Health and PopulationEducation.
v)   Any other programmes in collaboration with local charities, NGOs etc.

Reference Books:
   1. Nirmalya Kumar Sinha & Surajit Majumder, *A Text Book of National Service Scheme* Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
   2. *Red Book - National Cadet Corps* – Standing Instructions Vol I & II, DirectorateGeneral of NCC, Ministry of Defence, New Delhi
   3. Davis M. L. and Cornwell D. A., *Introduction to Environmental Engineering*,McGraw Hill, New York 4/e 2008
   4. Masters G. M., Joseph K. and Nagendran R. *Introduction to EnvironmentalEngineering and Science*, Pearson Education, New Delhi. 2/e 2007
   5. Ram Ahuja. *Social Problems in India*, Rawat Publications, New Delhi.

General Guidelines:
   1. Institutes must assign slots in the Timetable for the activities.
   2. Institutes are required to provide instructor to mentor the students.

Evaluation Guidelines:
   1. Evaluated for a total of 100 marks.
   2. A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totaling to 90 marks.
   3. A student shall be evaluated by the concerned teacher for 10 marks by conducting vivavoce on the subject.

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ENGINEERING (AUTONOMOUS) ANANTHAPURAMU– 515002 (A.P) INDIA
Department of Computer Science and Engineering
II B.Tech (R23) **STRUCTURE & SYLLABI**

B. Tech – II Year I Semester Course Structure (R23)

S.No.	Course code	Title	L	T	P	Credits
1	23A35105	Discrete Mathematics & Graph Theory	3	0	0	3
2	23A35401a 23A35401b 23A35401c	a) Managerial Economics and Financial Analysis b) Organizational Behavior c) Business Environment (Common to EEE, ECE, CSE)	2	0	0	2
3	23A30503	Digital Logic and Computer Organization	3	0	0	3
4	23A30504	Advanced Data Structures & Algorithms Analysis	3	0	0	3
5	23A30505	Object-Oriented Programming Through JAVA	3	0	0	3
6	23A30506	Advanced Data Structures and Algorithms Analysis Lab	0	0	3	1.5
7	23A30507	Object-Oriented Programming Through JAVA Lab	0	0	3	1.5
8	23A30502	Python programming (Skill Enhancement Course) (Common to ME, ECE,CSE, CHEM)	0	1	2	2
9	23A39902	Environmental Science (Audit Course) (Common to all Branches)	2	0	0	-
		Total	16	1	8	19

B. Tech – II Year II Semester Course Structure (R23)

S.No.	Course code	Title	L	T	P	Credits
1	23A49902	Universal Human Values 2- Understanding Harmony and Ethical human conduct (Common to EEE, ECE, CSE)	2	1	0	3
2	23A45102	Probability & Statistics	3	0	0	3
3	23A40501	Operating Systems	3	0	0	3
4	23A40502	Database Management Systems	3	0	0	3
5	23A40503	Software Engineering	3	0	0	3
6	23A40504	Operating Systems Lab	0	0	3	1.5
7	23A40505	Database Management Systems Lab	0	0	3	1.5
8	23A40506	Full stack development (Skill Enhancement Course)	0	1	2	2
9	23A49901	Design Thinking & Innovation (Common to all Branches)	1	0	2	2
		Total	15	2	10	22
		23A49903- Mandatory Community Service Project Internship of 08 weeks duration during summer vacation				

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II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A35105	**DISCRETE MATHEMATICS & GRAPH THEORY**	**3**	**0**	**0**	**3**

Course Objectives:

Introduce the concepts of mathematical logic and gain knowledge in sets, relations and functions and Solve problems using counting techniques and combinatory and to introduce generating functions and recurrence relations. Use Graph Theory for solving real world problems.

Course Outcomes:

After successful completion of this course, the students should be able to:

COs	Statements	Blooms level
CO1	Apply mathematical logic to solve problems.	L2, L3
CO2	Understand the concepts and perform the operations related to sets, relations and functions. Gain the conceptual background needed and identify structures of algebraic nature.	L3, L5
CO3	Apply basic counting techniques to solve combinatorial problems.	L3
CO4	Formulate problems and solve recurrence relations.	L2, L3
CO5	Apply Graph Theory in solving computer science problems	L3, L5

CourseArticulationMatrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	-	-	-	-	-	-	1
CO2	3	2	2	2	-	-	-	-	-	-	-	1
CO3	3	2	2	1	-	-	-	-	-	-	-	1
CO4	2	2	2	1	-	-	-	-	-	-	-	1
CO5	3	3	2	1	-	-	-	-	-	-	-	1

1-Slightly,   2-Moderately,   3-Substantially

UNIT – I: sets and propositions
Introduction, combinations of sets, finite and infinite sets, uncountably infinite sets, principle of inclusion and exclusion, mathematical induction, propositions, logical connectiviteies, conditional and biconditionals,well formed formulas, tautologies, logical equaliences, Normal forms, theory of inference for statement calculus, predicate calculus ,the statement function, variable and quantifiers.

UNIT II Relations and functions:
Introduction, a relation model for data bases, properities of binary relations, closure of relations, warshels algorithm, equilence relations and partitions, partial ordering relations and lattices, functions, composition of functions, invetiable function, recursive functions.

UNIT – III: Permutations, combinations and Recurrence relations
Introduction, the rules of sum and product, permutations and combinations
Recurrence relations and recursive algorithms: Introduction, recurrence relations, linear recurrence relations with constant coefficients, homogenous solutions, particular solutions, total solutions, solution by the method of generating functions.

UNIT – IV : Groups and Rings:
Introduction, groups, sub groups, normal subgroups, generators and equitation of powers, cosets, codes and group codes, isomorphisms and automorphisms, homomorphisms and, rings ,integral domains, and fields, ring homomorphisms, polynomial rings .
Boolean algebra: lattices and algebraic systems, principle of duality, basic properties of algebraic systems defined by lattices,

UNIT – V: Graph Theory
Basic terminology, multigraphs and weighted graphs, diagraphs and relations, reprentation of graphs, operations on graphs, paths and circuits, graph Traversals, shortest paths in weighted graphs, eulerianpaths and circuits, planar graphs

Textbooks:
1. C L Liu| D P Mohapatra, Elements of Discrete Mathematics A computer Oriented Approach, Fourth Edition, McGraw-Hill Education.
2. J.P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, 2002

ReferenceBooks:
1. Kenneth H. Rosen, Discrete Mathematics and its Applications with Combinatorics and Graph Theory, 7th Edition, McGraw Hill Education (India) Private Limited.
2. Joe L. Mott, Abraham Kandel and Theodore P. Baker, Discrete Mathematics for Computer Scientists & Mathematicians, 2nd Edition, Pearson Education
3. Graph Theory with Applications to Engineering and Computer Science by Narsingh Deo.

Online Learning Resources:

1. http://www.cs.yale.edu/homes/aspnes/classes/202/notes.pdf

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II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A35401a	**MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS** **(Common to EEE. ECE. CSE)**	2	0	0	2

Course Objectives:
- To inculcate the basic knowledge of microeconomics and financial accounting
- To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost
- To Know the Various types of market structure and pricing methods and strategy
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills on accounting and to explain the process of preparing financial statements.

Course Outcomes:
- Define the concepts related to Managerial Economics, financial accounting and management(L1)
- Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets (L2)
- Apply the Concept of Production cost and revenues for effective Business decision (L3)
- Analyse how to invest their capital and maximize returns (L4)
- Evaluate the capital budgeting techniques. (L5)
- Develop the accounting statements and evaluate the financial performance of business entity (L6)

UNIT - I   Managerial Economics
Introduction – Nature, meaning, significance, functions, and advantages - Demand-Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement Demand Forecasting- Factors governing Forecasting, Methods - Managerial Economics and Financial Accounting and Management.

UNIT - II   Production and Cost Analysis
Introduction – meaning, functions - Production Function– Least-cost combination – Short run and long run Production Function- Isoquants and Isocosts, Cost & Break-Even Analysis - Cost concepts - Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

UNIT - III   Business Organizations and Markets
Introduction – Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition–Oligopoly-Price-Output Determination - Pricing Methods and Strategies

UNIT - IV   Capital Budgeting
Introduction –Meaning, Capital Budgeting– Features, Proposals, Methods and Evaluation - Pay Back Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)

UNIT - V   Financial Accounting and Analysis

Introduction –- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments) - Introduction to Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability

Textbooks:
1. Varshney & Maheswari, *Managerial Economics*, Sultan Chand & sons. 2014
2. Aryasri, *Business Economics and Financial Analysis*, 4/e, MGH. 2008

Reference Books:
1. Ahuja H, *Managerial Economics,* S Chand. 2022
2. S.A. Siddiqui and A.S. Siddiqui, *Managerial Economics and Financial Analysis*, New Age International. Third edition 2022
3. Joseph G. Nellis and David Parker, *Principles of Business Economics*, Pearson, 2/e, New Delhi. 2002
4. Domnick Salvatore, *Managerial Economics in a Global Economy*, Cengage. 2004

Online Learning Resources:
https://www.slideshare.net/123ps/managerial-economics-ppt
https://www.slideshare.net/rossanz/production-and-cost-45827016
https://www.slideshare.net/darkyla/business-organizations-19917607
https://www.slideshare.net/balarajbl/market-and-classification-of-market
https://www.slideshare.net/ruchi101/capital-budgeting-ppt-59565396
https://www.slideshare.net/ashu1983/financial-accounting

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Department of Computer Science and Engineering
II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A35402b	**ORGANIZATIONAL BEHAVIOR** **(Common to EEE, ECE, CSE)**	**2**	**0**	**0**	**2**

To enable student's comprehension of organizational behaviour
- To offer knowledge to students on self-motivation, leadership and management
- To facilitate them to become powerful leaders
- To impart knowledge about group dynamics
- To make them understand the importance of change and development

Course Outcomes:
- Define the Organizational Behaviour, its nature and scope (L1)
- Understand the nature and concept of Organizational behaviour (L2)
- Apply theories of motivation to analyse the performance problems (L3)
- Analyse the different theories of leadership (L4)
- Evaluate group dynamics (L5)
- Develop as powerful leader (L3,L6)

UNIT - I   Introduction to Organizational Behavior
Meaning, definition, nature, scope and functions - Organizing Process – Making organizing effective - Understanding Individual Behavior – Attitude - Perception - Learning – Personality

UNIT - II   Motivation
Theories of Motivation- Maslow's Hierarchy of Needs - Hertzberg's Two Factor Theory - Vroom's theory of expectancy – Mc Cleland's theory of needs–Mc Gregor's theory X and theory Y– Adam's equity theory

UNIT - III   Organizational Culture & Leadership
Meaning definition - Organizational Climate - Leadership - Traits Theory–Managerial Grid - Transactional Vs Transformational Leadership - Qualities of good Leader - Conflict Management -Evaluating Leader

UNIT - IV   Group Dynamics
Introduction – Meaning, definition - Types of groups - Determinants of group behavior - Group process – Group Development - Group norms - Group cohesiveness - Small Groups - Group decision making - Team building

UNIT - V   Organizational Change and Development
Introduction –Meaning, definition and functions - Organizational Culture - Changing the Culture – Change Management – Work Stress Management - Organizational management

Textbooks:
1. Fred Luthans, Organisational *Behaviour*, McGraw-Hill, 12 Th edition. 2011

2. P Subba Rao, *Organisational Behaviour*, Himalya Publishing House. 2010

Reference Books:

1. McShane, *Organizational Behaviour*, TMH. 2022
2. Nelson, *Organisational Behaviour*, Thomson. 2012
3. Robbins, P. Stephen, Timothy A. Judge, *Organisational Behaviour*, Pearson. 2013
4. Aswathappa, *Organisational Behaviour*, Himalaya. 2010

Online Learning Resources:

https://www.slideshare.net/Knight1040/organizational-culture
9608857s://www.slideshare.net/AbhayRajpoot3/motivation-165556714
https://www.slideshare.net/harshrastogi1/group-dynamics-159412405
https://www.slideshare.net/vanyasingla1/organizational-change-development-26565951

Subject Code	Title of the Subject	L	T	P	C
23A35402c	**BUSINESS ENVIRONMENT** **(Common to EEE, ECE, CSE)**	**2**	**0**	**0**	**2**

Course Objectives:
- To make the student to understand about the business environment
- To enable them in knowing the importance of fiscal and monitory policy
- To facilitate them in understanding the export policy of the country
- To Impart knowledge about the functioning and role of WTO
- To Encourage the student in knowing the structure of stock markets

Course Outcomes:
- Define Business Environment and its Importance. (L1)
- Understand various types of business environment. (L2)
- Apply the knowledge of Money markets in future investment (L3)
- Analyse India's Trade Policy (L4)
- Evaluate fiscal and monitory policy (L5)
- Develop a personal synthesis and approach for identifying business opportunities (L6)

UNIT – I Overview of Business Environment

Introduction – meaning nature, scope, significance, functions and advantages - Internal & External environment - Competitive structure of industries -Environmental analysis

UNIT – II Fiscal & Monetary Policy

Meaning – advantages of Public Revenues - Public Expenditure - Evaluation of recent fiscal policy of GOI - Monetary Policy – RBI -Objectives of monetary and credit policy - Role of Finance Commission.

UNIT – III India's Trade Policy

Meaning- Magnitude and direction of Indian International Trade - Bilateral and Multilateral Trade Agreements - EXIM policy and role of EXIM bank -Balance of Payments – Causes for Disequilibrium in Balance of Payments

UNIT – IV World Trade Organization

Nature, significance, functions and advantages - Organization and Structure - Role and functions of WTO in promoting world trade - GATT -Agreements in the Uruguay Round –TRIPS, TRIMS - Disputes Settlement Mechanism - Dumping and Anti-dumping Measures

UNIT – V Money Markets and Capital Markets

Nature, meaning - Features and components of Indian financial systems - Objectives and structure of money markets and capital markets – SEBI – Stock Exchanges

- Investor protection and role of SEBI

Textbooks:

1. Cherunilam Francis, *International Business*: Text and Cases, Prentice Hall of India. 2010

2. K. Aswathappa, *Essentials of Business Environment*: Texts and Cases & Exercises 13th Revised Edition.HPH 2015

Reference Books:

1. K. V. Sivayya, V. B. M Das, *Indian Industrial Economy*, Sultan Chand Publishers, New Delhi, India. 1975

2. Sundaram, Black, *International Business Environment* Text and Cases, Prentice Hall of India, New Delhi, India. 2015

3. Chari. S. N, *International Business*, Wiley India. 2005

4.E. Bhattacharya, *International Business*, Excel Publications, New Delhi. 2022

Online Learning Resources:

https://www.slideshare.net/ShompaDhali/business-environment-53111245
https://www.slideshare.net/rbalsells/fiscal-policy-ppt
https://www.slideshare.net/aguness/monetary-policy-presentationppt
https://www.slideshare.net/DaudRizwan/monetary-policy-of-india-69561982
https://www.slideshare.net/ShikhaGupta31/indias-trade-policyppt
https://www.slideshare.net/viking2690/wto-ppt-60260883
https://www.slideshare.net/prateeknepal3/ppt-mo

Subject Code	Title of the Subject	L	T	P	C
23A30503	**DIGITAL LOGIC & COMPUTER ORGANIZATION**	3	0	0	3

Course Objectives: The main objective of the course is to
- provide students with a comprehensive understanding of digital logic design principles and computer organization fundamentals
- Describe memory hierarchy concepts
- Explain input/output (I/O) systems and their interaction with the CPU, memory, and peripheral devices

Course Outcomes: After completion of the course, students will be able to
- Differentiate between combinational and sequential circuits based on their characteristics and functionalities. (L2)
- Demonstrate an understanding of computer functional units. (L2)
- Analyze the design and operation of processors, including instruction execution, pipelining, and control unit mechanisms, to comprehend their role in computer systems.(L3)
- Describe memory hierarchy concepts, including cache memory, virtual memory, and secondary storage, and evaluate their impact on system performance and scalability. (L3)
- Explain input/output (I/O) systems and their interaction with the CPU, memory, and peripheral devices, including interrupts, DMA, and I/O mapping techniques. (L3)
- Design Sequential and Combinational Circuits (L6)

UNIT – I:
Data Representation: Binary Numbers, Fixed Point Representation. Floating Point Representation. Number base conversions, Octal and Hexadecimal Numbers, components, Signed binary numbers, Binary codes
Digital Logic Circuits-I: Basic Logic Functions, Logic gates, universal logic gates, Minimization of Logic expressions. K-Map Simplification, Combinational Circuits, Decoders, Multiplexers

UNIT – II:
Digital Logic Circuits-II: Sequential Circuits, Flip-Flops, Binary counters, Registers, Shift Registers, Ripple counters
Basic Structure of Computers: Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Computer Generations, Von- Neumann Architecture

UNIT – III:
Computer Arithmetic : Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations
Processor Organization: Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization, Hardwired Control and Multi programmed Control

UNIT – IV:

The Memory Organization: Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage

UNIT – V:

Input /Output Organization: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces

Textbooks:

1. Computer Organization, Carl Hamacher, ZvonkoVranesic, SafwatZaky, 6th edition, McGraw Hill, 2023.
2. Digital Design, 6th Edition, M. Morris Mano, Pearson Education, 2018.
3. Computer Organization and Architecture, William Stallings, 11thEdition, Pearson, 2022.

Reference Books:

1. Computer Systems Architecture, M.Moris Mano, 3rdEdition, Pearson, 2017.
2. Computer Organization and Design, David A. Paterson, John L. Hennessy, Elsevier, 2004.
3. Fundamentals of Logic Design, Roth, 5thEdition, Thomson, 2003.

Online Learning Resources:
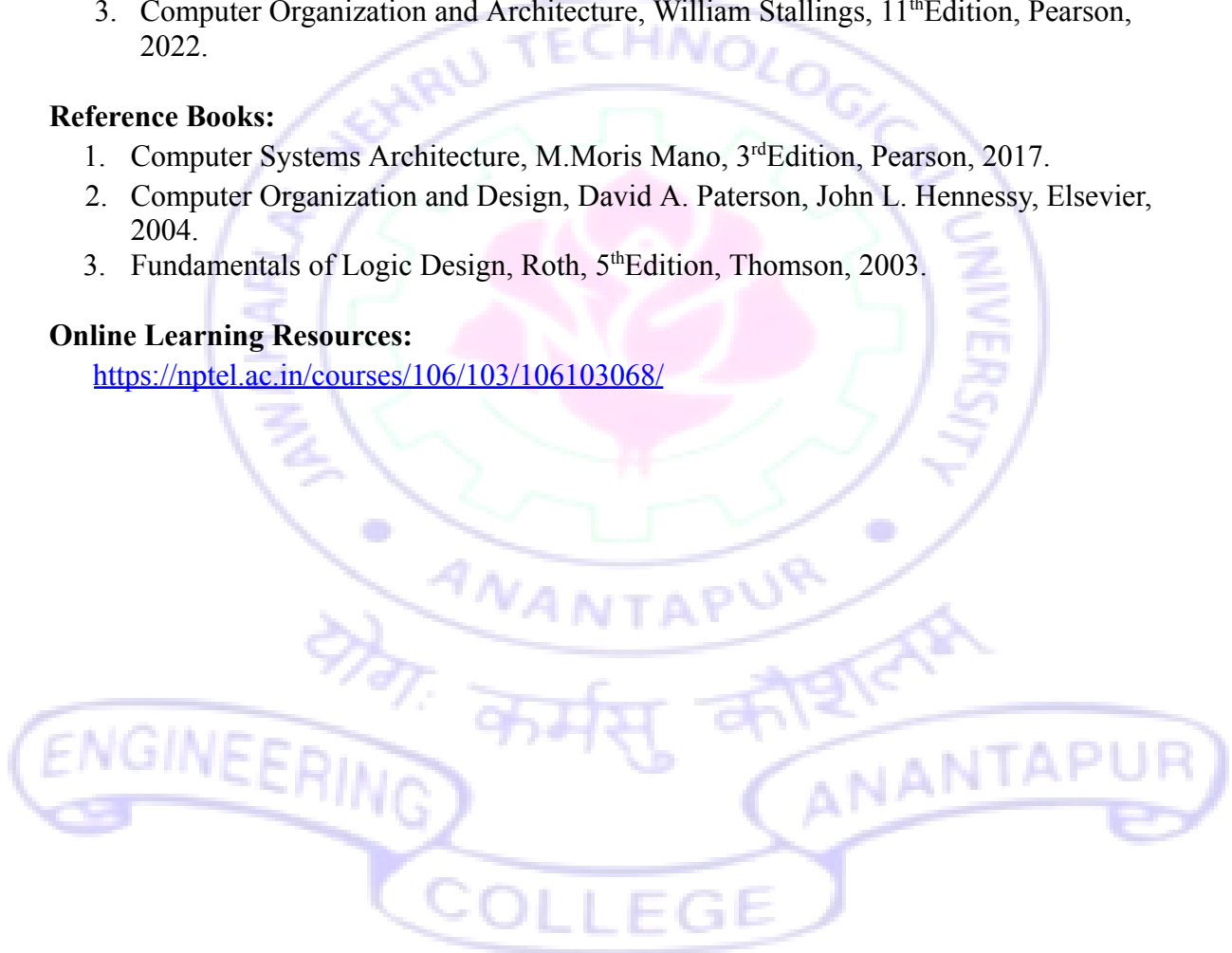
https://nptel.ac.in/courses/106/103/106103068/

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Subject Code	Title of the Subject	L	T	P	C
23A30504	**ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS**	**3**	**0**	**0**	**3**

Course Objectives: The main objective of the course is to
- provide knowledge on advance data structures frequently used in Computer Science domain
- Develop skills in algorithm design techniques popularly used
- Understand the use of various data structures in the algorithm design

Course Outcomes: After completion of the course, students will be able to
- Illustrate the working of the advanced tree data structures and their applications (L2)
- Understand the Graph data structure, traversals and apply them in various contexts. (L2)
- Use various data structures in the design of algorithms (L3)
- Recommend appropriate data structures based on the problem being solved (L5)
- Analyze algorithms with respect to space and time complexities (L4)
- Design new algorithms (L6)

UNIT – I:
Introduction to Algorithm Analysis, Space and Time Complexity analysis, Asymptotic Notations.
AVL Trees – Creation, Insertion, Deletion operations and Applications
B-Trees – Creation, Insertion, Deletion operations and Applications

UNIT – II:
Heap Trees (Priority Queues) – Min and Max Heaps, Operations and Applications
Graphs – Terminology, Representations, Basic Search and Traversals, Connected Components and Biconnected Components, applications
Divide and Conquer: The General Method, Quick Sort, Merge Sort, Strassen's matrix multiplication, Convex Hull

UNIT – III:
Greedy Method: General Method, Job Sequencing with deadlines, Knapsack Problem, Minimum cost spanning trees, Single Source Shortest Paths
Dynamic Programming: General Method, All pairs shortest paths, Single Source Shortest Paths – General Weights (Bellman Ford Algorithm), Optimal Binary Search Trees, 0/1 Knapsack, String Editing, Travelling Salesperson problem

UNIT – IV:
Backtracking: General Method, 8-Queens Problem, Sum of Subsets problem, Graph Coloring, 0/1 Knapsack Problem
Branch and Bound: The General Method, 0/1 Knapsack Problem, Travelling Salesperson problem

UNIT – V:

NP Hard and NP Complete Problems: Basic Concepts, Cook's theorem NP Hard Graph Problems: Clique Decision Problem (CDP), Chromatic Number Decision Problem (CNDP), Traveling Salesperson Decision Problem (TSP)

NP Hard Scheduling Problems: Scheduling Identical Processors, Job Shop Scheduling

Textbooks:

1. Fundamentals of Data Structures in C++, Horowitz, Ellis; Sahni, Sartaj; Mehta, Dinesh 2nd Edition Universities Press
2. Computer Algorithms/C++ Ellis Horowitz, SartajSahni, SanguthevarRajasekaran2nd Edition University Press

Reference Books:

1. Data Structures and program design in C, Robert Kruse, Pearson Education Asia
2. An introduction to Data Structures with applications, Trembley & Sorenson, McGraw Hill
3. The Art of Computer Programming, Vol.1: Fundamental Algorithms, Donald E Knuth, Addison-Wesley, 1997.
4. Data Structures using C & C++: Langsam, Augenstein&Tanenbaum, Pearson, 1995
5. Algorithms + Data Structures &Programs:,N.Wirth, PHI
6. Fundamentals of Data Structures in C++: Horowitz Sahni& Mehta, Galgottia Pub.
7. Data structures in Java:, Thomas Standish, Pearson Education Asia

Online Learning Resources:

1. https://www.tutorialspoint.com/advanced_data_structures/index.asp
2. http://peterindia.net/Algorithms.html
3. Abdul Bari,1. Introduction to Algorithms (youtube.com)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR COLLEGE OF ENGINEERING (AUTONOMOUS) ANANTHAPURAMU– 515002 (A.P) INDIA

Department of Computer Science and Engineering

II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A30505	**OBJECT-ORIENTED PROGRAMMING THROUGH JAVA**	3	0	0	3

Course Objectives: The learning objectives of this course are to:
- Identify Java language components and how they work together in applications
- Learn the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries.
- Learn how to extend Java classes with inheritance and dynamic binding and how to use exception handling in Java applications
- Understand how to design applications with threads in Java
- Understand how to use Java apisfor program development

Course Outcomes: After completion of the course, students will be able to
- Analyze problems, design solutions using OOP principles, and implement them efficiently in Java. (L4)
- Design and implement classes to model real-world entities, with a focus on attributes, behaviors, and relationships between objects (L4)
- Demonstrate an understanding of inheritance hierarchies and polymorphic behaviour, including method overriding and dynamic method dispatch. (L3)
- Apply Competence in handling exceptions and errors to write robust and fault-tolerant code. (L3)
- Perform file input/output operations, including reading from and writing to files using Java I/O classes, graphical user interface (GUI) programming using JavaFX. (L3)
- Choose appropriate data structure of Java to solve a problem (L6)

UNIT I: Object Oriented Programming: Basic concepts, Principles, Program Structure in Java: Introduction, Writing Simple Java Programs, Elements or Tokens in Java Programs, Java Statements, Command Line Arguments, User Input to Programs, Escape Sequences Comments, Programming Style.

Data Types, Variables, and Operators :Introduction, Data Types in Java, Declaration of Variables, Data Types, Type Casting, Scope of Variable Identifier, Literal Constants, Symbolic Constants, Formatted Output with printf() Method, Static Variables and Methods, Attribute Final, **Introduction to Operators**, Precedence and Associativity of Operators, Assignment Operator (=), Basic Arithmetic Operators, Increment (++) and Decrement (- -) Operators, Ternary Operator, Relational Operators, Boolean Logical Operators, Bitwise Logical Operators.

Control Statements: Introduction, if Expression, Nested if Expressions, if–else Expressions, Ternary Operator?:, Switch Statement, Iteration Statements, while Expression, do–while Loop, for Loop, Nested for Loop, For–Each for Loop, Break Statement, Continue Statement.

UNIT II: Classes and Objects: Introduction, Class Declaration and Modifiers, Class Members, Declaration of Class Objects, Assigning One Object to Another, Access Control for Class Members, Accessing Private Members of Class, Constructor Methods for Class, Overloaded Constructor Methods, Nested Classes, Final Class and Methods, Passing Arguments by Value and by Reference, Keyword this.

Methods: Introduction, Defining Methods, Overloaded Methods, Overloaded Constructor Methods, Class Objects as Parameters in Methods, Access Control, Recursive Methods, Nesting of Methods, Overriding Methods, Attributes Final and Static.

Arrays: Introduction, Declaration and Initialization of Arrays, Storage of Array in Computer Memory, Accessing Elements of Arrays, Operations on Array Elements, Assigning Array

to Another Array, Dynamic Change of Array Size, Sorting of Arrays, Search for Values in Arrays, Class Arrays, Two-dimensional Arrays, Arrays of Varying Lengths, Three-dimensional Arrays, Arrays as Vectors.

String Handling in Java: Introduction, Interface Char Sequence, Class String, Methods for Extracting Characters from Strings, Comparison, Modifying, Searching; Class String Buffer.

UNIT III: Inheritance: Introduction, Process of Inheritance, Types of Inheritances, Universal Super Class- Object Class, Inhibiting Inheritance of Class Using Final, Access Control and Inheritance, Multilevel Inheritance, Application of Keyword Super, Constructor Method and Inheritance, Method Overriding, Dynamic Method Dispatch, Abstract Classes, Interfaces and Inheritance.

Interfaces: Introduction, Declaration of Interface, Implementation of Interface, Multiple Interfaces, Nested Interfaces, Inheritance of Interfaces, Default Methods in Interfaces, Static Methods in Interface, Functional Interfaces, Annotations.

Packages : Introduction, Defining Package, Importing Packages and Classes into Programs, Path and Class Path, Access Control, Packages in Java SE,

UNIT IV: Java Library: Java.lang Package and its Classes, Class Object, Enumeration, class Math, Wrapper Classes, Auto-boxing and Auto- unboxing, Java util Classes and Interfaces, Formatter Class, Random Class, Time Package, Class Instant (java.time.Instant), Formatting for Date/Time in Java, Temporal Adjusters Class, Temporal Adjusters Class.

Exception Handling: Introduction, Hierarchy of Standard Exception Classes, Keywords throws and throw, try, catch, and finally Blocks, Multiple Catch Clauses, Class Throwable, Unchecked Exceptions, Checked Exceptions.

Java I/O and File: Java I/O API, standard I/O streams, types, Byte streams, Character streams, Scanner class, Files in Java.

UNIT V:

Multithreaded Programming: Introduction, Need for Multiple Threads Multithreaded Programming for Multi-core Processor, Thread Class, Main Thread-Creation of New Threads, Thread States, Thread Priority-Synchronization, Deadlock and Race Situations, Inter-thread Communication - Suspending, Resuming, and Stopping of Threads.

Java Database Connectivity: Introduction, JDBC Architecture, Installing MySQL and MySQL Connector/J, JDBC Environment Setup, Establishing JDBC Database Connections, ResultSet Interface

Java FX GUI: Java FX Scene Builder, Java FX App Window Structure, displaying text and image, event handling, laying out nodes in scene graph, mouse events.

Text Books:
1. The complete Reference Java, 11thedition, Herbert Schildt,TMH

References Books:
1. Introduction to Java programming, 7th Edition, Y Daniel Liang, Pearson.
2. Joy with JAVA, Fundamentals of Object Oriented Programming, DebasisSamanta, MonalisaSarma, Cambridge, 2023.
3. JAVA 9 for Programmers, Paul Deitel, Harvey Deitel, 4th Edition, Pearson.

Online Resources:
1. https://nptel.ac.in/courses/106/105/106105191/
2. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012880464547618816347_shared/overview

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Department of Computer Science and Engineering

II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A30506	**ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS LAB**	0	0	3	1.5

Course Objectives: The objective of the course is to
- acquire practical skills in constructing and managing Data structures
- apply the popular algorithm design methods in problem-solving scenarios

Course Outcomes: After completion of the course, students will be able to
- Design and develop programs to solve real world problems with the popular algorithm design methods. (L5)
- Demonstrate an understanding of Non-Linear data structures by developing implementing the operations on AVL Trees, B-Trees, Heaps and Graphs. (L2)
- Critically assess the design choices and implementation strategies of algorithms and data structures in complex applications. (L5)
- Utilize appropriate data structures and algorithms to optimize solutions for specific computational problems. (L3)
- Compare the performance of different of algorithm design strategies (L4)
- Design algorithms to new real world problems (L6)

Experiments covering the Topics:
- Operations on AVL trees, B-Trees, Heap Trees
- Graph Traversals
- Sorting techniques
- Minimum cost spanning trees
- Shortest path algorithms
- 0/1 Knapsack Problem
- Travelling Salesperson problem
- Optimal Binary Search Trees
- N-Queens Problem
- Job Sequencing

Sample Programs:
1. Construct an AVL tree for a given set of elements which are stored in a file. And implement insert and delete operation on the constructed tree. Write contents of tree into a new file using in-order.
2. Construct B-Tree an order of 5 with a set of 100 random elements stored in array. Implement searching, insertion and deletion operations.
3. Construct Min and Max Heap using arrays, delete any element and display the content of the Heap.
4. Implement BFT and DFT for given graph, when graph is represented by
   a) Adjacency Matrix   b) Adjacency Lists
5. Write a program for finding the bi-connected components in a given graph.
6. Implement Quick sort and Merge sort and observe the execution time for various input

sizes (Average, Worst and Best cases).

7. Compare the performance of Single Source Shortest Paths using Greedy method when the graph is represented by adjacency matrix and adjacency lists.
8. Implement Job sequencing with deadlines using Greedy strategy.
9. Write a program to solve 0/1 Knapsack problem Using Dynamic Programming.
10. Implement N-Queens Problem Using Backtracking.
11. Use Backtracking strategy to solve 0/1 Knapsack problem.
12. Implement Travelling Sales Person problem using Branch and Bound approach.

Reference Books:

1. Fundamentals of Data Structures in C++, Horowitz Ellis, SahniSartaj, Mehta, Dinesh, 2ndEdition, Universities Press
2. Computer Algorithms/C++ Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, 2ndEdition, University Press
3. Data Structures and program design in C, Robert Kruse, Pearson Education Asia
4. An introduction to Data Structures with applications, Trembley& Sorenson, McGraw Hill

Online Learning Resources:
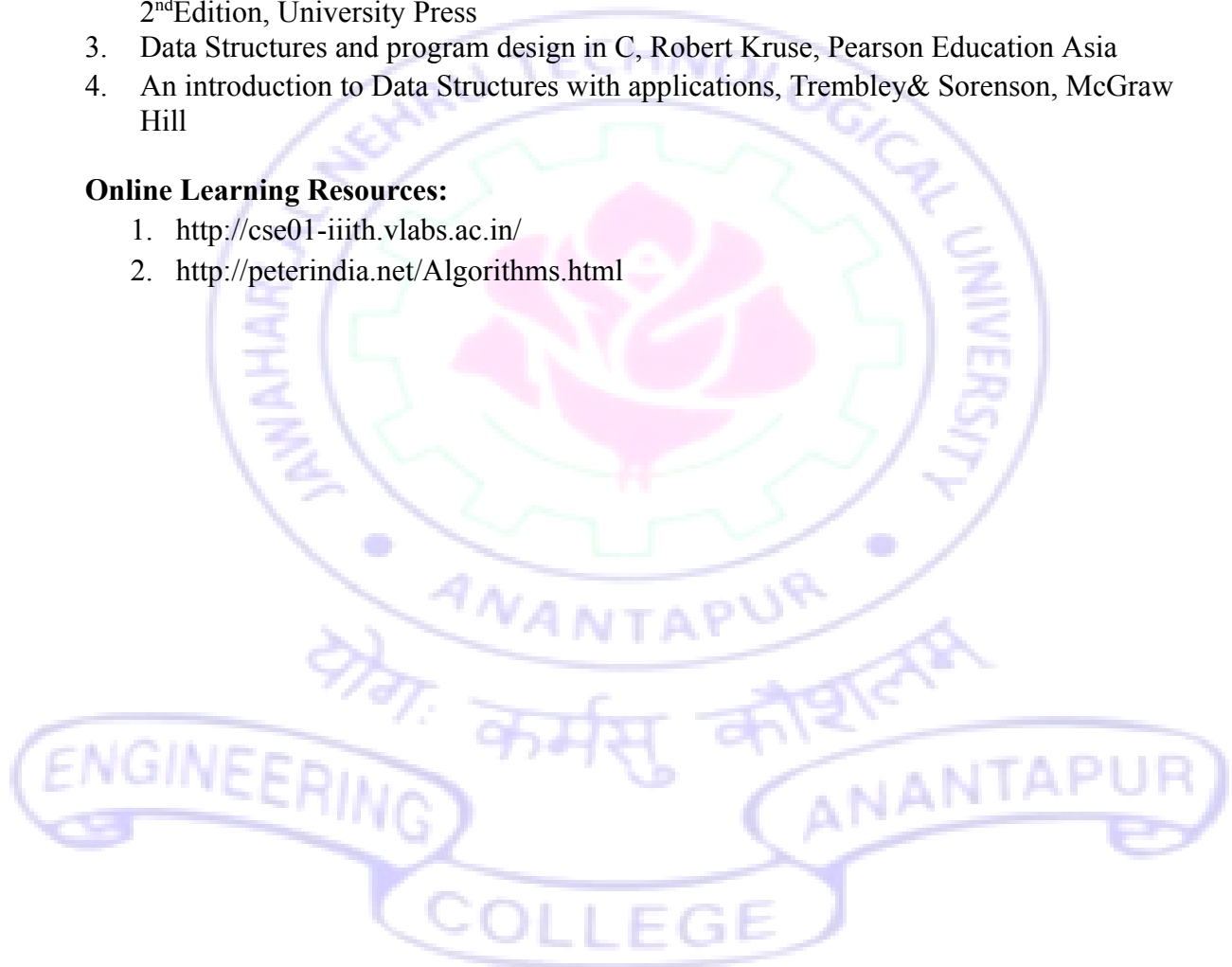
1. http://cse01-iiith.vlabs.ac.in/
2. http://peterindia.net/Algorithms.html

Department of Computer Science and Engineering
II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A30507	**OBJECT-ORIENTED PROGRAMMING THROUGH JAVA LAB**	0	0	3	1.5

Course Objectives: The aim of this course is to
- Practice object-oriented programming in the Java programming language
- Implement Classes, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism
- Illustrate inheritance, Exception handling mechanism, JDBC connectivity
- Construct Threads, Event Handling, implement packages, Java FX GUI

Course Outcomes: After completion of the course, students will be able to
- Demonstrate a solid understanding of Java syntax, including data types, control structures, methods, classes, objects, inheritance, polymorphism, and exception handling. (L2)
- Apply fundamental OOP principles such as encapsulation, inheritance, polymorphism, and abstraction to solve programming problems effectively. (L3)
- Familiar with commonly used Java libraries and APIs, including the Collections Framework, Java I/O, JDBC, and other utility classes. (L2)
- Develop problem-solving skills and algorithmic thinking, applying OOP concepts to design efficient solutions to various programming challenges. (L3)
- Proficiently construct graphical user interface (GUI) applications using JavaFX (L4)
- Develop new programs for solving typical computer science problems (L6)

Experiments covering the Topics:
- Object Oriented Programming fundamentals- data types, control structures
- Classes, methods, objects, Inheritance, polymorphism,
- Exception handling, Threads, Packages, Interfaces
- Files, I/O streams, JavaFX GUI

Sample Experiments:
Exercise – 1:
a) Write a JAVA program to display default value of all primitive data type of JAVA
b)   Write a java program that display the roots of a quadratic equation $ax^2+bx=0$. Calculate the discriminate D and basing on value of D, describe the nature of root.
Exercise - 2
a)   Write a JAVA program to search for an element in a given list of elements using binary search mechanism.
b) Write a JAVA program to sort for an element in a given list of elements using bubble sort
c) Write a JAVA program using String Buffer to delete, remove character.
Exercise - 3
a)   Write a JAVA program to implement class mechanism. Create a class, methods and invoke them inside main method.
b) Write a JAVA program implement method overloading.

c) Write a JAVA program to implement constructor.

d) Write a JAVA program to implement constructor overloading.

Exercise - 4

a) Write a JAVA program to implement Single Inheritance

b) Write a JAVA program to implement multi level Inheritance

c) Write a JAVA program for abstract class to find areas of different shapes

Exercise - 5

a) Write a JAVA program give example for "super" keyword.

b) Write a JAVA program to implement Interface. What kind of Inheritance can be achieved?

c) Write a JAVA program that implements Runtime polymorphism

Exercise - 6

a) Write a JAVA program that describes exception handling mechanism

b) Write a JAVA program Illustrating Multiple catch clauses

● Write a JAVA program for creation of Java Built-in Exceptions

● Write a JAVA program for creation of User Defined Exception

Exercise - 7

a)   Write a JAVA program that creates threads by extending Thread class. First thread display "Good Morning "every 1 sec, the second thread displays "Hello "every 2 seconds and the third display "Welcome" every 3 seconds, (Repeat the same by implementing Runnable)

b) Write a program illustrating **is Alive** and **join ()**

c) Write a Program illustrating Daemon Threads.

d) Write a JAVA program Producer Consumer Problem

Exercise – 8

8. Write a JAVA program that import and use the user defined packages

9. Without writing any code, build a GUI that display text in label and image in an ImageView (use JavaFX)

10.   Build a Tip Calculator app using several JavaFX components and learn how to respond to user interactions with the GUI

Exercise – 9

a) Write a java program that connects to a database using JDBC

b) Write a java program to connect to a database using JDBC and insert values into it.

c) Write a java program to connect to a database using JDBC and delete values from it

Textbooks:
1. JAVA one step ahead, Anitha Seth, B.L.Juneja, Oxford.
2. Joy with JAVA, Fundamentals of Object Oriented Programming, DebasisSamanta, MonalisaSarma, Cambridge, 2023.
3. JAVA 9 for Programmers, Paul Deitel, Harvey Deitel, 4th Edition, Pearson.

References Books:
1. The complete Reference Java, 11th edition, Herbert Schildt,TMH
2. Introduction to Java programming, 7th Edition, Y Daniel Liang, Pearson

Online Resources:
1. https://nptel.ac.in/courses/106/105/106105191/
2. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012880464547
618816347_shared/overview

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Department of Computer Science and Engineering
II B.Tech I Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A30502	**PYTHON PROGRAMMING** **(SKILL ENHANCEMENT COURSE)** **(Common to ME, ECE, CSE, CHEM)**	0	1	2	2

Course Objectives: The main objectives of the course are to
- Introduce core programming concepts of Python programming language.
- Demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries
- Implement Functions, Modules and Regular Expressions in Python Programming and to create practical and contemporary applications using these

Course Outcomes: After completion of the course, students will be able to
- Classify data structures of Python (L4)
- Apply Python programming concepts to solve a variety of computational problems (L3)
- 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 (L3)
- Become proficient in using commonly used Python libraries and frameworks such as JSON, XML, NumPy, pandas (L2)
- Exhibit competence in implementing and manipulating fundamental data structures such as lists, tuples, sets, dictionaries (L3)
- Propose new solutions to computational problems (L6)

UNTI-I: History of Python Programming Language, Thrust Areas of Python, Installing Anaconda Python Distribution, Installing and Using Jupyter 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
12. Write a program to perform any 5 built-in functions by taking any list.

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, Frozenset.
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 os.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 matplotlib

Reference Books:

1. Gowrishankar S, Veena A., Introduction to Python Programming, CRC Press.
2. Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2nd Edition, Pearson, 2024
3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

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
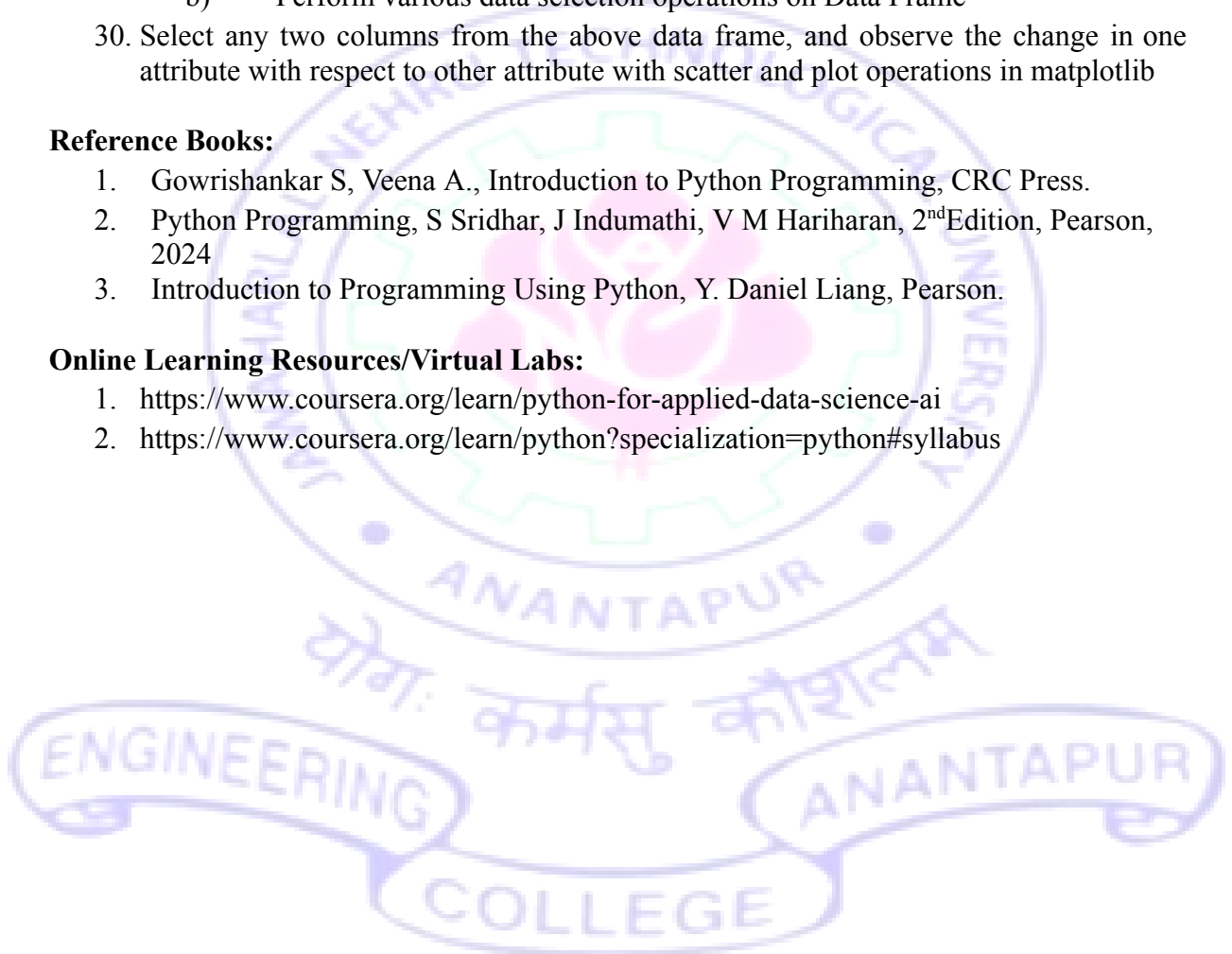
Subject Code	Title of the Subject	L	T	P	C
23A39902	**ENVIRONMENTAL SCIENCE (Audit Course)** (Common to all Branches)	2	0	0	-

COURSE OBJECTIVES: To make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.

UNIT – I:
NATURAL RESOURCES:
Energy resources: Sources of energy and their classification, renewable and non-renewable sources of energy; Conventional energy sources, Non-conventional energy sources; Implications of energy use on the environment.

Forest resources – Use and over – exploitation, deforestation, **Water resources** – Use and over utilization of surface and ground water– **Mineral resources**: Use and exploitation, environmental effects of extracting and using mineral resources

Introduction to sustainable development: Sustainable Development Goals (SDGs) - targets and indicators, challenges and strategies for SDGs.

UNIT – II:
ECOSYSTEMS: Concept of an ecosystem, Structure and function of an ecosystem, Energy flow in the ecosystem, Ecological succession. Introduction, types, characteristic features, structure and function of Forest, Grassland, Desert and aquatic ecosystems.

BIODIVERSITY AND ITS CONSERVATION : 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

UNIT – III:
ENVIRONMENTAL POLLUTION: Definition, Cause, effects and control measures of Air, Water, Soil, Marine, Noise, Thermal and Nuclear Pollutions.

SOLID WASTE MANAGEMENT: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.

UNIT – IV:
Climate Change: Impacts, Adaptation and Mitigation:
Understanding climate change: Natural variations in climate; Structure of atmosphere; **Anthropogenic climate change from greenhouse gas emissions**– past, present and future; Projections of global climate change
Impacts, vulnerability and adaptation to climate change. Observed impacts of climate change on ocean and land systems.

  Mitigation of climate change: Green House Gas (GHG) reduction vs. sink enhancement; Concept of carbon intensity, energy intensity and carbon neutrality; Energy efficiency measures; Renewable energy sources; Carbon capture and storage.

UNIT – V: **Environmental Management**
Introduction to environmental laws and regulation: Constitutional provisions- Article 48A, Article 51A (g) and other derived environmental rights; Introduction to environmental legislations on the forest, wildlife and pollution control.
Environmental management system: ISO 14001, Concept of Circular Economy, Life cycle analysis; Cost-benefit analysis, Environmental audit and impact assessment; Environmental risk assessment Pollution control and management; Waste Management- Concept of 3R (Reduce, Recycle and Reuse) and sustainability; Ecolabeling /Ecomark scheme.

TEXT BOOKS:
1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies by Palani Swamy – Pearson education
3. Environmental Studies by Dr.S.Azeem Unnisa, Academic Publishing Company

REFERENCES:
1. Textbook of Environmental Science by Deeksha Dave and E.Sai Baba Reddy, Cengage Pubilications.
2. Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.
3. Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.
4. Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Printice hall of India Private limited.
5. A Text Book of Environmental Studies by G.R.Chatwal, Himalaya Pubilishing House
6. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited

Course Outcomes:
At the end of the course the student will be able to
   CO1: Gain knowledge on natural resources that sustain life and govern economy
   CO2: Understand various causes of pollution and solid waste management and related preventive measures.
   CO3: Develop critical thinking for shaping strategies (scientific, social, economic, administrative, and legal) for environmental protection, conservation of biodiversity, environmental equity, and sustainable development.
   CO4: Gain knowledge on climate change, adaptation and mitigation.
   CO5: Adopt sustainability as a practice in life, society, and industry

   Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	1	3	1	1	-	-	1
CO2	-	-	-	-	-	1	3	1	1	-	-	1
CO3	-	-	-	-	-	1	3	1	1	-	-	1
CO4	-	-	-	-	-	1	3	1	1	-	-	1
CO5	-	-	-	-	-	1	3	1	1	-	-	1

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Department of Computer Science and Engineering
II B.Tech II Semester (R23)

Subject Code	Title of the Subject	L	T	P	C
23A49902	**UNIVERSAL HUMAN VALUES – UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT** **(Common to EEE, ECE, CSE)**	2	1	0	3

Course Objectives:
- To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.

COURSE OUTCOMES: At the end of the course, students will be able to	**Blooms Level**
CO1	Define the terms like Natural Acceptance, Happiness and Prosperity	L1, L2
CO2	Identify one's self, and one's surroundings (family, society nature)	L1, L2
CO3	Apply what they have learnt to their own self in different day-to-day settings in real life	L3
CO4	Relate human values with human relationship and human society.	L4
CO5	Justify the need for universal human values and harmonious existence	L5
CO6	Develop as socially and ecologically responsible engineers	L3, L6

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 Goal

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
Tutorial 14: Practice Session PS14 Exploring Steps of Transition towards Universal Human Order

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

READINGS:
Textbook and Teachers Manual
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

self-exploration.

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/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201-Introduction%20to%20Value%20Education.pdf**

2. **https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf**

3. **https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf**

4. **https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3-S2%20Respect%20July%2023.pdf**

5. **https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf**

6. **https://fdp-si.aicte-india.org/download/FDPTeachingMaterial/3-days%20FDP-SI%20UHV%20Teaching%20Material/Day%203%20Handouts/UHV%203D%20D3-S2A%20Und%20Nature-Existence.pdf**

7. **https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%2023-25%20Ethics%20v1.pdf**

8. **https://www.studocu.com/in/document/kiet-group-of-institutions/universal-human-values/chapter-5-holistic-understanding-of-harmony-on-professional-ethics/62490385**

9. **https://onlinecourses.swayam2.ac.in/aic22_ge23/preview**

Subject Code	Title of the Subject	L	T	P	C
23A45102	**PROBABILITY & STATISTICS**	**3**	**0**	**0**	**3**

Course Outcomes:
After successful completion of this course, the students should be able to:

COs	Statements	Blooms level
CO1	Acquire knowledge in finding the analysis of the data quantitatively or categorically and various statistical elementary tools.	L2, L3
CO2	Develop skills in designing mathematical models involving probability, random variables and the critical thinking in the theory of probability and its applications in real life problems.	L3, L5
CO3	Apply the theoretical probability distributions like binomial, Poisson, and Normal in the relevant application areas.	L3
CO4	Analyze to test various hypotheses included in theory and types of errors for large samples.	L2, L3
CO5	Apply the different testing tools like t-test, F-test, chi-square test to analyze the relevant real life problems.	L3,L5

CourseArticulationMatrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	-	-	-	-	-	-	-	1
CO2	3	2	2	2	-	-	-	-	-	-	-	1
CO3	3	2	2	1	-	-	-	-	-	-	-	1
CO4	2	2	2	1	-	-	-	-	-	-	-	1
CO5	3	3	2	1	-	-	-	-	-	-	-	1

1-Slightly, 2-Moderately, 3-Substantially.

UNITI :   Descriptive statistics
Statistics Introduction, Population vs Sample, Collection of data, primary and secondary data, Measures of Central tendency, Measures of Variability (spread or variance) Skewness, Kurtosis, correlation, correlation coefficient, rank correlation, regression coefficients, method of least squares, regression lines.

UNIT II   Probability
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 III Probability distributions
Probability distributions: Binomial, Poisson and Normal-their properties (Chebyshevs inequality). Approximation of the binomial distribution to normal distribution.

UNIT IV   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

UNIT V   Small sample tests
Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), $\chi2$ - test for goodness of fit, $\chi2$ - test for independence of attributes.

Textbooks:
1. Miller and Freunds, Probability and Statistics for Engineers,7/e, Pearson, 2008.
2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.

Reference Books:
1. S. Ross, a First Course in Probability, Pearson Education India, 2002.
2. W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968.

3. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.

Online Learning Resources:

1. https://onlinecourses.nptel.ac.in/noc21_ma74/preview
2. https://onlinecourses.nptel.ac.in/noc22_mg31/preview
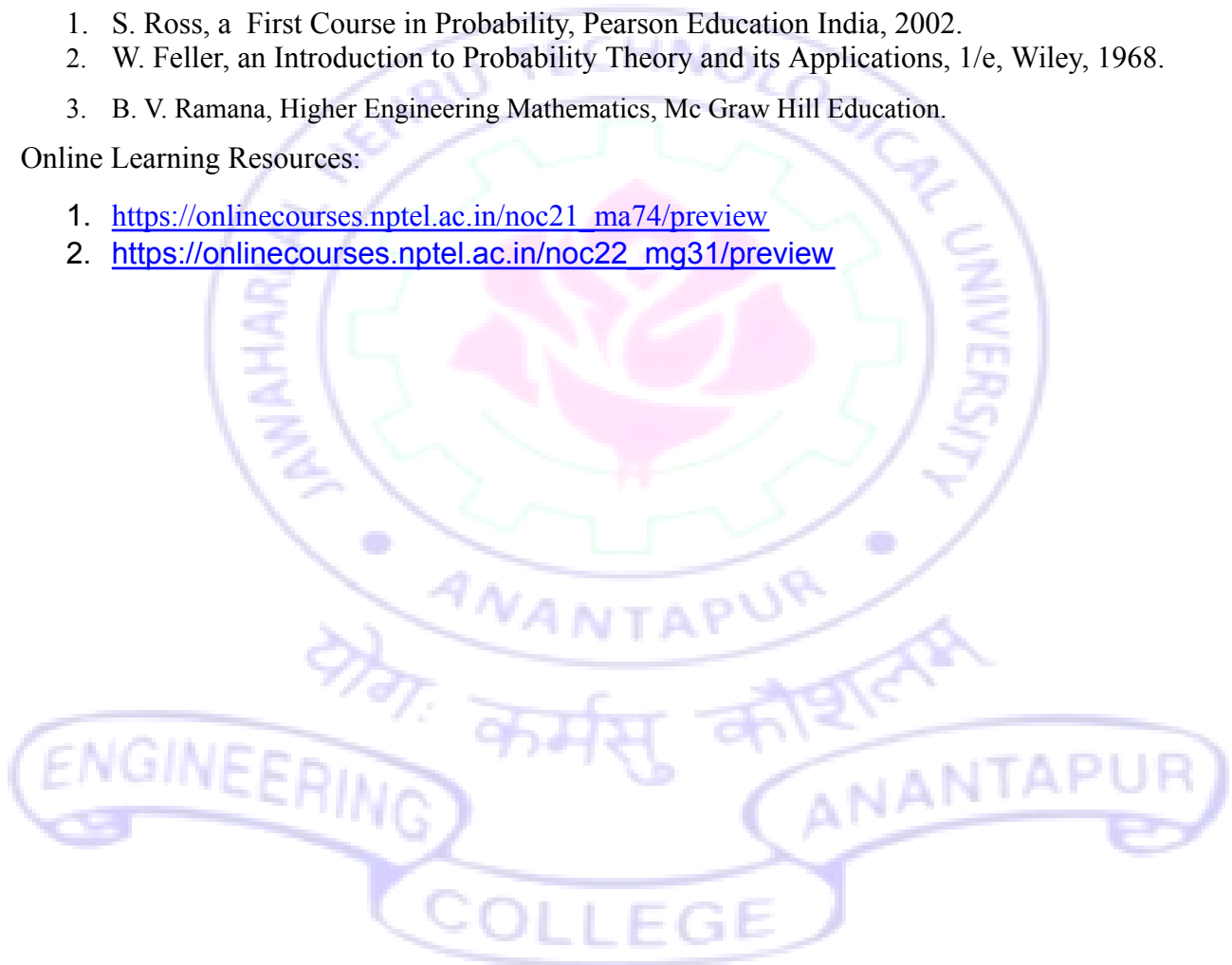
Subject Code	Title of the Subject	L	T	P	C
23A40501	**OPERATING SYSTEMS**	**3**	**0**	**0**	**3**

Course Objectives: The main objectives of the course is to make student
- Understand the basic concepts and principles of operating systems, including process management, memory management, file systems, and Protection
- Make use of process scheduling algorithms and synchronization techniques to achieve better performance of a computer system.
- Illustrate different conditions for deadlock and their possible solutions.

Course Outcomes: After completion of the course, students will be able to
- Describe the basics of the operating systems, mechanisms of OS to handle processes, threads, and their communication. (L1)
- Understand the basic concepts and principles of operating systems, including process management, memory management, file systems, and Protection. (L2)
- Make use of process scheduling algorithms and synchronization techniques to achieve better performance of a computer system. (L3)
- Illustrate different conditions for deadlock and their possible solutions. (L2)
- Analyze the memory management and its allocation policies. (L4)

UNIT - I
Operating Systems Overview: Introduction, Operating system functions, Operating systems operations, Computing environments, Free and Open-Source Operating Systems **System Structures:** Operating System Services, User and Operating-System Interface, system calls, Types of System Calls, system programs, Operating system Design and Implementation, Operating system structure, Building and Booting an Operating System, Operating system debugging

UNIT - II
Processes: Process Concept, Process scheduling, Operations on processes, Inter-process communication. **Threads and Concurrency:** Multithreading models, Thread libraries, Threading issues. **CPU Scheduling:** Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling.

UNIT – III
Synchronization Tools: The Critical Section Problem, Peterson's Solution, Mutex Locks, Semaphores, Monitors, Classic problems of Synchronization. **Deadlocks:** system Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from Deadlock.

UNIT - IV
Memory-Management Strategies: Introduction, Contiguous memory allocation, Paging, Structure of the Page Table, Swapping. **Virtual Memory Management:** Introduction, Demand paging, Copy-on-write, Page replacement, Allocation of frames, Thrashing. **Storage Management:** Overview of Mass Storage Structure, HDD Scheduling.

UNIT - V

File System: File System Interface: File concept, Access methods, Directory Structure; File system Implementation: File-system structure, File-system Operations, Directory implementation, Allocation method, Free space management; File-System Internals: File-System Mounting, Partitions and Mounting, File Sharing. **Protection:** Goals of protection, Principles of protection, Protection Rings, Domain of protection, Access matrix.

Textbooks:

1. Operating System Concepts, Silberschatz A, Galvin P B, Gagne G,   10th Edition, Wiley, 2018.
2. Modern Operating Systems, Tanenbaum A S, 4th Edition, Pearson , 2016

Reference Books:

1. Operating Systems -Internals and Design Principles, Stallings W, 9th edition, Pearson, 2018
2. Operating Systems: A Concept Based Approach, D.M Dhamdhere, 3rd Edition, McGraw- Hill, 2013

Online Learning Resources:

1. https://nptel.ac.in/courses/106/106/106106144/
2. http://peterindia.net/OperatingSystems.html
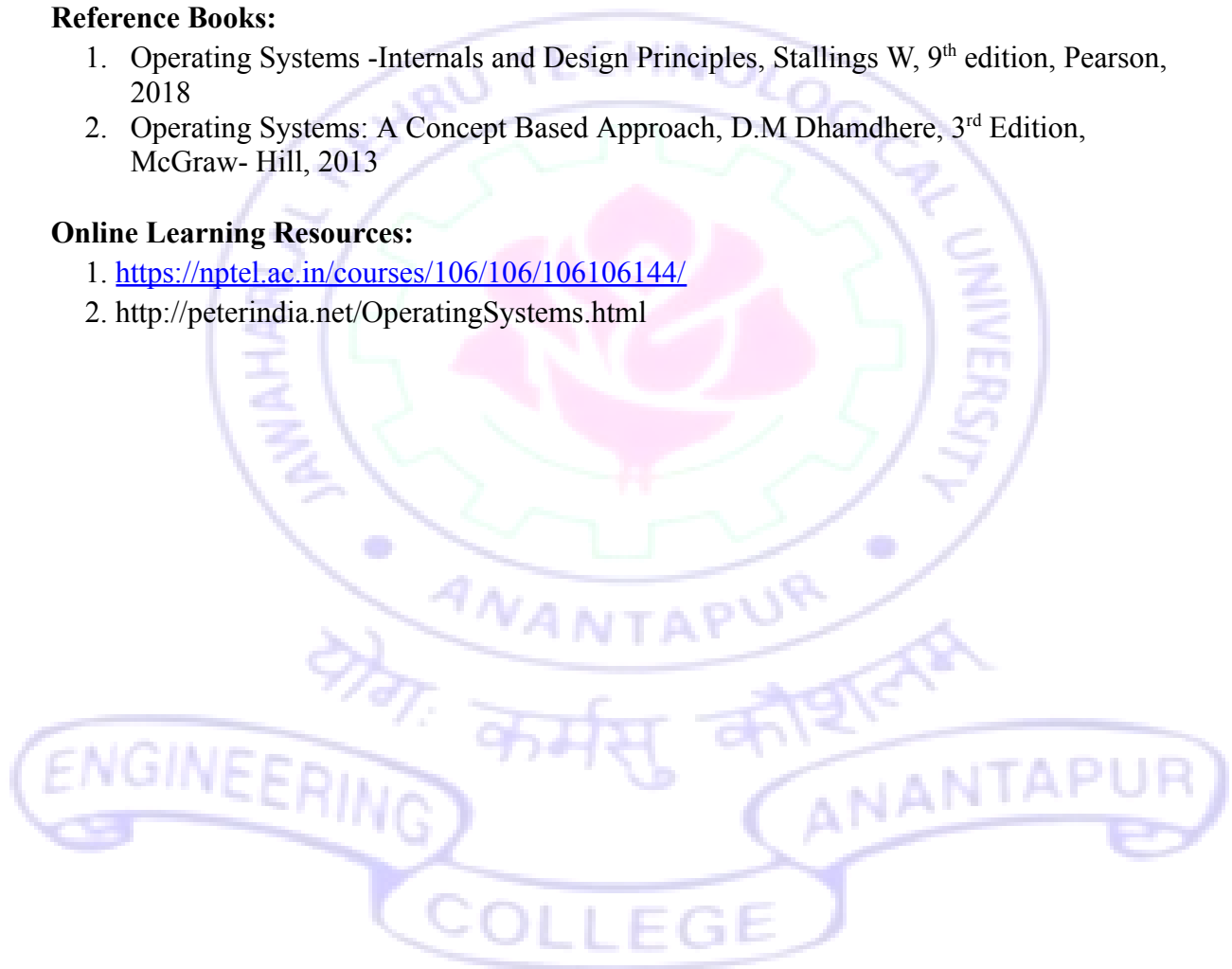
Subject Code	Title of the Subject	L	T	P	C
23A40502	**DATABASE MANAGEMENT SYSTEMS**	3	0	0	3

Course Objectives: The main objective of the course is to
- Introduce database management systems and to give a good formal foundation on the relational model of data and usage of Relational Algebra
- Introduce the concepts of basic SQL as a universal Database language
- Demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization
- Provide an overview of physical design of a database system, by discussing Database indexing techniques and storage techniques

Course Outcomes: After completion of the course, students will be able to
- Understand the basic concepts of database management systems (L2)
- Analyze a given database application scenario to use ER model for conceptual design of the database (L4)
- Utilize SQL proficiently to address diverse query challenges (L3).
- Employ normalization methods to enhance database structure (L3)
- Assess and implement transaction processing, concurrency control and database recovery protocols in databases. (L4)

UNIT I:Introduction: Database system, Characteristics (Database Vs File System), Database Users, Advantages of Database systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure, environment, Centralized and Client Server architecture for the database.
Entity Relationship Model: Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance, specialization, generalization using ER Diagrams.

Unit II: Relational Model: Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints) and their importance, Relational Algebra, Relational Calculus. BASIC SQL:Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update).

UNIT III: SQL: Basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions(Date and Time, Numeric, String conversion).Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, view(updatable and non-updatable), relational set operations.

UNIT IV: Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency, Lossless join and dependency preserving decomposition, (1NF, 2NF and 3 NF), concept of surrogate key, Boyce-Codd normal form(BCNF), MVD, Fourth normal form(4NF), Fifth Normal Form (5NF).

UNIT V:Transaction Concept: Transaction State, ACID properties, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability, lock based, time stamp based, optimistic, concurrency protocols, Deadlocks, Failure Classification, Storage, Recovery and Atomicity, Recovery algorithm.

Introduction to Indexing Techniques: B+ Trees, operations on B+Trees, Hash Based Indexing:

Textbooks:
1. Database Management Systems, 3rd edition, Raghurama Krishnan, Johannes Gehrke, TMH (For Chapters 2, 3, 4)
2. Database System Concepts,5th edition, Silberschatz, Korth, Sudarsan,TMH (For Chapter 1 and Chapter 5)

Reference Books:
1. Introduction to Database Systems, 8thedition, C J Date, Pearson.
2. Database Management System, 6th edition, RamezElmasri, Shamkant B. Navathe, Pearson
3. Database Principles Fundamentals of Design Implementation and Management, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning.

Web-Resources:
1. https://nptel.ac.in/courses/106/105/106105175/
2. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_0127580666728202 2456_shared/overview
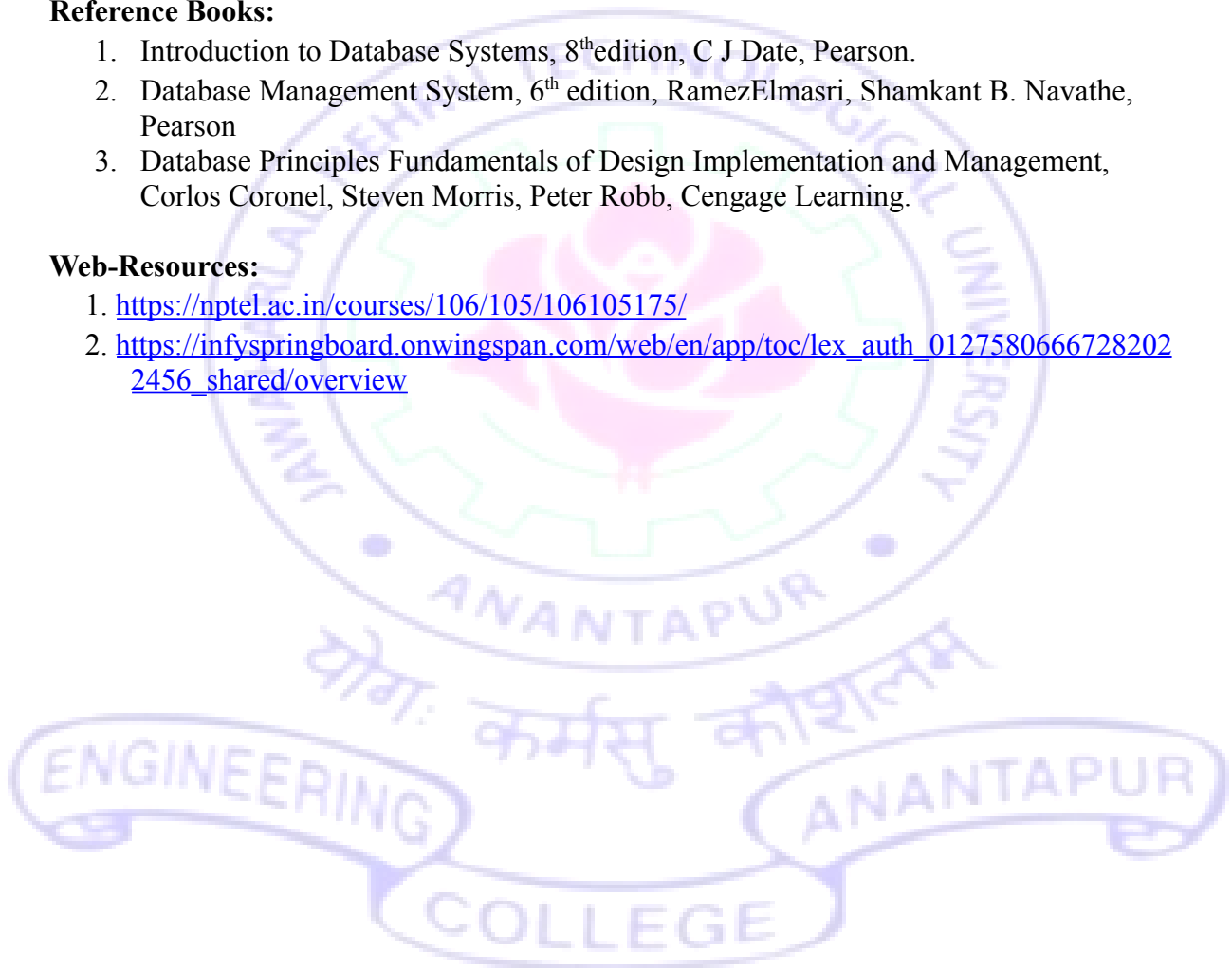
Subject Code	Title of the Subject	L	T	P	C
23A40503	**SOFTWARE ENGINEERING**	**3**	**0**	**0**	**3**

Course Objectives: The objectives of this course are to introduce

Software life cycle models, Software requirements and SRS document.

Project Planning, quality control and ensuring good quality software.

Software Testing strategies, use of CASE tools, Implementation issues, validation & verification procedures.

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

Perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance (L3)

Analyse various software engineering models and apply methods for design and development of software projects. (L4)

Develop system designs using appropriate techniques. (L3)

Understand various testing techniques for a software project. (L2)

Apply standards, CASE tools and techniques for engineering software projects (L3)

UNIT I:
Introduction: Evolution, Software development projects, Exploratory style of software developments, Emergence of software engineering, Notable changes in software development practices, Computer system engineering.
Software Life Cycle Models: Basic concepts, Waterfall model and its extensions, Rapid application development, Agile development model, Spiral model.

UNIT II:
Software Project Management: Software project management complexities, Responsibilities of a software project manager, Metrics for project size estimation, Project estimation techniques, Empirical Estimation techniques, COCOMO, Halstead's software science, risk management.
Requirements Analysis And Specification: Requirements gathering and analysis, Software Requirements Specification (SRS), Formal system specification, Axiomatic specification, Algebraic specification, Executable specification and 4GL.

UNIT III:
Software Design: Overview of the design process, How to characterize a good software design? Layered arrangement of modules, Cohesion and Coupling. approaches to software design.
Agility: Agility and the Cost of Change, Agile Process, Extreme Programming (XP), Other

Agile Process Models, Tool Set for the Agile Process (Text Book 2)

Function-Oriented Software Design: Overview of SA/SD methodology, Structured analysis, Developing the DFD model of a system, Structured design, Detailed design, and Design Review.

User Interface Design: Characteristics of a good user interface, Basic concepts, Types of user interfaces, Fundamentals of component-based GUI development, and user interface design methodology.

UNIT IV:

Coding And Testing: Coding, Code review, Software documentation, Testing, Black-box testing, White-Box testing, Debugging, Program analysis tools, Integration testing**,** Testing object-oriented programs, Smoke testing, and Some general issues associated with testing.

Software Reliability And Quality Management: Software reliability. Statistical testing, Software quality, Software quality management system, ISO 9000. SEI Capability maturity model. Few other important quality standards, and Six Sigma**.**

UNIT V:

Computer-Aided Software Engineering (Case): CASE and its scope, CASE environment, CASE support in the software life cycle, other characteristics of CASE tools, Towards second generation CASE Tool, and Architecture of a CASE Environment.

Software Maintenance: Characteristics of software maintenance, Software reverse engineering, Software maintenance process models and Estimation of maintenance cost.

Software Reuse: reuse- definition, introduction, reason behind no reuse so far, Basic issues in any reuse program, A reuse approach, and Reuse at organization level.

Text Books:
1. Fundamentals of Software Engineering, Rajib Mall, 5th Edition, PHI.
2. Software Engineering A practitioner's Approach, Roger S. Pressman, 9th Edition, Mc-Graw Hill International Edition.

Reference Books:
1. Software Engineering, Ian Sommerville,10th Edition, Pearson.
2. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.

e-Resources:
1) https://nptel.ac.in/courses/106/105/106105182/
2) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01260589506387148827_shared/overview
3) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013382690411003904735_shared/overview

Subject Code	Title of the Subject	L	T	P	C
23A40504	**OPERATING SYSTEMS LAB**	0	0	3	1.5

Course Objectives: The main objectives of the course are to
- Provide insights into system calls, file systems, semaphores,
- Develop and debug CPU Scheduling algorithms, page replacement algorithms, thread implementation
- Implement Bankers Algorithms to Avoid the Dead Lock

Course Outcomes: After completion of the course, students will be able to
1. Trace different CPU Scheduling algorithms (L2).
2. Implement Bankers Algorithms to Avoid the Dead Lock (L3).
3. Evaluate Page replacement algorithms (L5).
4. Illustrate the file organization techniques (L4).
5. Illustrate Inter process Communication and concurrent execution of threads (L4)

Experiments covering the Topics:
- UNIX fundamentals, commands & system calls
- CPU Scheduling algorithms, thread processing
- IPC, semaphores, monitors, deadlocks
- Page replacement algorithms, file allocation strategies
- Memory allocation strategies

Sample Experiments:
1. Practicing of Basic UNIX Commands.
2. Write programs using the following UNIX operating system calls
   fork, exec, getpid, exit, wait, close, stat, opendir and readdir
3. Simulate UNIX commands like cp, ls, grep, etc.,
4. Simulate the following CPU scheduling algorithms
   a) FCFS b) SJF c) Priority d) Round Robin
5. Control the number of ports opened by the operating system with
   a) Semaphore b) Monitors.
6. Write a program to illustrate concurrent execution of threads using pthreads library.
7. Write a program to solve producer-consumer problem using Semaphores.
8. Implement the following memory allocation methods for fixed partition
   a) First fit b) Worst fit c) Best fit
9. Simulate the following page replacement algorithms
   a) FIFO b) LRU c) LFU
10. Simulate Paging Technique of memory management.
11. Implement Bankers Algorithm for Dead Lock avoidance and prevention
12. Simulate the following file allocation strategies
    a) Sequential b) Indexed c) Linked

Reference Books:

1. Operating System Concepts, Silberschatz A, Galvin P B, Gagne G, 10th Edition, Wiley, 2018.
2. Modern Operating Systems, Tanenbaum A S, 4th Edition, Pearson, 2016
3. Operating Systems -Internals and Design Principles, Stallings W, 9th edition, Pearson, 2018
4. Operating Systems: A Concept Based Approach, D.M Dhamdhere, 3rd Edition, McGraw- Hill, 2013

Online Learning Resources:

1. https://www.cse.iitb.ac.in/~mythili/os/
2. http://peterindia.net/OperatingSystems.html

Subject Code	Title of the Subject	L	T	P	C
23A40505	**DATABASE MANAGEMENT SYSTEMS LAB**	**0**	**0**	**3**	**1.5**

Course Objectives: This Course will enable students to
- Populate and query a database using SQL DDL/DML Commands
- Declare and enforce integrity constraints on a database
- Writing Queries using advanced concepts of SQL
- Programming PL/SQL including procedures, functions, cursors and triggers.

Course Outcomes: After completion of the course, students will be able to
- Utilizing Data Definition Language (DDL), Data Manipulation Language (DML), and Data Control Language (DCL) commands effectively within a database environment (L3)
- Constructing and execute queries to manipulate and retrieve data from databases. (L3)
- Develop application programs using PL/SQL. (L3)
- Analyze requirements and design custom Procedures, Functions, Cursors, and Triggers, leveraging their capabilities to automate tasks and optimize database functionality (L4)
- Establish database connectivity through JDBC (Java Database Connectivity) (L3)

Experiments covering the topics:
- DDL, DML, DCL commands
- Queries, nested queries, built-in functions,
- PL/SQL programming- control structures
- Procedures, Functions, Cursors, Triggers,
- Database connectivity- ODBC/JDBC

Sample Experiments:
1. Creation, altering and droping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.
3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)
5. Create a simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)
    i. Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
6. Develop a program that includes the features NESTED IF, CASE and CASE

expression. The program can be extended using the NULLIF and COALESCE functions.

7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE-APPLICATION ERROR.
8. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
9. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
10. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
11. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers
12. Create a table and perform the search operation on table using indexing and non-indexing techniques.
13. Write a Java program that connects to a database using JDBC
14. Write a Java program to connect to a database using JDBC and insert values into it
15. Write a Java program to connect to a database using JDBC and delete values from it

Text Books/Suggested Reading:
1. Oracle: The Complete Reference by Oracle Press
2. Nilesh Shah, "Database Systems Using Oracle", PHI, 2007
3. Rick F Vander Lans, "Introduction to SQL", Fourth Edition, Pearson Education, 2007
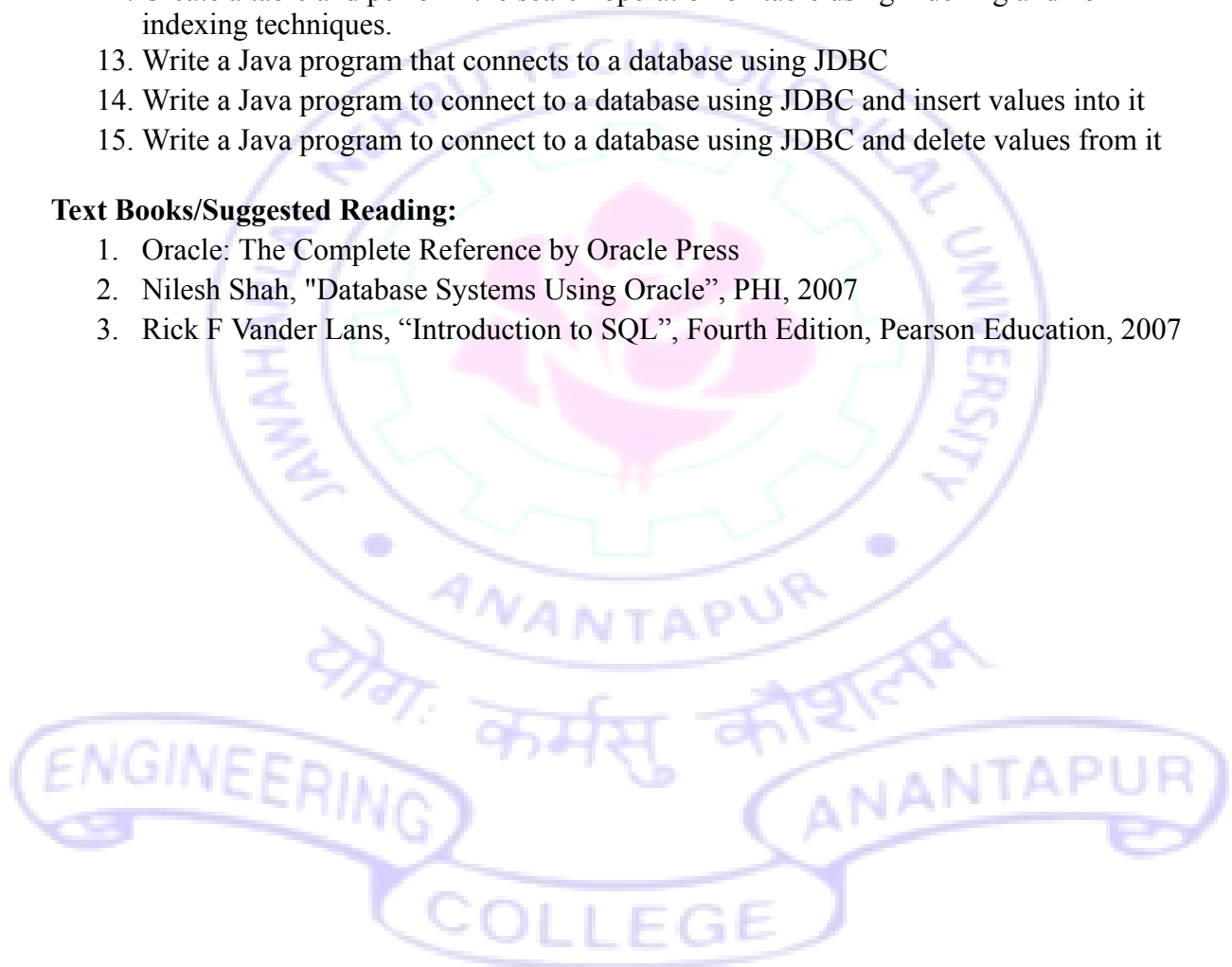
Subject Code	Title of the Subject	L	T	P	C
23A40506	**FULL STACK DEVELOPMENT** **(Skill Enhancement Course)**	**0**	**1**	**2**	**2**

Course Objectives: The main objectives of the course are to
- Understand the Fundamentals of Web Programming.
- Apply Coding Standards and Conventions.
- Apply CSS Styling Techniques, and properties to style web pages effectively, including color manipulation, font styling, and element positioning.
- Ability to Organize Web Page Content and build static web pages effectively.
- Build a web page by applying appropriate CSS styles to HTML elements
- Implement object oriented programming with JavaScript to develop dynamic web pages and validate forms

Course Outcomes: Students can
CO1: Design Websites. (L6)
CO2: Apply Styling to web pages. (L3)
CO3: Develop interactive Web pages. (L6)
CO4: Design Forms for applications. (L6)
CO5: Apply JavaScript control structures ensuring effective and logical code execution. (L3)
CO6: Implementation of real time application on Advanced Java Script Concepts

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	1	2	1											2	
CO 2														2	
CO 3		1			2									2	
CO 4			3	1	2	2								2	
CO 5	1										1		1	2	
CO 6												1		2	

Chapter 1:
Introduction to Web Programming: Introduction, Creating a Website, Web Page Example, HTML Tags, Structural Elements, title Element, meta Element, HTML Attributes, body Elements hr, p, br, div, Cascading Style Sheets Preview, History of HTML, HTML Governing Bodies, Differences Between Old HTML and HTML5.
Coding Standards, Block Elements, Text Elements, and Character References: Introduction, HTML Coding Conventions, Comments, HTML Elements Should Describe Web Page Content Accurately, Whitespace Collapsing, pre Element, 0 Phrasing Elements, Editing Elements, q and cite Elements, dfn, abbr, and time Elements, Code-Related Elements, br and wbr Elements, sub, sup, s, mark, and small Elements, strong, em, b, u, and i Elements, span Element, Character References, Web Page with Character References and Phrasing Elements, Forms and Form Elements.
Programs:

Task - 1. Lists, Links and Images

a. Write a HTML program, to explain the working of lists.
   Note: It should have an ordered list, unordered list, nested lists and ordered list in an unordered list and definition lists.

b. Write a HTML program, to explain the working of hyperlinks using <a> tag and href, target Attributes.

c. Create a HTML document that has your image and your friend's image with a specific height and width. Also when clicked on the images it should navigate to their respective profiles.

d. Write a HTML program, in such a way that, rather than placing large images on a page, the preferred technique is to use thumbnails by setting the height and width parameters to something like to 100*100 pixels. Each thumbnail image is also a link to a full sized version of the image. Create an image gallery using this technique

Task - 2. HTML Tables, Forms and Frames

a. Write a HTML program, to explain the working of tables. (use tags: <table>, <tr>, <th>, <td> and attributes: border, rowspan, colspan)

b. Write a HTML program, to explain the working of tables by preparing a timetable. (Note: Use <caption> tag to set the caption to the table & also use cell spacing, cell padding, border, rowspan, colspan etc.).

c. Write a HTML program, to explain the working of forms by designing Registration form. (Note: Include text field, password field, number field, date of birth field, checkboxes, radio buttons, list boxes using <select>&<option> tags, <text area> and two buttons ie: submit and reset. Use tables to provide a better view).

d. Write a HTML program, to explain the working of frames, such that page is to be divided into 3 parts on either direction. (Note: first frame □ image, second frame □ paragraph, third frame □ hyperlink. And also make sure of using "no frame" attribute such that frames to be fixed).

Chapter 2:

Cascading Style Sheets (CSS): Introduction, CSS Overview, CSS Rules, Example with Type Selectors and the Universal Selector, CS5 Syntax and Style, Class Selectors, Selectors, span and div Elements, Cascading, style Attribute, style Container, External CSS Files, CSS Properties, Color Properties, RGB Values for Color, Opacity Values for Color, HSL and HSLA Values for Color, Font Properties, line-height Property, Text Properties, Border Properties, Element Box, padding Property, margin Property.

Organizing a Page's Content with Lists, Figures, and Various Organizational Elements: Introduction, Unordered Lists, Descendant Selectors, Ordered Lists, Organizational Elements, section, article, and aside Elements, nav and a Elements, header and footer Elements, Child Selectors, CSS Inheritance.

Programs:

Task - 3. HTML 5 and Cascading Style Sheets, Types of CSS

a. Write a HTML program, that makes use of <article>, <aside>, <figure>, <figcaption>, <footer>, <header>, <main>, <nav>, <section>, <div>, <span> tags.

b. Write a HTML program, to embed audio and video into HTML web page.

c. Write a program to apply different types (or levels of styles or style specification formats) - inline, internal, external styles to HTML elements. (identify selector, property and value).

Task - 4. Selector forms

a. Write a program to apply different types of selector forms
   i. Simple selector (element, id, class, group, universal)
   ii. Combinator selector (descendant, child, adjacent sibling, general sibling)
   iii. Pseudo-class selector
   iv. Pseudo-element selector
   v. Attribute selector

Chapter 3:
Tables and CSS Layout: Introduction, Table Elements, formatting a Data Table Borders, Alignment, and Padding, CSS Structural Pseudo-Class Selectors, thread and tbody Elements, Cell Spanning, Web Accessibility, CSS display Property with Table Values, Absolute Positioning with CSS FotoProperties, Relative Positioning.
Links and Images: Introduction, an element**,** Relative URLs, index.html File, Web Design, Navigation Within a Web Page, CSS for Links, an Element Additional Details, Bitmap Image Formats: GIF, JPEG, PNG, img Element, Vector Graphics.

Image Manipulations, Audio, and Video: Introduction, Positioning Images, Shortcut Icon, iframe Element, CSS Image Sprites, Audio, Background Images, Web Fonts, Video.
Programs:
Task - 5. CSS with Color, Background, Font, Text and CSS Box Model
a. Write a program to demonstrate the various ways you can reference a color in CSS.
b. Write a CSS rule that places a background image halfway down the page, tilting it horizontally. The image should remain in place when the user scrolls up or down.
c. Write a program using the following terms related to CSS font and text:
    i. font-size   ii. font-weight   iii. font-style
    iv. text-decoration v. text-transformation   vi. text-alignment
d. Write a program, to explain the importance of CSS Box model using
    i. Content   ii. Border   iii. Margin   iv. padding

Task - 6. Applying JavaScript - internal and external, I/O, Type Conversion
a. Write a program to embed internal and external JavaScript in a web page.
b. Write a program to explain the different ways for displaying output.
c. Write a program to explain the different ways for taking input.
d. Create a webpage which uses prompt dialogue box to ask a voter for his name and age. Display the information in table format along with either the voter can vote or not

Chapter 4:
Introduction to JavaScript: Functions, DOM,Form and Event Handlers:
Introduction, History of JavaScript, Hello World Web Page, Buttons, Functions, Variables, Identifiers, Assignment Statements and Objects, Document Object Model, Forms and How They're Processed Client-Side Versus Server-Side, form Element, Controls, Text Control, Email Address Generator Web Page, Accessing a Form's Control Values, reset and focus Methods, Comments and Coding Conventions, Event-Handier Attributes, onchange, onmouseover, onmouseout, Using noscript to Accommodate Disabled JavaScript.
Loops, Additional Controls, Manipulating CSS with JavaScript: Introduction, while Loop, External JavaScript Files, Compound Interest Web Page, do Loop, Radio Buttons, Checkboxes, Job Skills Web Page, for Loop, fieldset and legend Elements, Manipulating CSS with JavaScript, Textarea Controls, Dormitory Blog Web Page, Pull-Down Menus, List Boxes.
Programs:
Task - 7. JavaScript Pre-defined and User-defined Objects
a. Write a program using document object properties and methods.
b. Write a program using window object properties and methods.
c. Write a program using array object properties and methods.
d. Write a program using math object properties and methods.
e. Write a program using string object properties and methods.
f. Write a program using regex object properties and methods.
g. Write a program using date object properties and methods.
h. Write a program to explain user-defined object by using properties, methods, accessors, constructors and display.

Task - 8. JavaScript Conditional Statements and Loops

a. Write a program which asks the user to enter three integers, obtains the numbers from the user and outputs HTML text that displays the larger number followed by the words "LARGER NUMBER" in an information message dialog. If the numbers are equal, output HTML text as "EQUAL NUMBERS".
b. Write a program to display week days using switch case.
c. Write a program to print 1 to 10 numbers using for, while and do-while loops.
d. Write a program to print data in object using for-in, for-each and for-of loops
e. Develop a program to determine whether a given number is an 'ARMSTRONG NUMBER' or not. [Eg: 153 is an Armstrong number, since sum of the cube of the digits is equal to the number i.e.,13 + 53+ 33 = 153]
f. Write a program to display the denomination of the amount deposited in the bank in terms of 100's, 50's, 20's, 10's, 5's, 2's & 1's. (Eg: If deposited amount is Rs.163, the output should be 1-100's, 1-50's, 1- 10's, 1-2's & 1-1's)

Chapter 5:
Additional JavaScript Basics: window Object, if Statement, Strings, Numbers, and Input Validation: Introduction, window Object, alert and confirm Methods, if Statement (E by itself, Game Night Web Page, prompt Method, Game Night Wath Page Revisited, if Statement else and else if Clauses, Strings, Word Ordering web page, Arithmetic Operators, Parsing Numbers, parseInt, parseFloat,
Object-Oriented Programming and Arrays: Introduction, Object-Oriented Programming Overview, Classes, Constructors, Properties, new Operator, Methods, Point Tracker Web Page, static Methods, Event Handlers, Primitive Values Versus Objects, Using addEventListener to Add Event Listeners, Using Prototypes to Emulate a Class, Inheritance Between Classes, Pet Registry Web Page, switch Statement, Arrays, Arrays of Objects.
Programs:
Task - 9. JavaScript Functions and Events
a. Design a appropriate function should be called to display
    i.   Factorial of that number
    ii. Fibonacci series up to that number
    iii. Prime numbers up to that number
    iv. Is it palindrome or not
b. Design a HTML having a text box and four buttons named Factorial, Fibonacci, Prime, and Palindrome. When a button is pressed an appropriate function should be called to display
    i.   Factorial of that number
    ii. Fibonacci series up to that number
    iii. Prime numbers up to that number
    iv. Is it palindrome or not
c. Write a program to validate the following fields in a registration page
    i.   Name (start with alphabet and followed by alphanumeric and the length should not be less than 6 characters)
    ii. Mobile (only numbers and length 10 digits)
    iii. E-mail (should contain format like xxxxxx@xxxxx.xxx)

Task - 10. Java Script Object oriented programming
a. Write a function to that takes two numbers and returns smallest of two, or square of two if they are equal and demonstrate js scope variables

b. Write JS function to show Local Variables Have Priority Over Global Variables.

c. Write a java script program to convert day of week number to day of week name using closures

d. Write a java script program to guess the password and validate. If the password is not correct display the security question. Use closures to implement the same.

e. Write a JavaScript program to delete the rollno property from the following object. Also print the object before or after deleting the property.

var student = {
    name : "Ram Mohan",
    Sem : "VI",
    rollno : 62 };

f. Create an object to hold information on your favorite recipe. It should have properties for title (a string), servings (a number), and ingredients (an array of strings). On separate lines (one console.log statement for each), log the recipe information so it looks like:
- Mole
- Serves: 2
- Ingredients:
- cinnamon
- cumin
- cocoa

g. Write a js program using prototype to calculate square, cube and square root of a number.

h. Write a Calculator class using prototype, which has add, subtract and getAnswer functions. The class should support chaining, that means we should be able to do new Calculator(2).add(2).add(2).subtract(3).getAnswer() to get 3 as the answer.

i. Write an Animal class with methods: makeSound and run. It should take parameters: name, sound, speed (in meter per second). The run method takes a parameter called time and returns a Promise which resolves with the distance the animal ran after "time" seconds and the name of the animal. (hint: use setTimeout inside a Promise). Construct 5 different animals with different speeds, store them in an array, call their run method with 5 seconds in a loop, wait for all the animals to finish running and then log which animal went the farthest

Text Books:
1. John Dean, "Web Programming-With HTML5, CSS and JavaScript",Jones and Bartlett learning.

Reference Books:
1. Douglas Crockford , "JavaScript: The Good Parts", Oreilly Publication.
2. Jennifer Robbins, "Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics",5th Edition, Oreilly Publication.
3. Terry Felke-Morris, "Web Development and Design Foundations with HTML5", 10th edition, Pearson.
4. Robin Nixon, "Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5", 4th Edition, Oreilly.

Subject Code	Title of the Subject	L	T	P	C
23A49901	**Design Thinking for Innovation** **(Common to all Branches)**	**1**	**0**	**2**	**2**

Pre-requisite NIL

Course Objectives:
The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.

Course Outcomes (CO):   **Blooms Level**

- Define the concepts related to design thinking.   L1, l2
- Explain the fundamentals of Design Thinking and innovation   L1, L2
- Apply the design thinking techniques for solving problems in various sectors.   L3
- Analyse to work in a multidisciplinary environment   L4
- Evaluate the value of creativity   L5
- Formulate specific problem statements of real time issues   L3, L6

UNIT – I Introduction to Design Thinking   **10 Hrs**

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   **10 Hrs**
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, brain storming, 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.
                                                                       8 Hrs
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   **8 Hrs**
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   **10 Hrs**

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

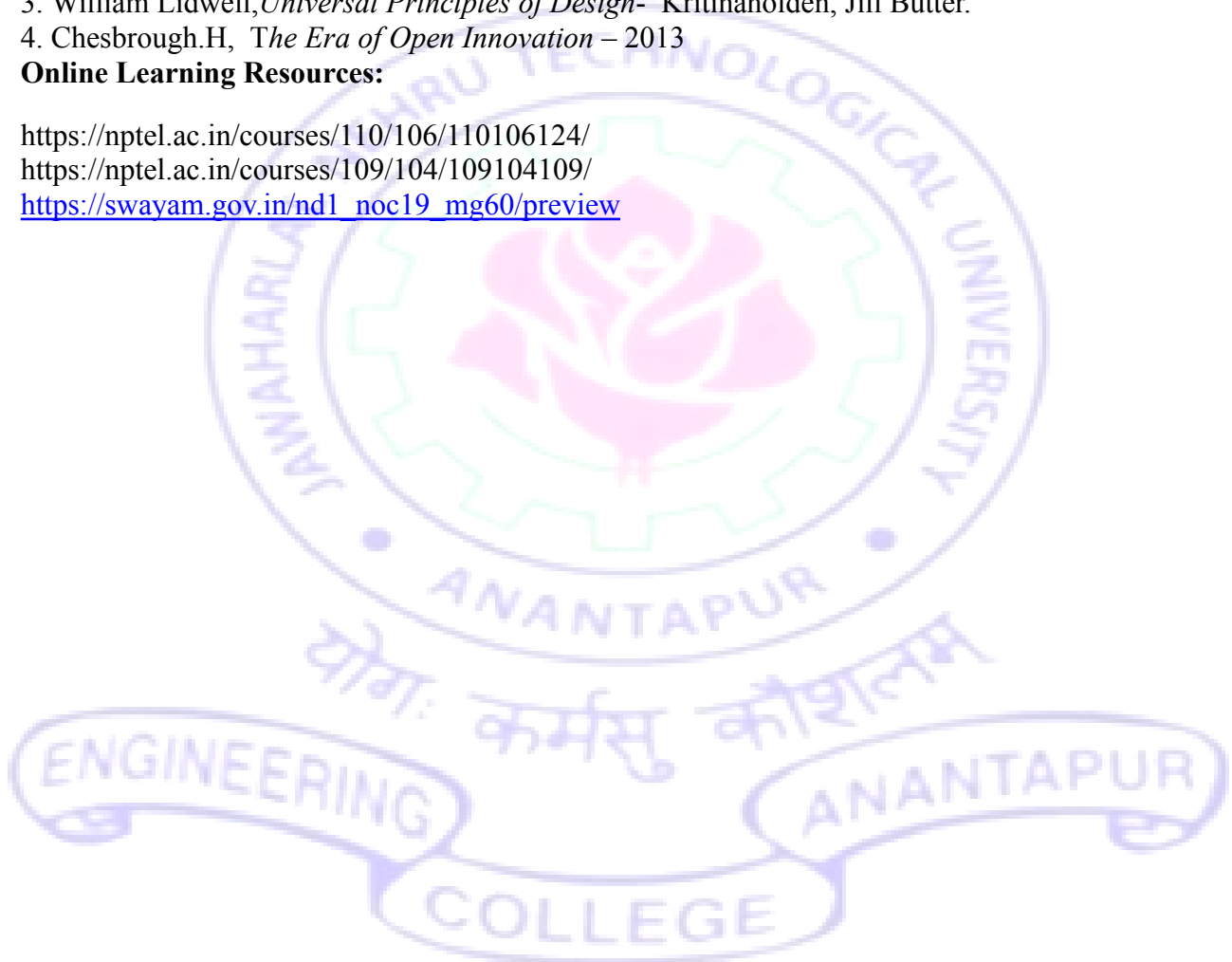**Activity:** How to market our own product, About maintenance, Reliability and plan for startup.

Textbooks:

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, T*he 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

Title of the Subject-23A49903
COMMUNITY SERVICE PROJECT
……Experiential learning through community engagement

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 –

- o 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.
- o 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 lvel- observation.

Complimenting 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 programmes
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 secreteriats 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 programmesto 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 students 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.

   1. Awareness Program on Good Touch and Bad Touch(Sexual abuse)

   2. Awareness Program on Socially relevant themes. Programs for Women Empowerment

Government Guidelines and Policy Guidelines

1. Women's Rights
2. Domestic Violence
3. Prevention and Control of Cancer
4. Promotion of Social

Entrepreneurship General Camps

1. General Medical camps
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   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

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- For conducting special camps like Health related, they will be coordinating with the Governmental agencies.

- AsandwhenrequiredtheCollegefacultythemselvesactasResourcePersons.
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- 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.
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