CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B. Tech- CSE(AI & ML)
CBCS & OUTCOME BASED COURSE STRUCTURE & SYLLABUS
(Effective for the students admitted into I year from the Academic Year 2022-23)

S. No	Course Code	Course Title	Category	L	T	P	Credits	CIE	SEE
				SEMESTER - I					
				Hours per Week				**Maximum Marks**	
1	A400101	English for Skill Enhancement	HSMC	2	0	0	2	40	60
2	A400001	Matrices and Calculus	BSC	3	1	0	4	40	60
3	A400008	Applied Physics	BSC	3	1	0	4	40	60
4	A405201	Programming for Problem Solving	ESC	3	0	0	3	40	60
5	A405501	Elements of Computer Science & Engineering	ESC	0	0	2	1	50	-
6	A400503	English Language and Communication Skills Laboratory	HSMC	0	0	2	1	40	60
7	A400501	Applied Physics Laboratory	BSC	0	0	3	1.5	40	60
8	A405504	IT Workshop	ESC	0	0	3	1.5	40	60
9	A405502	Programming for Problem Solving Laboratory	ESC	0	0	2	1	40	60
10	A400505	Introduction to Social Innovation	HSMC	0	0	2	1	40	60
11	A400704	Universal Human Values	MC	2	0	0	0	-	-
		Total:		13	2	14	20		
		Total hours per Week:					29		

S. No	Course Code	Course Title	Category	L	T	P	Credits	CIE	SEE
				SEMESTER – II					
				Hours per Week				**Maximum Marks**	
1	A400002	Ordinary Differential Equation and Vector Calculus	BSC	3	1	0	4	40	60
2	A400009	Engineering Chemistry	BSC	3	1	0	4	40	60
3	A402201	Basic Electrical Engineering	ESC	2	0	0	2	40	60
4	A405301	Data Structures	PCC	3	0	0	3	40	60
5	A403502	Computer Aided Engineering Drawing	ESC	0	1	2	2	40	60
6	A400502	Engineering Chemistry Laboratory	BSC	0	0	2	1	40	60
7	A402502	Basic Electrical Engineering Laboratory	ESC	0	0	2	1	40	60
8	A405505	Data Structures Laboratory	PCC	0	0	3	1.5	40	60
9	A400506	Engineering Exploration & Practice	HSMC	0	0	3	1.5	40	60
10	A400703	Constitution of India	MC	2	0	0	0	-	-
		Total:		13	3	12	20		
		Total hours per Week					28		
		Total Credits in I Year: 40							

S. No	Course Code	Course Title	Category	L	T	P	Credits	CIE	SEE
		SEMESTER – III							
				Hours per Week			Credits	**Maximum Marks**	
				L	T	P		CIE	SEE
1	A400003	Mathematical and Statistical Foundations	BSC	3	1	0	4	40	60
2	A404203	Electronic Devices and Circuits	ESC	2	0	0	2	40	60
3	A405307	Computer Organization and Architecture	PCC	3	0	0	3	40	60
4	A466301	Software Engineering	PCC	3	0	0	3	40	60
5	A405305	Operating Systems	PCC	3	0	0	3	40	60
6	A405506	Python Programming Laboratory	ESC	0	1	2	2	40	60
7	A405509	Operating Systems Laboratory	PCC	0	0	2	1	40	60
8	A466501	Software Engineering Laboratory	PCC	0	0	2	1	40	60
9	A400507	Social Innovation in Practice	HSMC	0	0	2	1	40	60
10	A400702	Gender Sensitization	MC	2	0	0	0	-	-
		Total:		**16**	**2**	**8**	**20**		
		Total hours per Week:		**26**					
		SEMESTER – IV							
				Hours per Week			Credits	**Maximum Marks**	
				L	T	P		CIE	SEE
1	A405306	Discrete Mathematics	PCC	3	0	0	3	40	60
2	A412303	Automata Theory and Compiler Design	PCC	3	0	0	3	40	60
3	A405304	Database Management Systems	PCC	3	0	0	3	40	60
4	A466302	Introduction to Artificial Intelligence	PCC	3	0	0	3	40	60
5	A405303	Object Oriented Programming through Java	PCC	3	0	0	3	40	60
6	A405508	Database Management Systems Laboratory	PCC	0	0	2	1	40	60
7	A412504	Java Programming Laboratory	PCC	0	0	2	1	40	60
8	A466502	Introduction to Artificial Intelligence Laboratory	PCC	0	0	2	1	40	60
9	A466801	Real-time Research Project/Field-Based Research Project	PROJ	0	0	4	2	40	60
10	A400701	Environmental Sciences	MC	2	0	0	0		
		Total:		**17**	**0**	**10**	**20**		
		Total hours per Week		**27**					
		Total Credits in II Year: 40							

(A400101)ENGLISH FOR SKILL ENHANCEMENT
(Common to all branches)

B.Tech I-Year I Semester

L T P C
2 0 0 2

UNIT - I
Chapter entitled 'Toasted English' by R.K.Narayan from "English: Language, Contextand Culture" published by Orient BlackSwan, Hyderabad.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes -Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives -Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.
Reading: Reading and Its Importance- Techniques for Effective Reading.

Writing: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance ofProper Punctuation- Techniques for writing precisely – Paragraph Writing – Types, Structuresand Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs inDocuments.

UNIT – II
Chapter entitled 'Appro JRD ' by Sudha Murthy from " English Language , Context and Culture" published by Orient Black Swan ,Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs Grammar:Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement andSubject-verb Agreement.

Reading: Sub-Skills of Reading – Skimming and Scanning

UNIT – III
Chapter entitled 'Lessons from Online Learning' by F.HaiderAlvi, Deborah Hurst et alfrom "English: Language, Context and Culture" published by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Confused - Words from Foreign Languages and their Use inEnglish.
Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers andTenses.
Reading: Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises forPractice.
Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter ofRequisition, Email Etiquette, Job Application with CV/Resume.

UNIT - IV
Chapter entitled 'Art and Literature' by Abdul Kalam from "English: Language,Context and Culture" published by Orient BlackSwan, Hyderabad.

Vocabulary: Standard Abbreviations in English Grammar: Redundancies and Clichés in Oraland Written Communication.

Reading: Writing: Survey, Question, Read, Recite and Review(SQ3R Method) - Exercises for Practice Writing Practices
Essay Writing-Writing Introductionand Conclusion -Précis Writing

UNIT - V
Grammar: Common Errors in English (Covering all the other aspects of grammar which werenot covered in the previous units)
Reading: Writing: Reading Comprehension-Exercises forPractice Technical Reports- Introduction.

NOTE:
Listening and Speaking Skills which are given under in AICTE Model Curriculum are covered in the syllabus of ELCS Lab Course.

➢ NOTE 1: As the syllabus of English given in AICTE Model Curriculum-2018 for B.Tech FirstYear is Open-ended, besides following the prescribed textbook, it is required to prepareteaching/learning materials by the teachers collectively in the form of handouts based on theneeds of the students in their respective colleges for effective teaching/learning in the class.

➢ NOTE 2: Based on the recommendations of NEP2020, teachers are requested to be flexibleto adopt Blended Learning in dealing with the course contents .They are advised to teach 40percent of each topic from the syllabus in blended mode.

TEXT BOOK:
  1. "English: Language, Context and Culture" by Orient BlackSwan Pvt. Ltd,Hyderabad. 2022. Print.

REFERENCE BOOKS:
  1. Effective Academic Writing,(2nd edition) by Liss and Davis (OUP)2014.
  2. Richards, Jack C. Interchange Series. Introduction, ,(4th edition), Cambridge University Press 2022
  3. Remedial English Grammar by Wood F.T, Macmillan.2007.
  4. Learn English: A Fun Book of Functional Language,Grammar and Vocabulary, (2ndedition)Chaudhuri, SantanuSinha,. Sage Publications India Pvt. Ltd.2018
  5. Technical Communication,(1st edition), Wiley India Pvt. Ltd.2019
  6. English for Technical Communication for Engineering, Vishwamohan, Aysha 2013

Course Outcomes:
On completion of the course students will be able to
  1. Understand the importance of vocabulary and sentence structures.
  2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
  3. Demonstrate their understanding of the rules of functional grammar.
  4. Develop comprehension skills from the known passages.
  5. Acquire basic proficiency in reading and writing modules of English and take an active part in drafting paragraphs, letters, essays, abstracts, precis, and reports in various contexts.

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

(A400001) MATRICES AND CALCULUS
(Common toAll)

B.Tech I-Year I Semester

L	T	P	C
3	1	0	4

UNIT-I
Matrices: Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous equations and Non-Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method.

UNIT-II
Eigen values and Eigen vectors:
Linear Transformation and Orthogonal transformation:Eigen values, Eigen vectors and their properties, Diagonalization of a square matrix, Cayley-Hamilton theorem (without proof) -Inverse and power of a matrix by Cayley-Hamilton theorem, Quadratic forms and nature of the quadratic forms, Reduction of quadratic form to canonical form by orthogonal transformations.

UNIT-III
Calculus:
Mean value theorems: Rolle's theorem, Lagrange's mean value theorem with their geometrical interpretation and applications, Cauchy's mean value theorem, Taylor's series, Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (only in Cartesian coordinates),
Improper Integral: Beta, Gamma functions and their applications.

UNIT-IV
Multivariable calculus (Partial Differentiation and applications):
Partial differentiation: Euler's Theorem, Total derivative, Jacobian, Functional dependence & independence. Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.
UNIT-V
MultivariableCalculus(Integration):

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (onlyCartesian form), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and(Cartesianto Spherical and Cylindricalpolarcoordinates)fortripleintegrals.

TEXT BOOKS:
1. Higher Engineering Mathematics, (36thEdition), B.S. Grewal, Khanna Publishers, 2010.
2. Advanced Engineering Mathematics, (5thEdition), R.K. Jain and S.R.K Iyengar,NarosaPublications,2016.

REFERENCE BOOKS:
1. AdvancedEngineeringMathematics,(9th Edition),Erwinkreyszig,JohnWiley& Sons,2006.
2. Calculus and Analytic geometry, (9thEdition), G.B. Thomas and R.L. Finney, Pearson, Reprint, 2002.
3. A text book of Engineering Mathematics, (10th Edition), N.P. Bali and Manish Goyal, Laxmi Publications, Reprint, 2019.
4. Higher Engineering Mathematics, (11thReprint), Ramana B.V., Tata McGraw Hill New Delhi, 2010.

COURSE OUTCOMES:.

On completion of the course students will be able to

1. Solve linear system of equations represented by matrices
2. Obtain eigen values, eigen vectors and perform diagonalization of a square matrix.
3. Verify mean value theorems & evaluation of improper integrals by using Beta and Gamma functions.
4. Develop the skill of determining optimal values of multivariable functions using classical methods.
5. Evaluatethemultipleintegralsandapplytheconcept tofindareas,volumes.

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

(A400008) APPLIED PHYSICS
(Common to all branches)

	L	**T**	**P**	**C**
B.Tech I-Year I Semester	**3**	**1**	**0**	**4**

UNIT – I

QUANTUM MECHANICS:
Introduction to quantum physics, blackbody radiation – Stefan-Boltzmann's law, Wein's and Rayleigh-Jean's law, Planck's radiation law - photoelectric effect – de Broglie hypothesis- Davisson and Germer experiment – Heisenberg uncertainty principle - Born interpretation of the wave function – time independent Schrodinger wave equation - particle in one dimensional potential box.

ELECTRIC PROPERTIES OF SOLIDS:
Free electron theory (Drude& Lorentz, Sommerfeld) - Fermi-Dirac distribution - Bloch's theorem -Kronig-Penney model – E-K diagram- effective mass of electron-origin of energy bands- classification of solids.

UNIT – II

SEMICONDUCTORS AND DEVICES:
Intrinsic and extrinsic semiconductors, Variation of Fermi level with temperature – Hall Effect - Construction, principle of operation and characteristics of P-N Junction diode, Zener diode

PHOTONIC DEVICES
Direct and indirect band gap semiconductors –LED, PIN diode, avalanche photo diode (APD) and solar cells, their structure, materials, working principle and characteristics.

UNIT – III

LASERS
Laser beam characteristics-three quantum processes-Einstein coefficients and their relations- lasing action - pumping methods- ruby laser, He-Ne laser , CO_2 laser - semiconductor laser-applications of laser.

FIBER OPTICS:
Introductionto optical fiber - advantages of optical fibers - total internal reflection- construction of optical fiber - acceptance angle - numerical aperture- classification of optical fibers- losses in optical fiber - optical fiber for communication system - applications.

UNIT - IV

DIELECTRIC MATERIALS
Dielectric Materials: Basic definitions- types of polarizations (qualitative) –Local field – ClasiusMossoti Equation ferroelectric, piezoelectric, and pyroelectric materials – applications

MAGNETIC MATERIALS:
Introduction to magnetic materials - Hysteresis-soft and hard magnetic materials- magnetostriction, magnetoresistance - applications - bubble memory devices, magnetic field sensors and multiferroics.

UNIT - V

ENERGY MATERIALS:
Conductivity of liquid and solid electrolytes- superionic conductors - materials and electrolytes for super capacitors - rechargeable ion batteries, solid fuel cells.

NANOTECHNOLOGY

Nanoscale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, precipitation, combustion methods – top-down fabrication: ball milling - physical vapour deposition (PVD) - chemical vapor deposition (CVD) - characterization techniques - XRD, SEM &TEM - applications of nanomaterials.

TEXT BOOKS

1. Engineering Physics(3rd edition), PK Palanisamy, SciTech Publications, 2015.
2. Essentials of Nan science&Nanotechnology(1st Edition), Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 2021.

REFERENCES

1. Fundamentals of Physics.(6th edition), Halliday, R.Resnick and J.Walker,John Wiley and Sons, 2001.
2. Quantum Physics,(2nd edition), H.C. Verma, TBS Publication, 2012
3. Introduction to Solid State Physics, (7th edition), Charles Kittel, Wiley Eastern, 2019.
4. Physics of Semiconductor devices (4th edition), Simon.MSze and Kwok K . Ng, Wiley Student Edition,2006.

COURSE OUTCOMES

On completion of the course students will be able to
1. Understand the concepts of Quantum mechanics and visualize the differences between the solids by their classification.
2. Identify and analyze the importance of semiconductors and semiconductor devices in Science and Engineering Applications.
3. Appreciate the features and applications of Lasers and Optical fibers.
4. Applying the fundamental properties of dielectric and magnetic materials in different engineering fields.
5. Evaluate various aspects of Energy Materials and Nano-materials and their applications in diverse fields.

CO PO MAPPING

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

(A405201)PROGRAMMING FOR PROBLEM SOLVING
(Common to CSE,IT, CSE-DS, CSE-AI&ML, AI&ML,AI&DS,CSE-CS)

B.Tech I-Year I Semester

L	T	P	C
3	0	0	3

UNIT-I
Representation of Algorithm: Algorithms for simple task, decision making task like finding maximum numbers of a given set and repetitive task like sum of numbers, Flowchart/Pseudo code with examples, Introduction to C Programming Language: Simple C Programs, Desirable Program Characteristics. C Character Set, Identifiers and Keywords, Data Types, Constants, Variables, Expressions
Operators and Expressions: Unary Operators, Arithmetic Operators, Relational and Logical Operators, Bitwise Operators, Conditional Operator, Assignment Operators, Special Operators, Precedence & Associatively of Operators , Evaluation of Expressions. **Data Input and Output:** Preliminaries, Single Character Input- The get char Function, Single Character Output- The putchar Function, Entering Input Data- The scanf Function, More About the scanf Function, Writing Output Data- The printf Function, More About the printf Function, The gets and puts Functions.

UNIT-II
Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do- while loops I/O: Simple input and output with scanf and printf, formatted I/O,
Arrays:one-and two-dimensional arrays, creating, accessing and manipulating elements of arrays

UNIT-III
Functions: Defining a Function, Accessing a Function, Declaring a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries, Storage classes (auto, extern, static and register). **Recursion:** Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions
Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

UNIT-IV
Structures: Defining structures, initializing structures, unions, Array of structures **Pointers:** Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self-referential structures in linked list (no implementation) Enumeration data type **Dynamic memory allocation:** Allocating and freeing memory, Allocating memory for arrays of different data types. **Preprocessor:** Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef

UNIT-V
Files: Text and Binary files, Creating and Reading and writing text and binary files, appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions, Command line arguments.
Searching and Sorting: Basic searching in an array of elements (linear and binary search techniques), Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs.

Textbooks
1 Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

Reference Books
1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
3. YashavantKanetkar, Let Us C, 18th Edition, BPB
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
7. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition, Pearson
Course Objectives

1. Introducing a Programming Language
2. Familiarizing the students with syntax and semantics of various C- programming language constructs.
3. learn to develop solutions to computational problems

Course Outcomes
Students shall be able
CO1: Describe the structure of C-program, and use iterative and decision control statements for developing solutions to computational problems.
CO2: Organize data in Arrays, structures and perform operations on data stored in Arrays.
CO3: Design and develop modular solutions using C-functions and allocate memory dynamically for variables.
CO4: Create and manipulate C-File structures and use preprocessing directives to control C source code.
CO5: Compare and contrast various searching and sorting strategies.

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

(A405501) ELEMENTS OF COMPUTER SCIENCE & ENGINEERING
(Common to CSE, IT, CSE-DS, CSE-AI&ML,AI&ML, AI&DS, CSE-CS)

L	**T**	**P**	**C**

B.Tech I Year I Semester 0 0 2 1

UNIT – I
Basics of a Computer – Hardware, Software, Generations of computers. Hardware - functional units, Components of CPU, Memory – hierarchy, types of memory, Input and output devices. Software – systems software, application software, packages, frameworks, IDEs.

UNIT – II
Software development – waterfall model, Agile, Types of computer languages – Programming, markup, scripting Program Development – steps in program development, flowcharts, algorithms, data structures – definition, types of data structures

UNIT – III
Operating systems: Functions of operating systems, types of operating systems, Device & Resource Management

Database Management Systems: Data models, RDBMS, SQL, Database Transactions, data centers, Cloud services

UNIT – IV
Computer Networks: Advantages of computer networks, LAN, WAN, MAN, internet, WiFi, sensor Networks, vehicular networks, 5G communication.
World Wide Web – Basics, role of HTML, CSS, XML, Tools for web designing, Social media, Online social networks.
Security – information security, cyber security, cyber laws

UNIT – V
Autonomous Systems: IoT, Robotics, Drones, Artificial Intelligence – Learning, Game Development, Natural language processing, image and video processing. Cloud Basics

TEXT BOOK:
1. Invitation to Computer Science, G. Michael Schneider, Macalester College, Judith L. Gersting University of Hawaii, Hilo, Contributing author: Keith Miller University of Illinois, Springfield.

REFERENCE BOOKS:
1. Fundamentals of Computers, Reema Thareja, Oxford Higher Education, Oxford University Press.
2. Introduction to computers, Peter Norton, 8th Edition, Tata McGraw Hill.
3. Computer Fundamentals, Anita Goel, Pearson Education India, 2010.
4. Elements of computer science, Cengage

Course Outcomes:
1. Know the working principles of functional units of a basic Computer
2. Understand program development, the use of data structures and algorithms in problem solving.
3. Know the need and types of operating system, database systems.
4. Understand the significance of networks, internet, WWW and cyber security.
5. Understand Autonomous systems, the application of artificial intelligence.

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

(A400503) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY
(Common to all branches)

L T P C
0 0 2 1

B.Tech I-Year I Semester

The English Language and Communication Skills (ELCS) Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

English Language and Communication Skills Lab (ELCS) shall have two parts:
   a. Computer Assisted Language Learning (CALL) Lab
   b. Interactive Communication Skills (ICS) Lab

Listening Skills Objectives
 1. To enable students develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation
 2. To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions. Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.
    ➢ Listening for general content
    ➢ Listening to fill up information
    ➢ Intensive listening
    ➢ Listening for specific information

Speaking Skills Objectives
 1. To involve students in speaking activities in various contexts
 2. To enable students express themselves fluently and appropriately in social and professional
    ➢ Oral practice
    ➢ Describing objects/situations/people
    ➢ Role play – Individual/Group activities
    ➢ Just A Minute (JAM) Sessions
      The following course content is prescribed for the English Language and Communication Skills Lab

Exercise – I
CALL Lab: Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening. Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs - Past Tense Marker and Plural Marker- Testing Exercises
ICS Lab: Understand: Spoken vs. Written language- Formal and Informal English. Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II
CALL Lab: Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Stress pattern in sentences – Intonation. Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern in sentences – Intonation - Testing Exercises.
ICS Lab: Understand: Features of Good Conversation – Strategies for Effective Communication. Practice: Situational Dialogues – Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise – III
 CALL Lab: Understand: Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI). Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation -Testing Exercises

ICS Lab: Understand: Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IV

CALL Lab: Understand: Listening for General Details. Practice: Listening Comprehension Tests - Testing Exercises

ICS Lab: Understand: Public Speaking – Exposure to Structured Talks - Non-verbal CommunicationPresentation Skills. Practice: Making a Short Speech – Extempore- Making a Presentation.

Exercise – V

CALL Lab: Understand: Listening for Specific Details. Practice: Listening Comprehension Tests -Testing Exercises

ICS Lab: Understand: Group Discussion Practice: Group Discussion

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab:** The Computer Assisted Language Learning Lab has to accommodate 30 students with 30 systems, with one Master Console, LAN facility and English language learning software for self- study by students. System Requirement (Hardware component): Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications: i) Computers with Suitable Configuration ii) High Fidelity Headphones

2. **Interactive Communication Skills (ICS) Lab :** The Interactive Communication Skills Lab: A Spacious room with movable chairs and audiovisual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio & video system and camcorder etc. Source of Material (Master Copy): • Exercises in Spoken English. Part 1,2,3. CIEFL and Oxford University Press Note: Teachers are requested to make use of the master copy and get it tailor-made to suit the contents of the syllabus

REFERENCE BOOKS:

1. English Language Communication Skills Lab Manual cum Workbook,(1st edition) ,by Rajesh Kumar Cengage Learning India Pvt. Ltd,2022

2. Communicative English - A workbook, (Revised Edition)byShobha, KN &Rayen, J. Lourdes, Cambridge University Press, 2019.

3. Communication Skills: A Workbook. Kumar, (2nd edition) by Sanjay &Lata, Pushp, Oxford University Press, 2019.

4. ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities,(Board of Editors), Orient Black Swan Pvt. Ltd, 2016

5. English Language Skills: A Practical Approach, Mishra, Veerendra et al., Cambridge University Press, 2020.

Course Outcomes:

On completion of the course students will be able to

1. Understand the nuances of English language through audio- visual experience and group activities.
2. Neutralise their accent for intelligibility.
3. Speak with clarity and confidence which in turn enhances their employability skills
4. Students will learn public speaking skills and overcome stage fear.
5. Express clarity of thoughts, capability to hold the discussion with everyone and develop analytical thinking.

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

(A400501)APPLIED PHYSICS LABORATORY

B.Tech I-Year I Semester

$\underline{L}$	$\underline{T}$	$\underline{P}$	$\underline{C}$
0	0	3	1.5

(Any 8 experiments are to be performed)

1. Determination of work function and Planck's constant using photoelectric effect.

2. Determination of Hall co-efficient and carrier concentration of a given semiconductor.

3. Characteristics of series and parallel LCR circuits.

4. V-I characteristics of a p-n junction diode and Zener diode

5. a) V-I and L-I characteristics of light emitting diode (LED)b)V-I Characteristics of solar cell

6. Determination of Energy gap of a semiconductor.

7. Determination of the resistivity of semiconductor by two probe method.

8. Study of B-H curve of a magnetic material.

9. Determination of dielectric constant of a given material

10. a) Determination of the beam divergence of the given LASER beam)Determination of Acceptance Angle and Numerical Apertureof an optical fiber.

11. Understanding the method of least squares – torsional pendulum as an example.

12. Diffraction grating: Determination of wavelength of a source (LASER).

LABORATORY MANUAL:

1. Applied Lab (2nd Edition) Dr M Chandra Shekhar Reddy, Dr NeelimaPatnaik, Jaya Prakash Reddy Kasu, Skytech Publications, 2022.

2. "A Text book of Practical Physics"(2nd Edition) - S. Balasubramanian, M.N. Srinivasan S Chand Publishers, 2017.

COURSE OUTCOMES

On completion of the course students will be able to

1. Appreciate quantum physics in optoelectronics.
2. Determine the Planck's constant using Photo electric effect
3. Determine energy gap of a semiconductor diode and magnetic fields.
4. Identify the material whether it is n-type or p-type by Hall experiment.
5. Evaluate the basic properties of lasers and optical fibers.

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

(A405504) IT WORKSHOP
(Common to CSE, ECE, IT, CSE-DS, CSE-AI&ML,AI&ML, AI&DS, CSE-CS)

	L	T	P	C
B.Tech I Year I Semester	0	0	3	1.5

PC Hardware

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 instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both Windows and Linux. Lab instructorsshould verify the installation and follow it 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 should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

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

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

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

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of LaTeX 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 LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

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

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

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

Powerpoint

Task 1: Students will be working on basic power point utilities and tools which help them create basicpowerpoint 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, notesetc), and Inserting – Background, textures, Design Templates, Hidden slides.

REFERENCE BOOKS:
1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, WILEY Dreamtech
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. PC Hardware - A Handbook – Kate J. Chase PHI (Microsoft)
5. LaTeX Companion – Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinsonand Ken Quamme. –
CISCO Press, Pearson Education.
7. IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by Patrick Regan– CISCO Press, Pearson Education.

Course Objectives
- To impart the knowledge of various hardware components of a computer
- To provide the skill of assembling the computer.
- To impart the knowledge and usage of various Microsoft tools such as Power Point ,Word and Excel

Course Outcomes
Students shall be able to:
CO-1. Identify various hardware components of a system and their significances
CO-2. Assemble and disassemblethe computer.
CO-3. Use various Microsoft tools for text processing, visual presentations, and number crunching
CO-4. Retrieve the information from Internet using web browsers.
CO-5. Safeguard the system from external and internal threats.

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

(A405502) PROGRAMMING FOR PROBLEM SOLVING LABORATORY
(Common to CSE, IT, CSE-DS, CSE-AI&ML, AI&ML,AI&DS,CSE-CS)

L	T	P	C
0	0	2	1

B.Tech I-Year I Semester

[Note: The programs may be executed using any available Open Source/ Freely available IDE
Some of the Tools available are:
CodeLite: https://codelite.org/
Code:Blocks: http://www.codeblocks.org/
DevCpp : http://www.bloodshed.net/devcpp.html
Eclipse: http://www.eclipse.org
This list is not exhaustive and is NOT in any order of preference]

I.OPERATORS AND EVALUATION OF EXPRESSIONS
Demonstration
1.Write a C program to print greetings message on the screen.
2.Write a C program to illustrate usage of comments in C.
3.Write a simple program that prints the results of all the operators available in C
(Including pre/post increment, bitwise and/or/not. etc.). Read required operand values from standard input.
4.Write a C program that converts given data type to another using auto conversion and casting. Take the values from standard input.
5.Write a program for finding the max and min from the three numbers (using ternary operator).
Experiment
6.Write a C program to compute simple, compound interest.
7.Write a C Program that declares Class awarded for a given percentage of marks, where mark = 70% = Distinction.
   (Read percentage from standard input.)

8.Write a C Program that prints a multiplication table for a given number and the number of rows in the table.
(For example, for a number 5 and rows = 3, the output should be: 5 x 1 = 5, 5 x 2 = 10, 5 x 3 = 15….
9.Write a program that shows the binary equivalent of a given positive number between 0 to 255.
10. Write a program that asks the user to enter the total time elapsed, in seconds, since an event and converts the time to hours, minutes and seconds. The time should be displayed as hours: minutes: seconds. [Hint: Use the remainder operator]

II. Expression Evaluation
Demonstration
1. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula $s = ut+(1/2)at^2$ where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).
2. Write a program that asks the user to enter the highest rainfall ever in one season for a country, and the rainfall in the current year for that country, obtains the values from the user, checks if the current rainfall exceed the highest rainfall and prints an appropriate message on the screen. If the current rainfall is higher, it assigns that value as the highest rainfall ever. Use only the single-selection form of the if statement.
3. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement).
4. Write a program that finds if a given number is a prime number
5. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
6.Write a program that reads the radius of a circle (as a float value) and computes and prints the diameter, the circumference and the area. Use the value 3.14159 for π.
7.Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
Experiment
8. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
9. Write a C program to find the roots of a Quadratic equation.

III.Iterative statements
Demonstration

1. Input an integer (5 digits or fewer) containing only 0s and 1s (i.e., a "binary" integer) and print its decimal equivalent. [Hint: Use the remainder and division operators to pick off the "binary" number's digits one at a time from right to left. Just as in the decimal number system, in which the rightmost digit has a positional value of 1, and the next digit left has a positional value of 10, then 100, then 1000, and so on, in the binary number system the rightmost digit has a positional value of 1, the next digit left has a positional value of 2, then 4, then 8, and so on. Thus the decimal number 234 can be interpreted as 4 * 1 + 3 * 10 + 2 * 100. The decimal equivalent of binary 1101 is 1 * 1 + 0 * 2 + 1 * 4 + 1 * 8 or 1 + 0 + 4 + 8 or 13.]

2. Armstrong numbers are numbers that are equal to the sum of their digits raised to power of the number of digits in them. The number 153, for example, equals 13 + 53 + 33. Thus it is an Armstrong number. Write a program to display all three-digit Armstrong numbers.

3. Write a program that reads an integer (5 digits or fewer) and determines and prints how many digits in the integer are 9s.

4. Write a program that keeps printing the powers of the integer 3, namely 3, 9, 27, 91, 273, and so on. Your loop should not terminate (i.e., you should create an infinite loop). What happens when you run this program?

5. Write a C program to calculate the following, where x is a fractional value. $1-x/2 +x^2/4-x^3/6 \ldots\ldots$

6. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: $1+x+x^2+x^3+\ldots\ldots\ldots.+x^n$. For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

7. Write a C program to construct a pyramid of numbers as follows:

```
1                        1
1  2                     2  2
1  2  3                  3  3  3
1  2  3  4               4  4  4  4
1  2  3  4  5            5  5  5  5  5
```

Experiment

8. Write a program that reads three nonzero integer values and determines and prints whether they could represent the sides of a triangle.

9. Write a program that reads three nonzero integers and determines and prints whether they could be the sides of a right triangle

10. Write a program that reads a nonnegative integer and computes and prints its factorial

11. Write a program that estimates the value of the mathematical constant *e* by using theformula:

$$e^1 = 1 + \frac{1}{1!} + \frac{1^2}{2!} + \frac{1^3}{3!} + \cdots$$

12. Write a program that computes the value of e^x by using the formula

$$e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots, -\infty < x < \infty$$

IV. Arrays, Pointers, and Functions
Demonstration

1. Write a C program to find the minimum, maximum and average in an array of integers.

2. Write a function to compute mean, variance, Standard Deviation, sorting of n elements in a single dimension array.

3. Write a C program that uses functions to perform the following:
   i. Addition of Two Matrices ii. Multiplication of Two Matrices iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be the same.

4. Write C programs that use both recursive and non-recursive functions

5. To find the factorial of a given integer.

Experiment

6. Write a C program to find the GCD (greatest common divisor) of two given integers.

7. Write a C program to compute x^n

8. Write a program for reading elements using a pointer into an array and display the values using the array.

9. Write a program for display values reverse order from an array using a pointer.

10. Write a program through a pointer variable to sum of n elements from an array.

V. Files
Demonstration
1. Write a C program to display the contents of a file to standard output device.
2. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
3. Write a C program to count the number of times a character occurs in a text file. The file name and the character
are supplied as command line arguments.
Experiment
4. Write a C program that does the following:
It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using atoi function)Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function)The program should then read all 10 values and print them back
5. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

VI. Strings
Demonstration
1. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
2. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent c.
3. Write a C program that uses functions to perform the following operations:
   • To insert a sub-string into a given main string from a given position.
   • To delete n Characters from a given position in a given string.

Experiment
4.Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
5.Write a C program that displays the position of a character ch in the string S or – 1 if S doesn't contain ch.
6.Write a C program to count the lines, words and characters in a given text.

VII. Sorting and Searching:
1.Write a C program that uses non recursive function to search for a Key value in a given list of integers using linear search method.
2.Write a C program that uses non recursive function to search for a Key value in a givensorted list of integers using binary search method.
3.Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.

Experiment
4.Write a C program that sorts the given array of integers using selection sort in descending order
5. Write a C program that sorts the given array of integers using insertion sort in ascending order
6.Write a C program that sorts a given array of names

Project
Students must submit a report on one of the following micro-projects before commencement of second internal examination.
1.Library management system
2.Payrol management system
3.Telecom billing management system
4.Bank management system
5.Employee's management system
6.Library management system
7.Personal Diary management system
8.Medical store management system.
9.Phone Contacts management
10.Fee Collection system

TEXTBOOKS:
1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition, Pearson
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

REFERENCE BOOKS:
1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
7. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

Course Objectives
Students will learn the following:
- work with an IDE to create, edit, compile, run and debug programs
- analyze the various steps in program development.
- develop programs to solve basic problems by understanding basic concepts in C like
- operators, control statements etc.
- develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- Write programs using the Dynamic Memory Allocation concept.
- create, read from and write to text and binary files

Course Outcomes
Students shall be able to:
CO1: formulate the algorithms for simple problems and translate given algorithms to a working and correct program
CO2: correct syntax errors as reported by the compilersidentify and correct logical errors encountered during execution
CO3: represent and manipulate data with arrays, strings and structures and use pointers of different types
CO4: create, read and write to and from simple text and binary files
CO5: Develop reusable code with the help C-functions

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

(A400505) INTRODUCTION TO SOCIAL INNOVATION
(Common to all branches)

L	T	P	C
0	0	2	1

B.Tech I Year I Semester

WEEK-1

Types and features of community- Rural, Suburban, Urban and Regional

WEEK-2

Service based learning, Aims of Community based projects, Sustainable Development Goals

WEEK-3

Community visit, Report Writing, Resource Diagram, Chapati Diagram, Transect Walk

WEEK-4

The non-profit sector, public sector, the private sector, the informal sector

WEEK-5

Poster presentation on four sectors

WEEK-6

Process of Design Thinking

WEEK-7

Social organizations and enterprises, social movements

WEEK-8

Social softwares and open-source methods

WEEK-9

Introduction to Ethics, moral values, significance of professional ethics

code of conduct for engineers

WEEK-10

Identify ethical dilemmas in different tasks of engineering, applying moral theories and codes of conduct for resolution of ethical dilemmas

WEEK-11

Case studies on Engineering Ethics

WEEK-12

Documentation, Steps for Patent filing and Startups, Poster presentation

Text Books
 1. Social Entrepreneurship for the 21st Century: Innovation Across the Non Profit, Private and Public Sectors; Georgia Levenson Keohane; Tata McGraw Hill
 2. Social Enterprises: An Organizational Perspective edited; Benjamin Gidron, YeheskelHasenfeld; Palgrave Macmillan
 3. Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011.
 4. Solving Problems with Design Thinking - Ten Stories of What Works (Columbia Business School Publishing) Hardcover – 20 Sep 2013 by Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett (Author)
 5. Engineering Ethics: An Industrial Perspective; Gail Baura; Elsevier

6. Intellectual Property and Financing Strategies for Technology Startups; Gerald B. Halt, Jr., John C. Donch, Jr., Amber R. Stiles, Robert Fesnak; Springer
7. Fundamentals of Intellectual Property (English) 1st Edition (Paperback, Dr. Kalyan C. Kankanala) Publisher: Asia Law House ISBN: 9789381849514, 938184951X Edition: 1st Edition, 2012.
8. Indian Patent Law (English, Paperback, Kalyan C. Kankanala) Publisher: Oxford University Press- New Delhi, ISBN: 9780198089605, 0198089600 Edition: 2012.

Course Outcomes

On Completion of the course, the students will be able to

1. Identify community issues through community Interaction

2. Illustrate the factors affecting social innovation in various sectors

3. Apply design thinking concept to analyze the community problems

4. Adopt the ethical values in implementing the Social innovation

5. Describe the process of property rights and patent filing.

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

(A400704) UNIVERSAL HUMAN VALUES
(Common to all branches)

L T P C
2 0 0 0

B.Tech I Year I Semester

UNIT - I
Basic Guidelines, Content and Process for Value Education
- ➢ Purpose and motivation for the course, recapitulation from Universal Human Values-I
- ➢ Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration
- ➢ Continuous Happiness and Prosperity- A look at basic Human Aspirations
- ➢ Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority
- ➢ Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- ➢ Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking

UNIT - II
Understanding Harmony in the Human Being - Harmony in Myself!
- ➢ Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
- ➢ Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
- ➢ Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) • Understanding the characteristics and activities of 'I' and harmony in 'I'
- ➢ Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
- ➢ Programs to ensure Sanyam and Health. Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

UNIT – III
Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship
- ➢ Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
- ➢ Understanding the meaning of Trust; Difference between intention and competence • Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
- ➢ Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals • Visualizing a universal harmonious order in society- Undivided Society, Universal Orderfrom family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc., Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives

UNIT - IV
Understanding Harmony in the Nature and Existence – Whole existence as Coexistence
- ➢ Understanding the harmony in the Nature
- ➢ Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature

➢ Understanding Existence as Co-existence of mutually interacting units in all- pervasive space
➢ Holistic perception of harmony at all levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

UNIT – V

Implications of the above Holistic Understanding of Harmony on Professional Ethics
➢ Natural acceptance of human values
➢ Definitiveness of Ethical Human Conduct
➢ Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
➢ Competence in professional ethics:
  a. Ability to utilize the professional competence for augmenting universal human order
  b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems,
  c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
➢ Case studies of typical holistic technologies, management models and production systems
➢ Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations
➢ Sum up. Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

Textbooks:
1. 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
2. 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.

Reference Books:
1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amar kantak, 1999.
2. A. N. Tripathi, "Human Values", New Age Intl. Publishers, New Delhi, 2004.
 3. The Story of Stuff (Book).
4. Mohandas Karamchand Gandhi "The Story of My Experiments with Truth"

Course Outcomes:
On completion of the course students will be able to
  1. Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
  2. They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. •
  3. They would have better critical ability about various issues in life.
  4. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
  5. It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

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

(A400002)ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
(Common to All)

B.Tech. I Year II Semester

L	T	P	C
3	1	0	4

UNIT-I
FirstOrderODE:

Exact differential equations, Equations reducible to exact differential equations, linear and Bernoulli's differential equations, Orthogonal Trajectories (only in Cartesian Coordinates). Applications: Newton's law ofcooling,Lawofnatural growth and decay.

UNIT-II
OrdinaryDifferential EquationsofHigherOrder:

Second and higher order linear differential equations with constant coefficients: Non-Homogeneous terms of thetype e^{ax}, sin ax, cosax,polynomials in x, $e^{ax}(x)$and $xV(x)$, methodof variationofparameters.

UNIT-III
Laplacetransforms:

Laplace Transforms: Laplace Transform of standard functions, First shifting theorem and Second shifting theorem.Unit step function, Dirac delta function, Laplace transforms of functions when they are multiplied and divided by 't'. Evaluation of integrals by Laplace transforms, Laplace transform of periodic functions. Inverse Laplace transform by different methods, convolution theorem (without proof). Applications: solving Initial value problems by Laplace Transform method..

UNIT-IV
VectorDifferentiation:

Vectorpointfunctionsandscalarpointfunctions,Gradient,Tangent plane and normal line, Directionalderivatives, DivergenceandCurl,SolenoidalandIrrotationalvectors, Scalar potential functions, Vector Identities.

UNIT-V
VectorIntegration:

Line, Surface and Volume Integrals.Theorems of Green, Gauss and Stoke's (without proofs) and their applications.

TEXT BOOKS:
1. Higher Engineering Mathematics, (36thEdition), B.S. Grewal, Khanna Publishers, 2010.
2. AdvancedEngineeringMathematics, (5thEdition),R.K.JainandS.R.K.Iyengar,NarosaPublications,2016.

REFERENCE BOOKS:
1. AdvancedEngineeringMathematics, (9th Edition),Erwinkreyszig,JohnWiley& Sons,2006.
2. Calculus and Analytic geometry, (9thEdition), G.B. Thomas and R.L. Finney, Pearson, Reprint, 2002.
3. A text book of Engineering Mathematics, (10thEdition), N.P. Bali and Manish Goyal, Laxmi Publications, Reprint, 2019.
4. HigherEngineeringMathematics, (9thEdition), H.K.DassandEr.RajnishVerma,SChandand companyLimited,NewDelhi, 2011.

COURSE OUTCOMES:
On completion of the course students will be able to
1. Determine first order differential equations and obtain solutions.
2. Solve the Higher order differential equations and apply the differential equation concepts to real world problems.
3. UsetheLaplacetransformstechniquesforsolvingODE's.
4. Evaluate Gradient – Divergence – Curl, Directional derivatives.
5. Evaluatetheline,surfaceandvolumeintegralsand convertingthemfromone toanother.

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

(A400009) ENGINEERING CHEMISTRY
(Common to all Branches)

B.Tech. I Year II Semester

L	T	P	C
3	1	0	4

UNIT-I: Electrochemistry, Batteries and Corrosion

Electrochemistry: Electrode potential, Standard electrode potential and E.M.F of the cell. Electrochemical cell, Nernst equation- derivation and applications, Types of electrodes- Quinhydrone electrode, Calomel electrode and Glass electrode.Electro chemical series and its applications.**Batteries**- primary (Lithium cell), secondary (Lead acid storage battery and Lithium-ion battery) and Fuel cells (H_2-O_2 and methanol-oxygen), Solar cells - Introduction and applications of Solar cells.

Corrosion: Introduction, Definition, Causes and effects of corrosion, Theories of chemical and electrochemical corrosion, Pilling-Bedworth rule, Types of corrosion- Galvanic, Waterline and Pitting corrosion, Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection, Sacrificial anode and Impressed current cathodic methods, Surface coatings- Metallic coatings, hot dipping, galvanizing and tinning, Electroplating-Copper plating and electrolessplating - Nickel plating.

UNIT-II: Material Chemistry - High Polymers

Types of polymerizations (addition, condensation and copolymerization).

Plastics: Thermoplastic and Thermosetting resins, Compounding and fabrication of plastics (compression and injection moulding). Preparation, properties, Engineering applications of PVC, Teflon and Bakelite.

Fibers: Characteristics of fibers - preparation, properties and uses of Nylon-6,6 and Dacron, Fiber Reinforced Plastics (FRP) - applications.

Rubbers: Natural rubber and its vulcanization. Elastomers: Buna-s, Butyl rubber and Thiokol rubber.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Preparation and applications of Polyvinyl acetate, Polylactic acid and poly vinyl alcohol.

UNIT-III: Energy Sources

Introduction, Calorific value of fuel – HCV, LCV- Dulongs formula. Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel – Transesterification, advantages

UNIT-IV: Water Technology

Sources of water, Impurities in water, Hardness of water, Temporary and permanent hardness, Units of hardness, Estimation of temporary and permanent hardness of water, EDTA method, Numerical problems, Potable water Treatment-Specifications, Steps involved in Treatment-Sedimentation, Coagulation, Filtration, Sterilization, Desalination of Brackish Water, Reverse Osmosis and Electro dialysis.

Industrial water treatment, Boiler Troubles-Scales and sludges, Caustic embrittlement, Boiler corrosion, Priming and foaming. Hot lime and cold lime soda Process-Numerical problems, Zeolite process and Ion exchange process. Internal conditioning methods like Phosphate, Carbonate, Calgon and Colloidal conditioning.

UNIT-V: Engineering Materials

Cement: Portland cement, its composition, setting and hardening.

Smart materials: Smart materials and their engineering applications

Advanced Glass Technology: Structure and nature of glasses, transformation range behaviour, dependence of physico-chemical characteristic of glasses on their constituents. Strength of glass and glass articles.

Lubricants: Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

Text Books:
1. Engineering chemistry (1st edition), B. Rama Devi & Ch. VenkataRamana Reddy; Cengage Learning, 2012.
2. Engineering Chemistry (1st edition), P. C. Jain and M. Jain, DhanapatRai& Sons.
3. Engineering chemistry (1st edition), Dr. Bharathikumari, Dr. Jyotsna.

4. Engineering chemistry (1ˢᵗ edition), Thirumala chary, E. Laxminyarana, SCITECH Publications (India) Pvt. Ltd.

Reference Books:
1. Engineering Chemistry (2ⁿᵈ edition), ShikhaAgarwal; Cambridge University Press, 2015.
2. Engineering Chemistry (2ⁿᵈ edition), Wiley India Pvt. Ltd., Vairam and others, 2014.
3. Engineering Chemistry (1ˢᵗ edition), PrasanthRath, Cengage Learning, 2015.
4. Applied Chemistry (1ˢᵗ edition), H.D. Gesser, Springer Publishers.
5. Engineering Chemistry (3ʳᵈ edition), B. Siva Shankar, Tata McGraw Hill Publishing Limited, 2015.
6. Text of Engineering Chemistry (12ᵗʰ edition), S. S. Dara, Mukkanti, S. Chand & Co, New Delhi, 2006.
7. Chemistry of Engineering Materials (5ᵗʰ edition), C. V. Agarwal, C. P. Murthy, A. Naidu, Wiley India, 2013.
8. Chemistry of Engineering Materials (3ʳᵈ edition), R. P. Mani, K. N. Mishra, Cengage Learning, 2015

Course Outcomes:

After completion of the course students will be able to
1. Apply the concept of electrochemistry and corrosion science in various practical applications.
2. Predict the different engineering applications by preparing various polymers.
3. Summarize the manufacturing process of various fuels and their applications in daily life.
4. Understand the benefits of treated water as source in steam generation in industrial application.
5. Illustrate the importance and applications of various advanced engineering materials.

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

(A402201) BASIC ELECTRICAL ENGINEERING
(Common to CSE, INF, ECE)

B.Tech. I Year II Semester

L T P C
2 0 0 2

Prerequisites: Mathematics

UNIT-I:
D.C. Circuits: Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple
circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL
and RC circuits.

UNIT-II:
A.C. Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series R-L-C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-III:
Transformers: Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency.
Auto-transformer and three-phase transformer connections.

UNIT-IV:
Electrical Machines: Construction and working principle of dc machine, performance characteristics of dc shunt machine. Generation of rotating magnetic field, Construction and working of a three-phase induction motor, Significance of torque-slip characteristics. Single-phase induction motor, Construction and working. Construction and working of synchronous generator.

UNIT-V:
Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for
energy consumption, power factor improvement and battery backup.

TEXT BOOKS:
1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition, 2008.

REFERENCE BOOKS:
1. P. Ramana, M. Suryakalavathi, G.T. Chandrasheker, "Basic Electrical Engineering", S. Chand, 2 nd Edition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

Course Objectives:
• To understand DC and Single & Three phase AC circuits
• To study and understand the different types of DC, AC machines and Transformers.
• To import the knowledge of various electrical installations and the concept of power, Power factor and its
  improvement.

Course Outcomes: Upon the completion of the course the student will be able to

1. Understand and analyze basic concepts of DC Circuits
2. Understand and analyze basic concepts of AC Circuits
3. Discus the technical aspects of transformers
4. Study the working principles of Electrical Machines.
5. Introduce components of Low Voltage Electrical Installations

(A405301) DATA STRUCTURES
(Common to ECE, EEE, Mech & Civil)

	L	T	P	C
B.Tech. I Year II Semester	3	0	0	3

[Note: The programs may be executed using any available Open Source/ Freely available IDE
Some of the Tools available are:
CodeLite: https://codelite.org/
Code:Blocks: http://www.codeblocks.org/
DevCpp : http://www.bloodshed.net/devcpp.html

UNIT-I
Overview of C: Basic structure of C programs, programming style, Executing a C program. **Constants, Variables, and Data Types:**Introduction,Character set,C-Tokens,keywords and identifiers,constants,variables,Data types,declaration of variables,declaration of Storage class, assigning values to variables, defining symbolic constant.
Operators& Expressions: Introduction, ArithmeticOperators, RelationalOperators, LogicalOperators, Assignment Operators,Increment & Decrement Operators,Conditional Operators,Bitwise Operator,SpecialOperators. Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators.

UNIT-II
Decision Making: Introduction,Decision making with *if*statement, simple*if* statement,the *if---else---*statement,Nesting of *if---else---*statements.the *else-if* ladder,the *switch* statement,the ?: operator, the goto statement. **Looping:** Introduction, the *while* statement,the *do -while* statement,*for* statement,break and continue statements.
Arrays: Introduction, One-Dimensional Arrays, Declaration of One-Dimensional Arrays, Initialization of One-Dimensional Arrays, Two-Dimensional Arrays, Initializing two dimensional arrays.
UNIT-III
Character Arrays and Strings: Introduction,declaring and initializing string variables,reading strings from terminal,writing strings to screen, string-handling functions.**Functions:**Introduction,definition of functions, return values, function calls, function declaration, scope, visibility and lifetime of variables. **Pointers:** Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self-referential structures in linked list (no implementation)

UNIT-IV
Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks- Operations, array and linked representations of stacks, stack applications, Queues- operations, array, and linked representations.

UNIT-V
Searching and Sorting: Basic searching in an array of elements (linear and binary search techniques), Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs.

Textbooks
1. Programming in ANSI C, 8th Edition, E.Balagurusamy McGraw Hill Educationpublication,2019.
2. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.

Reference Books
1. C Programming Absolute Beginner's Guide,3rd Edition, Pearson Education ,2014.
2. Learn C the Hard Way,1st Edition,Zed A.Shaw, Pearson Education,2018

3. The C-Programming Language,2nd Edition, Brian Kernighan and Dennis Ritchie, Pearson Education,2014.
4. Data Structures using C – A. S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

Course Objectives
1. Introducing a Programming Language
2. Familiarizing the students with syntax and semantics of various C- programming language constructs.
3. learn to develop solutions to computational problems

Course Outcomes
Students shall be able
CO1:Describe the structure of C program and explainthe various components of it.
CO2: Use iterative statements for writing the C programs.
CO3: Organize data in Arrays and perform operations on data stored in Arrays.
CO4: Define & describe user defined functions in C language.
CO5: Differentiate structures, unions and manipulate data using pointers

END

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

(A403502) COMPUTER AIDED ENGINEERING DRAWING

B.Tech. I Year II Semester

L	T	P	C
0	1	2	2

UNIT – I:
Introduction to Engineering Drawing: Principles of Engineering Drawing and their Significance, Introduction to Computer aided drafting – views, commands.
Computer aided drafting of conic Sections: Ellipse, Parabola and Hyperbola – General Method (eccentricity) only.
Computer aided drafting of Cycloid, Epicycloids and Hypocycloid.

UNIT- II:
Orthographic Projections: Introduction to Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures.
Computer aided orthographic projections – points, lines and planes

UNIT – III:
Projections of Regular Solids: Introduction to   Regular Solids – Prism, Cylinder, Pyramid, Cone
Computer aided projections of solids – Regular views

UNIT – IV:
Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views –Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric
Projection of objects having non- isometric lines, Isometric Projection of Spherical Parts using computer aided drafting.

UNIT – V:
Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions
Conversion of orthographic projection into isometric view and vice versa using computer aided drafting.

TEXT BOOKS:
1. Engineering Drawing, 51st Edition, N.D. Bhatt, Charotar Pub, 2012
2. Computer Aided Engineering Drawing, 2nd Edition, K. Balaveera Reddy et al, CBS Publishers, 2015

REFERENCE BOOKS:
1. Engineering Drawing, 2nd Edition, Basant Agrawal and C M Agrawal, McGraw Hill, 2014
2. Engineering Drawing, 1st Edition, M. B. Shah, B.C. Rane, Pearson, 2015
3. Engineering Drawing, 1st Edition, N. S. Parthasarathy and Vela Murali, Oxford, 2015
4. Engineering Drawing and graphics Using AutoCAD, 3rd Edition, T. Jeyapoovan, Vikas, S.Chand and Company Ltd, 2000

Course Outcomes: At the end of the course, the student will be able to:
1. Apply computer aided drafting tools to create 2D objects like Conic section and Cycloidal curves
2. Sketch the Orthographic projection of Point, Line and Plane objects by drafting tools
3. Create, read and interpret engineering drawings of Solids by computer tools
4. Create and interpret 2D and 3D Isometric objects by drafting tools
5. Conversion of orthographic projection into isometric view and vice versa by using computer aided drafting tools

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

(A400502) ENGINEERING CHEMISTRY LABORATORY
(Common to all Branches)

L	**T**	**P**	**C**
0	**0**	**2**	**1**

B.Tech. I Year II Semester

Lab Experiments:

1. Estimation of Hardness of water by EDTA Method.
    2. Estimation of Alkalinity of Water.
    3. Estimation of Copper by Colorimetric Method.
    4. Conductometric Titration of aStrong Acid vs a Strong Base.
    5. Conductometric Titration of aWeak Acid vs a Strong Base.
    6. Potentiometric Titration of aStrong Acid vs a Strong Base.
    7. PotentiometricTitration of Ferrous Ammonium Sulphate (FAS) vs Potassium Dichromate.
    8. Preparation of Thiokol Rubber.
    9. Determination of Viscosity of a Liquid.
    10. Determination of Surface Tension of a liquid.
    11. Adsorption of acetic acid on Activated charcoal.
    12. Estimation of Iodine in Table Salt (by potentiometric)
    13. Thin Layer Chromatography (Ortho-Nitro phenol &Para-Nitro phenol).
    14. Determination of rate constant of acid catalyzed hydrolysis of methyl acetate.

Virtual lab experiments:

    1. Construction of Fuel Cell and its working.
    2. Smart Materials for biomedical applications.
    3. Batteries for Electrical Vehicles.
    4. Functioning of Solar Cell and its applications.

Reference Books:

    1. Engineering Chemistry Lab Manual (1st edition), Glaze Publishers 2018.
    2. Engineering chemistry (1st edition), B. Rama Devi & Ch. VenkataRamana Reddy; Cengage Learning, 2012.
    3. A Textbook of Engineering Chemistry (1st edition), SashiChawla, DhanapathRai& Sons.

Course Outcomes:

At the end of the course the student will be able to
    1. Determine the extent of hardness present in water and its consequences in industrial operations
    2. Prepare polymer like Thiokol Rubber
    3. Estimate the strength of solutions, p^H of various solutions
    4. Determine the viscosity and surface tension of various liquids
    5. Apply the electrochemical concepts in conductometric and potentiometric titrations

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

(A402502) BASIC ELECTRICAL ENGINEERING LABORATORY
(Common to CSE, INF, ECE)

B.Tech. I Year II Sem.

L T P C
0 0 2 1

List of experiments/demonstrations:
PART- A (compulsory)

1. Verification of KVL and KCL
2. Verification of Thevenin's and Norton's theorem
3. Transient Response of Series RL and RC circuits for DC excitation
4. Resonance in series RLC circuit
5. Calculations and Verification of Impedance and Current of RL, RC and RLC series Circuits.
6. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
7. Performance Characteristics of a DC Shunt Motor
8. Torque-Speed Characteristics of a Three-phase Induction Motor.

PART-B (any two experiments from the given list)

1. Verification of Superposition theorem.
2. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
3. Measurement of Active and Reactive Power in a balanced Three-phase circuit
4. Magnetization Characteristics of DC Shunt Generator.

TEXT BOOKS:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition,2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition,2008.

REFERENCE BOOKS:

1. P. Ramana, M. Suryakalavathi, G.T.Chandrasheker,"Basic Electrical Engineering", S. Chand,2nd Edition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1stEdition, 2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

Course Objectives:
• To measure the electrical parameters for different types of DC and AC circuits using Conventional and theorems approach.
• To study the transient response of various R, L and C circuits using different excitations.
• To determine the performance of different types of DC, AC machines and Transformers.

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

1. Verify the basic Electrical circuits through different experiments.
2. Analyze the transient responses of R, L and C circuits for different input conditions.
3. Calculate the of Impedance and Current of RL, RC and RLC series Circuits.
4. Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods.
5. Measure the Active and Reactive Power in a single phase transformer

(A405505) DATA STRUCTURES LABORATORY
(Common to ECE, EEE, Mech and Civil)

B.Tech. I Year II Semester

L	T	P	C
0	0	3	1.5

[Note:The programs may be executed using any available Open Source/ Freely available IDE
Some of the Tools available are:
CodeLite: https://codelite.org/
Code:Blocks: http://www.codeblocks.org/
DevCpp : http://www.bloodshed.net/devcpp.html
Eclipse: http://www.eclipse.org
This list is not exhaustive and is NOT in any order of preference]

I. OPERATORS AND EVALUATION OF EXPRESSIONS
Demonstration
1.Write a C program to print greetings message on the screen.
2.Write a C program to illustrate usage of comments in C.
3.Write a simple program that prints the results of all the operators available in C
   (Including pre/post increment, bitwise and/or/not. etc.). Read required operand values from standard input.
4.Write a C program that converts given data type to another using auto conversion and casting. Take the values from standard input.
5.Write a program for finding the max and min from the three numbers (using ternary operator).
Experiment
6.Write a C program to compute simple, compound interest.
7.Write a C program that declares Class awarded for a given percentage of marks, where mark = 70% = Distinction.
   (Read percentage from standard input.)

II. Expression Evaluation
Demonstration
1. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula $s = ut+(1/2)at^2$ where u and a are the initial velocity in m/sec ($= 0$) and acceleration in m/sec^2 ($= 9.8$ m/s^2)).
2. Write a program that asks the user to enter the highest rainfall ever in one season for a country, and the rainfall in the current year for that country, obtains the values from the user, checks if the current rainfall exceed the highest rainfall and prints an appropriate message on the screen. If the current rainfall is higher, it assigns that value as the highest rainfall ever. Use only the single-selection form of the if statement.
Experiment
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
4. Write a C program to find the roots of a Quadratic equation.

III. Iterative statements
Demonstration
1. Write a program that reads an integer (5 digits or fewer) and determines and prints how many digits in the integer are 9s.
2. Write a program that keeps printing the powers of the integer 3, namely 3, 9, 27, 91, 273, and so on. Your loop should not terminate (i.e., you should create an infinite loop). What happens when you run this program?
3. Write a program that reads the radius of a circle (as a float value) and computes and prints the diameter, the circumference and the area. Use the value 3.14159 for π
Experiment
4. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
5. Write a C program to construct a pyramid of numbers as follows:

```
1                     1
1   2                 2   2
1   2   3             3   3   3
1   2   3   4         4   4   4   4
1   2   3   4   5     5   5   5   5   5
```

IV. Arrays, Pointers, and Functions
Demonstration
1. Write a C program to find the minimum, maximum and average in an array of integers.
2. Write a function to compute mean, variance, Standard Deviation, sorting of n elements in a single dimension array.
3. Write a C program that uses functions to perform the following:
   i. Addition of Two Matrices ii. Multiplication of Two Matrices iii. Transpose of a matrix.
Experiment
4. Write a C program to find the GCD (greatest common divisor) of two given integers.
5. Write a C program to compute x^n

V. Strings
Demonstration
1. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
2. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent c.
3. Write a C program that uses functions to perform the following operations:
   - To insert a sub-string into a given main string from a given position.
   - To delete n Characters from a given position in a given string.
Experiment
4. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
5. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn't contain ch.
6. Write a C program to count the lines, words and characters in a given text.

VI Data Structures
Demonstration
1. Write a program that uses functions to perform the following operations on singly linked list
   i) Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that implement stack (its operations) using
   i) Arrays ii) Pointers
3. Write a program that implement Queue (its operations) using
   i) Arrays ii) Pointers

Experiment
4. Write a program that uses functions to perform the following operations on doubly linked List.
   i) Creation ii) Insertion iii) Deletion iv) Traversal
5. Write a program that uses functions to perform the following operations on circular linked List. i) Creation ii) Insertion iii) Deletion iv) Traversal

VII Searching & Sorting
Demonstration
1. Write a C program that uses non recursive function to search for a Key value in a given list of integers using linear search method.
2. Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using binary search method.
3. Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
Experiment
5. Write a C program that sorts the given array of integers using selection sort in descending order
6. Write a C program that sorts the given array of integers using insertion sort in ascending order

Textbooks

3. Programming in ANSI C, 8th Edition, E. Balagurusamy McGraw Hill Education publication,2019.
4. Fundamentals of Data Structures in C, 2 nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.

Reference Books

5. C Programming Absolute Beginner's Guide,3rd Edition, Pearson Education ,2014.
6. Learn C the Hard Way,1st Edition, Zed A. Shaw, Pearson Education,2018
7. The C-Programming Language,2nd Edition, Brian Kernighan and Dennis Ritchie, Pearson Education, 2014.
8. Data Structures using C – A. S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

Course Objectives

Students will learn the following:

- work with an IDE to create, edit, compile, run and debug programs
- analyze the various steps in program development.
- develop programs to solve basic problems by understanding basic concepts in C like
- operators, control statements etc.
- develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- Write programs using the Dynamic Memory Allocation concept.
- create, read from and write to text and binary files

Course Outcomes

Students shall be able to:

CO1: formulate the algorithms for simple problems and translate given algorithms to a working and correct program

CO2: correct syntax errors as reported by the compilers identify and correct logical errors encountered during execution

CO3: represent and manipulate data with arrays, strings and structures and

CO4: Develop applications using pointer concept.

CO5: Develop reusable code with the help C-functions

END

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

(A400506) ENGINEERING EXPLORATION & PRACTICE
(Common to all branches)

B.Tech. I Year II Semester

L	T	P	C
0	0	3	1.5

Week-1

Difference between Science and Engineering, Scientist and Engineer needs and wants, various disciplines of engineering, some misconceptions of engineering, Expectation for the 21st century engineer. Significance of teamwork, Importance of communication in engineering profession

Week-2

Engineering Design Process, Need statement to Problem conversion, Pair wise comparison chart, decision matrix, Concepts of reverse engineering

Week-3

Project management tools: Checklist, Timeline, Gantt chart, Requirement Analysis

Week-4

Basic Components of a Mechanism, Degrees of Freedom or Mobility of a Mechanism, 4 Bar Chain, Crank Rocker Mechanism, Slider Crank Mechanism

Week-5

3-D Modelling of a Box with two holes and curvature

Week-6

3-D Modelling of Electronic Enclosure and Assembly of two parts

Week-7

Introduction to various platform-based development, Introduction to basic components, transducers, actuators and sensors, Introduction to Tinkercad

Week-8

Introduction to Arduino, basics of programming

Week-9

Interfacing Arduino with actuators and transducers

Week-10

Interfacing Arduino with Sensors, Liquid Crystal Display (LCD)

Week-11

Assembly and Crafting the Prototype

Week-12

Test and Validate the Prototype, Documentation, Panel Presentation

Text Books
1. Engineering Fundamentals: An Introduction to Engineering (MindTap Course List) 5th Edition by Saeed Moaveni
2. Software Project Management (SIE), (Fifth Edition); Bob Hughes,MikeCotterell,Rajib Mall; Published by Tata McGraw-Hill Education Pvt. Ltd (2011) ; ISBN 10: 0071072748 ISBN 13: 9780071072748
3. A Ghosh and AK Malik: Theory of Mechanism and Machine; East West Press (Pvt) Ltd., New Delhi.
4. Arduino Cookbook, 2nd Edition by Michael Margolis: O'Reilly Media
5. Introduction to autocad®2017-2D and 3D design by Bernd S. Palm and Alf Yarwood, Routledge (Taylor and Francis group)
6. Concepts in Engineering Design – 2016; by Sumesh Krishnan (Author), Dr.Mukul Shukla (Author), Publisher : Notion Press.

Course Outcomes

On Completion of the course, the students will be able to

1. Explain the importance of engineering profession in the world.
2. Identify multi-disciplinary approach required in solving an engineering problem
3. Build a mechanism for a given application
4. Create basic 3D models and animations
5. Design a mechatronic system using Arduino and electronic components

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

(A400703) CONSTITUTION OF INDIA
(Common to all branches)

B.Tech. I Year II Semester

L	T	P	C
2	0	0	0

UNIT - 1

History of Making of the Indian Constitution- History of Drafting Committee.

UNIT - 2

Philosophy of the Indian Constitution- Preamble Salient Features

UNIT - 3

Contours of Constitutional Rights & Duties - Fundamental Rights
- Right to Equality
- Right to Freedom
- Right against Exploitation
- Right to Freedom of Religion
- Cultural and Educational Rights
- Right to Constitutional Remedies
- Directive Principles of State Policy
- Fundamental Duties.

UNIT - 4

Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions

UNIT - 5

Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Panchayat raj: Introduction, PRI: Zila Panchayat. Elected officials and their roles, CEO ZilaPanchayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

REFERENCE BOOKS
1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. B. R. Ambedkar framing of Indian Constitution, Dr. S. N. Busi, 1st Edition, 2015.
3. Indian Constitution Law (7thEdn), M. P. Jain, Lexis Nexis, 2014.
4. Introduction to the Constitution of India, D.D. Basu, Lexis Nexis, 2015.

Course Outcomes:

On completion of the course students will be able to
1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru.
4. Discuss the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution

5. Discuss the passage of the Hindu Code Bill of 1956.

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

(A400003) MATHEMATICAL AND STATISTICAL FOUNDATIONS

B.Tech. II Year I Sem.

L	T	P	C
3	1	0	4

UNIT - I

Greatest Common Divisors and Prime Factorization: Greatest common divisors, The Euclidean algorithm, The fundamental theorem of arithmetic, Factorization of integers and the Fermat numbers
Congruences: Introduction to congruences, Linear congruences, The Chinese remainder theorem, Systems of linear congruences

UNIT - II

Simple Linear Regression and Correlation: Introduction to Linear Regression, The Simple Linear Regression Model, Least Squares and the Fitted Model, Properties of the Least Squares Estimators, Inferences Concerning the Regression Coefficients, Prediction, Simple Linear Regression Case Study
Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Statistical Independence.
Discrete Probability Distributions: Binomial Distribution, Poisson distribution.

UNIT - III

Continuous Probability Distributions: Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial
Fundamental Sampling Distributions: Random Sampling, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, Sampling Distribution of S2, t–Distribution, F-Distribution.

UNIT - IV

Estimation & Tests of Hypotheses: Introduction, Statistical Inference, Classical Methods of Estimation. Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance, Estimating a Proportion for single mean, Difference between Two Means, between Two Proportions for Two Samples and Maximum Likelihood Estimation.

UNIT - V

Stochastic Processes and Markov Chains: Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, nstep transition probabilities, Markov chain, Steady state condition, Markov analysis.

TEXT BOOKS:
1. Kenneth H. Rosen, Elementary number theory & its applications, sixth edition, Addison-Wesley, ISBN 978 0-321-50031-1
2. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statisticsfor Engineers & Scientists, 9th Ed. Pearson Publishers.
3. S. D. Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi

REFERENCE BOOK:
1. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications
2. T.T. Soong, Fundamentals of Probability And Statistics For Engineers, John Wiley & SonsLtd, 2004.
3. Sheldon M Ross, Probability and statistics for Engineers and scientists, Academic Press.

Course Objectives:
- The Number Theory basic concepts useful for cryptography etc
- The theory of Probability, and probability distributions of single and multiple random variables
- The sampling theory and testing of hypothesis and making inferences

Course Outcomes: After learning the contents of this course, the student must be able to

- Apply the number theory concepts to cryptography domain
- Apply the concepts of probability and distributions to some case studies
- Correlate the material of one unit to the material in other units
- Resolve the potential misconceptions and hazards in each topic of study.
- Stochastic process and Markov chains.

(A404203) ELECTRONIC DEVICES AND CIRCUITS

B.Tech. II Year I Sem.

L	T	P	C
2	0	0	2

UNIT - I
Diodes: Diode - Static and Dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances, V-I Characteristics, Diode as a switch- switching times.

UNIT - II
Diode Applications: Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive and Inductive Filters, Clippers-Clipping at two independent levels, Clamper-Clamping Circuit Theorem, Clamping Operation, Types of Clampers.

UNIT - III
Bipolar Junction Transistor (BJT): Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Transistor as a switch, switching times,

UNIT - IV
Junction Field Effect Transistor (FET): Construction, Principle of Operation, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET, FET as Voltage Variable Resistor, MOSFET, MOSTET as a capacitor.

UNIT – V
Special Purpose Devices: Zener Diode **-** Characteristics, Zener diode as Voltage Regulator, Principle ofOperation - SCR, Tunnel diode, UJT, Varactor Diode, Photo diode, Solar cell, LED, Schottky diode.

TEXT BOOKS:
1. Jacob Millman - Electronic Devices and Circuits, McGraw Hill Education
2. Robert L. Boylestead, Louis Nashelsky- Electronic Devices and Circuits theory, 11th Edition, 2009,Pearson.

REFERENCE BOOKS:
1. Horowitz -Electronic Devices and Circuits, David A. Bell – 5th Edition, Oxford.
2. Chinmoy Saha, Arindam Halder, Debaati Ganguly - Basic Electronics-Principles and Applications,Cambridge, 2018.

Course Objectives:
1. To introduce components such as diodes, BJTs and FETs.
2. To know the applications of devices.
3. To know the switching characteristics of devices.

Course Outcomes: Upon completion of the Course, the students will be able to:
1. Acquire the knowledge of various electronic devices and their use on real life.
2. Know the applications of various devices.
3. Acquire the knowledge about the role of special purpose devices and their applications.

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

(A405307) COMPUTER ORGANIZATION AND ARCHITECTURE

B.Tech. II Year I Sem.

L	T	P	C
3	0	0	3

Co-requisite: A Course on "Digital Electronics".

UNIT - I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

UNIT - II

Microprogrammed Control: Control memory, Address sequencing, micro program example, design of control unit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

UNIT - III

Data Representation: Data types, Complements, Fixed Point Representation, Floating PointRepresentation.
Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT - IV

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, CacheMemory.

UNIT - V

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics.

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor.

Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor communication and synchronization, Cache Coherence.

TEXT BOOK:
1. Computer System Architecture – M. Morris Mano, Third Edition, Pearson/PHI.

REFERENCE BOOKS:
1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, V th Edition, McGrawHill.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4 th Edition, PHI/Pearson.

Course Objectives

- The purpose of the course is to introduce principles of computer organization and the basic architectural concepts.
- It begins with basic organization, design, and programming of a simple digital computer andintroduces simple register transfer language to specify various computer operations.
- Topics include computer arithmetic, instruction set design, microprogrammed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors

Course Outcomes

- Understand the basics of instruction sets and their impact on processor design.
- Demonstrate an understanding of the design of the functional units of a digital computer system.
- Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
- Design a pipeline for consistent execution of instructions with minimum hazards.
- Recognize and manipulate representations of numbers stored in digital computers

(A466301) SOFTWARE ENGINEERING

B.Tech. II Year I Sem.

L	T	P	C
3	0	0	3

UNIT - I

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths. **A Generic view of process**: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI). **Process models**: The waterfall model, Spiral model and Agile methodology

UNIT - II

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

UNIT - III

Design Engineering: Design process and design quality, design concepts, the design model. Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT - IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.
Metrics for Process and Products: Software measurement, metrics for software quality.

UNIT - V

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM. **Quality Management:** Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXT BOOKS:
1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw HillInternational Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.

REFERENCE BOOKS:
1. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.
2. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
3. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies
4. .Fundamentals of object-oriented design using UML Meiler page-Jones:Pearson Education

Course Objectives

- The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
- Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams

Course Outcomes

- Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
- Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

(A405305) OPERATING SYSTEMS

B.Tech. II Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites:
1. A course on "Computer Programming and Data Structures".
2. A course on "Computer Organization and Architecture".

UNIT - I

Operating System - Introduction, Structures - Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls

Process - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads

UNIT - II

CPU Scheduling - Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling. System call interface for process management-fork, exit, wait, waitpid, exec

Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock

UNIT - III

Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors

Interprocess Communication Mechanisms: IPC between processes on a single computer system,IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

UNIT - IV

Memory Management and Virtual Memory - Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

UNIT - V

File System Interface and Operations -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.

TEXT BOOKS:
1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Advanced programming in the UNIX environment, W.R. Stevens, Pearson education.

REFERENCE BOOKS:
1. Operating Systems- Internals and Design Principles, William Stallings, Fifth Edition–2005,Pearson Education/PHI
2. Operating System A Design Approach- Crowley, TMH.
3. Modern Operating Systems, Andrew S. Tanenbaum 2nd edition, Pearson/PHI
4. UNIX programming environment, Kernighan and Pike, PHI/ Pearson Education
5. UNIX Internals -The New Frontiers, U. Vahalia, Pearson Education.

Course Objectives:

- Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
- Introduce the issues to be considered in the design and development of operating system
- Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix

Course Outcomes:

- Will be able to control access to a computer and the files that may be shared
- Demonstrate the knowledge of the components of computers and their respective roles in computing.
- Ability to recognize and resolve user problems with standard operating environments.
- Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

(A405506) PYTHON PROGRAMMING LABORATORY

B.Tech. II Year I Sem.

L	T	P	C
0	1	2	2

Week -1:
1. i) Use a web browser to go to the Python website http://python.org. This page contains information about Python and links to Python-related pages, and it gives you the ability to search the Python documentation.

ii) Start the Python interpreter and type help() to start the online help utility.
2. Start a Python interpreter and use it as a Calculator.3.
    i) Write a program to calculate compound interest when principal, rate and number of periods are given.
    ii) Given coordinates (x1, y1), (x2, y2) find the distance between two points
4. Read name, address, email and phone number of a person through keyboard and print the details.

Week - 2:
1. Print the below triangle using for loop.5

4 4
3 3 3
2 2 2 2
1 1 1 1 1

2. Write a program to check whether the given input is digit or lowercase character or uppercase character or a special character (use 'if-else-if' ladder)
3. Python Program to Print the Fibonacci sequence using while loop
4. Python program to print all prime numbers in a given interval (use break)

Week - 3:
1. i) Write a program to convert a list and tuple into arrays.

ii) Write a program to find common values between two arrays.
2. Write a function called gcd that takes parameters a and b and returns their greatest common divisor.
3. Write a function called palindrome that takes a string argument and returnsTrue if it is a palindrome and False otherwise. Remember that you can use the built-in function len to check the length of a string.

Week - 4:
1. Write a function called is_sorted that takes a list as a parameter and returns True if the list is sorted in ascending order and False otherwise.
2. Write a function called has_duplicates that takes a list and returns True if there is any element that appears more than once. It should not modify the original list.

  i). Write a function called remove_duplicates that takes a list and returns a new list with only the unique elements from the original. Hint: they don't have to be in the same order.
  ii). The wordlist I provided, words.txt, doesn't contain single letter words. So you might want to add "I", "a", and the empty string.
  iii). Write a python code to read dictionary values from the user. Construct a function to invert its content. i.e., keys should be values and values should be keys.
  3. i) Add a comma between the characters. If the given word is 'Apple', it should become 'A,p,p,l,e'
     ii) Remove the given word in all the places in a string?
  iii) Write a function that takes a sentence as an input parameter and replaces the first letter of every word with the corresponding upper case letter and the rest of the letters in the word by corresponding letters in lower case without using a built-in function?
  4. Writes a recursive function that generates all binary strings of n-bit length

Week - 5:
1. i) Write a python program that defines a matrix and prints
   ii) Write a python program to perform addition of two square matrices
   iii) Write a python program to perform multiplication of two square matrices
2. How do you make a module? Give an example of construction of a module using different geometricalshapes and operations on them as its functions.
3. Use the structure of exception handling all general purpose exceptions.

Week-6:
1. a. Write a function called draw_rectangle that takes a Canvas and a Rectangle as arguments and draws a representation of the Rectangle on the Canvas.
   b. Add an attribute named color to your Rectangle objects and modify draw_rectangle so that it uses the color attribute as the fill color.
   c. Write a function called draw_point that takes a Canvas and a Point as arguments and draws a representation of the Point on the Canvas.
   d. Define a new class called Circle with appropriate attributes and instantiate a few Circle objects. Write a function called draw_circle that draws circles on the canvas.
2. Write a Python program to demonstrate the usage of Method Resolution Order (MRO) in multiplelevels of Inheritances.
3. Write a python code to read a phone number and email-id from the user and validate it for correctness.

Week- 7
1. Write a Python code to merge two given file contents into a third file.
2. Write a Python code to open a given file and construct a function to check for given words present in it and display on found.
3. Write a Python code to Read text from a text file, find the word with most number of occurrences
4. Write a function that reads a file *file1* and displays the number of words, number of vowels, blankspaces, lower case letters and uppercase letters.

Week - 8:
1. Import numpy, Plotpy and Scipy and explore their functionalities.
2. a) Install NumPy package with pip and explore it.
3. Write a program to implement Digital Logic Gates – AND, OR, NOT, EX-OR
4. Write a program to implement Half Adder, Full Adder, and Parallel Adder
5. Write a GUI program to create a window wizard having two text labels, two text fields and two buttons as Submit and Reset.

TEXT BOOKS:
1. Supercharged Python: Take your code to the next level, Overland
2. Learning Python, Mark Lutz, O'reilly

REFERENCE BOOKS:
1. Python for Data Science, Dr. Mohd. Abdul Hameed, Wiley Publications - 1st Ed. 2021.
2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
3. Python Programming A Modular Approach with Graphics, Database, Mobile, and Web Applications, Sheetal Taneja, Naveen Kumar, Pearson
4. Programming with Python, A User's Book, Michael Dawson, Cengage Learning, India Edition
5. Think Python, Allen Downey, Green Tea Press
6. Core Python Programming, W. Chun, Pearson
7. Introduction to Python, Kenneth A. Lambert, Cengage

Course Objectives:
- To install and run the Python interpreter
- To learn control structures.
- To Understand Lists, Dictionaries in python
- To Handle Strings and Files in Python

Course Outcomes: After completion of the course, the student should be able to
- Develop the application specific codes using python.
- Understand Strings, Lists, Tuples and Dictionaries in Python
- Verify programs using modular approach, file I/O, Python standard library
- Implement Digital Systems using Python

Note: The lab experiments will be like the following experiment examples

(A405509)   OPERATING   SYSTEMS   LABORATORY

B.Tech. II Year I Sem.

L	T	P	C
0	0	2	1

Prerequisites: A course on "Programming for Problem Solving", A course on "Computer Organization and Architecture".

Co-requisite: A course on "Operating Systems".

List of Experiments:

1. Write C programs to simulate the following CPU Scheduling algorithms a) FCFS b) SJF c) RoundRobin d) priority

2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close,fcntl, seek, stat, opendir, readdir)

3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.

4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.

5. Write C programs to illustrate the following IPC mechanisms a) Pipes b) FIFOs c) Message Queues d) Shared Memory

6. Write C programs to simulate the following memory management techniques a) Paging b) Segmentation

7. Write C programs to simulate Page replacement policies a) FCFS b) LRU c) Optimal

TEXT BOOKS:
1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

REFERENCE BOOKS:
1. Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition–2005,Pearson Education/PHI
2. Operating System - A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum, 2nd edition, Pearson/PHI
4. UNIX Programming Environment, Kernighan and Pike, PHI/Pearson Education
5. UNIX Internals: The New Frontiers, U. Vahalia, Pearson Education

Course Objectives:
- To provide an understanding of the design aspects of operating system concepts through simulation
- Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix

Course Outcomes:
- Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
- Able to implement C programs using Unix system calls

(A466501) SOFTWARE ENGINEERING LABORATORY

B.Tech. II Year I Sem.

L	T	P	C
0	0	2	1

Prerequisites
- A course on "Programming for Problem Solving".

Co-requisite
- A Course on "Software Engineering".

List of Experiments

Do the following seven exercises for any two projects given in the list of sample projects or any other Projects:

1. Development of problem statements.
2. Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents.
3. Preparation of Software Configuration Management and Risk Management related documents.
4. Study and usage of any Design phase CASE tool
5. Performing the Design by using any Design phase CASE tools.
6. Develop test cases for unit testing and integration testing
7. Develop test cases for various white box and black box testing techniques.

Sample Projects:

1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System.
10. Recruitment system

TEXT BOOKS:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGrawHill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

REFERENCE BOOKS:

1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill

Course Objectives:

- To have hands on experience in developing a software project by using various software engineering principles and methods in each of the phases of software development.

Course Outcomes:

- Ability to translate end-user requirements into system and software requirements
- Ability to generate a high-level design of the system from the software requirements
- Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

(A400507) SOCIAL INNOVATION IN PRACTICE
(Common for all branches)

B.Tech. II Year I Sem.

L	T	P	C
0	0	2	1

Week-1
Identify community issues to be addressed, Requirements Analysis: Extensive User requirements analysis
Week-2
Generating effective System Requirement document
Week-3
Social Innovation – Case Studies
Week-4
Impact of Social Innovation on communities
Week-5
Process of Social Innovation Prompts – identifying needs,Proposals –generating ideas,
Prototyping – testing the ideain practice,
Week-6
Sustaining-developing a business model, Scaling and diffusion-growing social innovations, Systematic change
Week-7
Introduction to sustainability, Sustainability leadership, Life cycle assessment
Week-8
Carbon footprint Calculation
Week-9
Types of Start-Ups, Types of business models, Market risksand Marketing strategies
Week-10
Verification of Business Model and Validation
Week-11
Business Model Development
Week-12
Documentation and Panel presentation

Course Outcomes
On Completion of the course, the students will be able to
1. Identify several social issues to be addressed
2. Analyse the impact of social innovations on the society
3. Illustrate the process of social innovation for a community problem
4. Demonstrate the solution from sustainability perspectives.
5. Develop a scalable business model.

Reference Books
1. Requirements Analysis: From Business Views to Architecture; David C. Hay; Prentice Hall Professional
2. Social Enterprises: An Organizational Perspective edited; Benjamin Gidron, YeheskelHasenfeld; Palgrave Macmillan
3. Social Enterprise Law: Trust, Public Benefit and Capital Markets By Dana Brakman Reiser & Steven A. Dean
4. Introduction to Sustainability by Robert Brinkmann, Wiley-Blackwell

(A400702) GENDER SENSITIZATION

B.Tech. II Year I Sem.

L	T	P	C
2	0	0	0

COURSE DESCRIPTION

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

Unit-I: UNDERSTANDING GENDER

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men
  - Preparing for Womanhood. Growing up Male. First lessons in Caste.

Unit – II: GENDER ROLES AND RELATIONS

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles-Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences-Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

Unit – III: GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work. -Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

Unit – IV: GENDER - BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No!-Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "*Chupulu".*
Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

Unit – V: GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals
Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-The Brave Heart.

Note: **Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of**

English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

> *Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on "Gender".*

☞ **ESSENTIAL READING**: The Textbook, "*Towards a World of Equals: A Bilingual Textbook on Gender*" written by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu **published by Telugu Akademi, Telangana Government in 2015.**

Objectives of the Course
- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Learning Outcomes
> Students will have developed a better understanding of important issues related to gender in contemporary India.
> Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
> Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
> Students will acquire insight into the gendered division of labor and its relation to politics and economics.
> Men and women students and professionals will be better equipped to work and live together as equals.
> Students will develop a sense of appreciation of women in all walks of life.
> Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

ASSESSMENT AND GRADING:
- Discussion & Classroom Participation: 20%
- Project/Assignment: 30%
- End Term Exam: 50%

(A405306) DISCRETE MATHEMATICS

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

UNIT - I
Mathematical logic: Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

UNIT - II
Set theory: Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions.

UNIT - III
Algebraic Structures: Introduction, Algebraic Systems, Semi groups and Monoids, Lattices as Partially Ordered Sets, Boolean Algebra.

UNIT - IV
Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutation with Constrained Repetitions, Binomial Coefficient, The Binomial and Multinomial Theorems, The Principle of Exclusion.

UNIT - V
Graph Theory: Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

TEXT BOOKS:
1. Discrete Mathematical Structures with Applications to Computer Science: J.P. Tremblay, R. Manohar, McGraw-Hill, 1st ed.
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe l. Mott, Abraham Kandel,Teodore P. Baker, Prentis Hall of India, 2nd ed.

REFERENCE BOOKS:
1. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, Pearsoneducation, 5th edition.
2. Discrete Mathematical Structures: Thomas Kosy, Tata McGraw Hill publishing co.

Course Objectives:
- Introduces elementary discrete mathematics for computer science and engineering.
- Topics include formal logic notation, methods of proof, induction, sets, relations, algebraic structures, elementary graph theory, permutations and combinations, counting principles; recurrence relations and generating functions.

Course Outcomes:
- Understand and construct precise mathematical proofs
- Apply logic and set theory to formulate precise statements
- Analyze and solve counting problems on finite and discrete structures
- Describe and manipulate sequences
- Apply graph theory in solving computing problems

(A412303) AUTOMATA THEORY AND COMPILER DESIGN

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Prerequisite: Nil

UNIT - I
Introduction to Finite Automata: Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems.
Nondeterministic Finite Automata: Formal Definition, an application, Text Search, Finite Automata with Epsilon-Transitions.
Deterministic Finite Automata: Definition of DFA, How A DFA Process Strings, The language of DFA, Conversion of NFA with €-transitions to NFA without €-transitions. Conversion of NFA to DFA

UNIT - II
Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions.
Pumping Lemma for Regular Languages: Statement of the pumping lemma, Applications of the Pumping Lemma.
Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Parse Trees, Ambiguity in Grammars and Languages.

UNIT - III
Push Down Automata: Definition of the Pushdown Automaton, the Languages of a PDA, Equivalence of PDA and CFG's, Acceptance by final state
Turing Machines: Introduction to Turing Machine, Formal Description, Instantaneous description, The language of a Turing machine
Undecidability: Undecidability, A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines

UNIT - IV
Introduction: The structure of a compiler,
Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical- Analyzer Generator Lex,
Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom- Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers

UNIT - V
Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Syntax-Directed Translation Schemes, Implementing L-Attributed SDD's.
Intermediate-Code Generation: Variants of Syntax Trees, Three-Address Code
Run-Time Environments: Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management

TEXT BOOKS:
1. Introduction to Automata Theory, Languages, and Computation, 3nd Edition, John E. Hopcroft,Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Theory of Computer Science – Automata languages and computation, Mishra and Chandrashekaran, 2nd Edition, PHI.

REFERENCE BOOKS:
1. Compilers: Principles, Techniques and Tools, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry

D. Ullman, 2nd Edition, Pearson.

2. Introduction to Formal languages Automata Theory and Computation, Kamala Krithivasan,Rama R, Pearson.
3. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
4. lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly Compiler Construction, Kenneth

C. Louden, Thomson. Course Technology.

Course Objectives
- To introduce the fundamental concepts of formal languages, grammars and automata theory.
- To understand deterministic and non-deterministic machines and the differences between decidability and undecidability.
- Introduce the major concepts of language translation and compiler design and impart the knowledge of practical skills necessary for constructing a compiler.
- Topics include phases of compiler, parsing, syntax directed translation, type checking use of symbol tables, intermediate code generation

Course Outcomes
- Able to employ finite state machines for modeling and solving computing problems.
- Able to design context free grammars for formal languages.
- Able to distinguish between decidability and undecidability.
- Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis.
- Acquire skills in using lex tool and design LR parsers

(A405304) DATABASE MANAGEMENT SYSTEMS

B.Tech. II Year II Sem

L	T	P	C
3	0	0	3

Prerequisites: A course on "Data Structures".

UNIT - I

Database System Applications: A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS
Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model

UNIT - II

Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical database design, introduction to views, destroying/altering tables and views.
Relational Algebra, Tuple relational Calculus, Domain relational calculus.

UNIT - III

SQL: QUERIES, CONSTRAINTS, TRIGGERS: form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active databases.
Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, First, Second, Third normal forms, BCNF, lossless join decomposition, multivalued dependencies, Fourth normal form, Fifth normal form.

UNIT - IV

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.

UNIT - V

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree based Indexing, Comparison of File Organizations, Indexes- Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM),
B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:
1. Database System Concepts, Silberschatz, Korth, McGraw hill, V edition.3rd Edition
2. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill

REFERENCE BOOKS:
1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
3. Introduction to Database Systems, C. J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

Course Objectives:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

Course Outcomes:

- Gain knowledge of fundamentals of DBMS, database design and normal forms
- Master the basics of SQL for retrieval and management of data.
- Be acquainted with the basics of transaction processing and concurrency control.
- Familiarity with database storage structures and access techniques

(A466302) INTRODUCTION TO ARTIFICIAL INTELLIGENCE

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Prerequisite: Knowledge on Data Structures.

UNIT - I
Introduction to AI - Intelligent Agents, Problem-Solving Agents,
Searching for Solutions - Breadth-first search, Depth-first search, Hill-climbing search, Simulated annealing search, Local Search in Continuous Spaces.

UNIT-II
Games - Optimal Decisions in Games, Alpha–Beta Pruning, Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Knowledge-Based Agents, **Logic-** Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses.

UNIT-III
First-Order Logic - Syntax and Semantics of First-Order Logic, Using First Order Logic, Knowledge Engineering in First-Order Logic. Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification, Forward Chaining, Backward Chaining, Resolution.
Knowledge Representation: Ontological Engineering, Categories and Objects, Events.

UNIT-IV
Planning - Definition of Classical Planning, Algorithms for Planning with State Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches. Hierarchical Planning.

UNIT-V
Probabilistic Reasoning:
Acting under Uncertainty, Basic Probability Notation Bayes' Rule and Its Use, Probabilistic Reasoning, Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient

Representation of Conditional Distributions, Approximate Inference in Bayesian Networks, Relational and First- Order Probability.

TEXT BOOK:
1. Artificial Intelligence: A Modern Approach, Third Edition, Stuart Russell and Peter Norvig, Pearson Education.

REFERENCE BOOKS:
1. Artificial Intelligence, 3rd Edn., E. Rich and K. Knight (TMH)
2. Artificial Intelligence, 3rd Edn., Patrick Henny Winston, Pearson Education.
3. Artificial Intelligence, Shivani Goel, Pearson Education.
4. Artificial Intelligence and Expert systems – Patterson, Pearson Education.

Course Objectives:

- To learn the distinction between optimal reasoning Vs. human like reasoning.
- To understand the concepts of state space representation, exhaustive search, heuristic
- search together with the time and space complexities.
- To learn different knowledge representation techniques.
- To understand the applications of AI, namely game playing, theorem proving, and machine learning.

Course Outcomes:

- Learn the distinction between optimal reasoning Vs human like reasoning and formulate an efficient problem space for a problem expressed in natural language. Also select a search algorithm for a problem and estimate its time and space complexities.
- Apply AI techniques to solve problems of game playing, theorem proving, and machine learning.
- Learn different knowledge representation techniques.
- Understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
- Comprehend the applications of Probabilistic Reasoning and Bayesian Networks.
- Analyze Supervised Learning Vs. Learning Decision Trees

(A405303) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

UNIT - I

Object oriented thinking and Java Basics- Need for oop paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and lifetime of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

UNIT - II

Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring java.io.

UNIT - III

Exception handling and Multithreading-- Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception subclasses. String handling, Exploring java.util. Differences between multithreading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication, thread groups, daemon threads. Enumerations, autoboxing, annotations, generics.

UNIT - IV

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, checkbox groups, choices,

lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT - V

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS:
1. Java the complete reference, 7th edition, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson education.

REFERENCE BOOKS:
1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley& sons.
2. An Introduction to OOP, third edition, T. Budd, Pearson education.

3. Introduction to Java programming, Y. Daniel Liang, Pearson education.
4. An introduction to Java programming and object-oriented application development, R.A. Johnson- Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S. Horstmann and Gary Cornell, eighth Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S. Horstmann and Gary Cornell, eighth Edition, Pearson Education
7. Object Oriented Programming with Java, R.Buyya, S.T.Selvi, X.Chu, TMH.
8. Java and Object Orientation, an introduction, John Hunt, second edition, Springer. 9. Maurach's Beginning Java2 JDK 5, SPD.

Course Objectives
- To Understand the basic object-oriented programming concepts and apply them in problem solving.
- To Illustrate inheritance concepts for reusing the program.
- To Demonstrate multitasking by using multiple threads and event handling
- To Develop data-centric applications using JDBC.
- To Understand the basics of java console and GUI based programming

Course Outcomes
- Demonstrate the behavior of programs involving the basic programming constructs like controlstructures, constructors, string handling and garbage collection.
- Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by usingextend and implement keywords
- Use multithreading concepts to develop inter process communication.
- Understand the process of graphical user interface design and implementation using AWT or swings.
- Develop applets that interact abundantly with the client environment and deploy on the server.

(A405508) DATABASE MANAGEMENT SYSTEMS LABORATORY

B. Tech II Year II Sem

L	T	P	C
0	0	2	1

Co-requisites: "Database Management Systems"

Course Objectives:
1. Introduce ER data model, database design and normalization
2. Learn SQL basics for data definition and data manipulation

Course Outcomes:
- Design database schema for a given application and apply normalization
- Acquire skills in using SQL commands for data definition and data manipulation.
- Develop solutions for database applications using procedures, cursors and triggers

List of Experiments:
1.Concept design with E-R Model
 Draw an ER diagram for the following

a. There are two entity sets **Employee** and **Department**. These entity sets are participating in a relationship **works in.** The relationship set is converted into relation with attributes EmpNo from **Employee** relation, D_id from **Department** relation and **Since**, the attribute of the relationship set itself.

2.Relational Model
   a. Convert the above ER diagram into Relational Model

3.Normalization

Eid	E.Name	Ph.no	ProjId	ProjName	ProjLeader	EmpCity	City Zip
101	John	98765623,998234123	P03	Project103	Grey	ModelTown	110033
102	John	89023467	P01	Project101	Christian	Badarpur	110044
103	Ryan	76213908	P04	Project104	Hudson	Naraina	110028
104	stephine	98132452	P02	Project102	Petro	HariNagar	110064

Consider the following table.

 a) Normalize the given Relation. Consider the given schema is in first normal form and
Schema(Student id ,Student name, Project Id, Project name, City, country, ZIP)
Primarykey(Student id,Project id)
Fd's: Project Id-$\rightarrow$ Project name
 country-$\rightarrow$ZIP,ZIP

 b) Normalize the given Table to the BCNF
 Consider the set of Functional Dependencies..
 Eid $\rightarrow$EName, Ph.no, Empcity, CityZipPrimaryKey = (EmpId, ProjId)
 ProjId$\rightarrow$ProjName, ProjLeader
 EmpId,ProjId$\rightarrow$ProjLeader
 EmpCity$\rightarrow$CityZip
 ProjId$\rightarrow$ProjLeader

4.Practicing DDL commands

5.Practicing DML commands
1. a. Create a user and grant all permissions to the user.
   b. Insert the any three records in the employee table and use rollback. Check the result.
   c. Add primary key constraint and not null constraint to the employee table.

   d. Insert null values to the employee table and verify the result.
2. a. Create a user and grant all permissions to the user.
   b. Insert values in the department table and use commit.
   c. Add constraints like unique and not null to the department table.
   d. Insert repeated values and null values into the table.
3. a. Create a user and grant all permissions to the user.
   b. Insert values into the table and use commit.
   c. Delete any three records in the department table and use rollback.
   d. Add constraint primary key and foreign key to the table
4. a. Create a user and grant all permissions to the user.
   b. Insert records in the sailor table and use commit.
   c. Add save point after insertion of records and verify save point.
   d. Add constraints not null and primary key to the sailor table.
5. a. Create a user and grant all permissions to the user.
   b. Use revoke command to remove user permissions.
   c. Change password of the user created.
   d. Add constraint foreign key and not null.
6. a. Create a user and grant all permissions to the user.
   b. Update the table reserves and use savepoint and rollback.
   c. Add constraint primary key , foreign key and not null to the reserves table
   d. Delete constraint not null to the table column

6.A. Querying (using ANY, ALL, UNION, INTERSECT, JOIN, Constraints etc.)
6.B. Nested, Correlated subqueries

   A. Find the Sid's of sailors who have reserved a red or a green boat.
   B. Find the names of sailors who have reserved a red and a green boat.
   C. Find the names of sailors who have reserved a red but not green boats.
   D. Find all sids of sailors who have a rating of 10 or reserved boat 104.
   E. Find the names of sailors who have reserved boat 103 using independent nested query.
   F. Find the names of sailors who have reserved a red boat.
   G. Find the names of sailors who have not reserved a red boat.
   1. Find the names of sailors who have reserved boat number 103 using correlated nestedquery.
   H. Find sailors whose rating is better than some sailor called 'Horatio'.
   I. Find the sailors with the highest rating.
   2. Find the names of sailors who have reserved both a red and a green boat using nestedqueries.
   J. Find the names of sailors who have reserved all boats.

7.Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
a. who is the youngest sailor
b.Find the name of the sailor who have maximum rating
c.What is the average rating of all Sailors
d. how many sailors are there with the rating above 7
e. The following SQL lists the number of customers in each country, sorted high to low
f. The following SQL lists the number of customers in each country, sorted high to low (Only include countries with more than 5 customers):

8.Triggers (Creation of insert trigger, delete trigger, update trigger)
1.
a. Create a pl/sql trigger which will calculate the total marks and percentage of students after insert/update the details of a student in database.
b. Write a trigger that keeps backup of deleted records of emp_trig table. Deleted records of emp_trigger inserted in emp_backup table.

2. Creation of insert trigger, delete trigger, update trigger practice triggers using the passenger database.
   Passenger (Passport_ id INTEGER PRIMARY KEY, Name VARCHAR (50) Not NULL, Age Integer Not NULL, Sex Char, Address VARCHAR (50) Not NULL);
   a. Write a Insert Trigger to check the Passport_id is exactly six digits or not.
   b. Write a trigger on passenger to display messages '1 Record is inserted', '1 record is deleted', '1 record is updated' when insertion, deletion and updation are done on passenger respectively.

9.Procedures and functions

    a. Create a procedure which displays employee salary for given employee number using out variable
    b. Write a pl/sql block which displays the department name for department 40.
    c. Create a procedure to check whether the given number is prime or not
    d. Create a function which returns week day of a given date
    e. Create a function which returns number of sailors for a given rating level.
    f. Create a procedure to find the lucky number of a given birth date
    g. Create a function which returns average age of sailors for a given rating level.

10.Usage of Cursors

a. Display the employee names and their salary for the accepted department number.
    b. Display the top N earners for an accepted department number.
    c. To write a Cursor to display the list of employees who are working as a Managers or Analyst.
    d. write a Cursor to find employee with given job and deptno.
    e. Write a PL/SQL block using implicit cursor that will display message, the salaries of all the employees in the 'employee' table are updated. If none of the employee's salary are updated we get a message 'None of the salaries were updated'. Else we get a message like for example, 'Salaries for 1000 employees are updated' if there are 1000 rows in 'employee'table.

11. Packages

a. creates HR package which contains Hire and Fire functions.
Hire function adds the details of employee and Fire function deletes the details of Employee.

TEXTBOOKS:
1.Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill, 3rd Edition
2.Database System Concepts, Silberschatz, Korth, McGraw Hill, V edition.

REFERENCE BOOKS:
1.Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2.Fundamentals of Database Systems, ElmasriNavrate, Pearson Education
3.Introduction to Database Systems, C.J. Date, Pearson Education
4.Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
5.Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6.Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

(A412504) JAVA PROGRAMMING LABORATORY

B.Tech. II Year II Sem.

L	T	P	C
0	0	2	1

List of Experiments:

1. Use Eclipse or Net bean platform and acquaint yourself with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

2. Write a Java program to demonstrate the OOP principles. [i.e., Encapsulation, Inheritance, Polymorphism and Abstraction]

3. Write a Java program to handle checked and unchecked exceptions. Also, demonstrate the usage of custom exceptions in real time scenario.

4. Write a Java program on Random Access File class to perform different read and write operations.

5. Write a Java program to demonstrate the working of different collection classes. [Use package structure to store multiple classes].

6. Write a program to synchronize the threads acting on the same object. [Consider the example of any reservations like railway, bus, movie ticket booking, etc.]

7. Write a program to perform CRUD operations on the student table in a database using JDBC.

8. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

9. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. [Use Adapter classes]

REFERENCE BOOKS:

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education.
2. Thinking in Java, Bruce Eckel, Pearson Education.
3. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
4. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, Pearson.

Course Objectives:
- To understand OOP principles.
- To understand the Exception Handling mechanism.
- To understand Java collection framework.
- To understand multithreaded programming.
- To understand swing controls in Java.

Course Outcomes:
- Able to write the programs for solving real world problems using Java OOP principles.
- Able to write programs using Exceptional Handling approach.
- Able to write multithreaded applications.
- Able to write GUI programs using swing controls in Java.

(A466502) INTRODUCTION TO ARTIFICIAL INTELLIGENCE LABORATORY

B.Tech. II Year II Sem.

L	T	P	C
0	0	2	1

LIST OF EXPERIMENTS:

Week-1 & 2:

Basic programs in Python to get familiarize various programming structures

Week - 3:

Implementation of logical rules in Python

Week - 4, 5, 6 & 7:

Using any data apply the concept of:

a. Liner regression

b. Gradient decent

c. Logistic regression

Week - 8:

Perform and plot overfitting in a data set

Week - 9 &10:

Implementation of KNN classification algorithm

Week - 11 &12:

Implementation of k-means clustering algorithm

Week - 13:

Explore statistical methods for machine learning

TEXT BOOKS:

1. Artificial Intelligence, Cengage Learning, Saroj Kaushik, 1st Edition, 2011

2. Python Machine Learning by Example, Yuxi (Hayden) Liu, Packet PublishingLimited, 2017

3. Machine Learning, Saikar Dutt, Subramanian Chandramouli, Amit Kumar Das,Pearson India

REFERENCES:

1. Practical Workbook Artificial Intelligence and Soft Computing for beginners,Anindita Das Bhattacharjee, Shroff Publisher-X team Publisher

2. Machine Learning, Tom Mitchell, McGraw Hill, 2017

3. Pattern Recognition and Machine Learning, Christopher M. Bishop, Springer, 2011

   The Elements of Statistical Learning, T. Hastie, R. Tibshirani, J. Friedman, 2e, 20

(A400701) ENVIRONMENTAL SCIENCES

B.Tech. II Year II Sem.

L	T	P	C
2	0	0	0

UNIT - I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT - II

Natural Resources: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

UNIT - III

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT - IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Sources and types of pollution, drinking water quality standards. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. Global Environmental Issues and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT - V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socioeconomical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). Towards Sustainable Future: Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.

2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI

Learning Pvt. Ltd.

3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.

4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.

5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.

Course Objectives:

☐ Understanding the importance of ecological balance for sustainable development.

☐ Understanding the impacts of developmental activities and mitigation measures.

☐ Understanding the environmental policies and regulations

Course Outcomes:

☐ Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development