CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B. Tech- CSE (Cyber Security)
CBCS & OUTCOME BASED COURSE STRUCTURE

S.No	Course Code	Course Title	Category	L	T	P	Credits	CIE	SEE
**SEMESTER - I**									
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	A400503	English Language and	HSMC	0	0	2	1	40	60
6	A400501	Applied Physics Laboratory	BSC	0	0	3	1.5	40	60
7	A405501	Elements of Computer Science & Engineering	ESC	0	0	2	1	50	-
8	A405504	IT Workshop	ESC	0	0	3	1.5	40	60
9	A405502	Programming for Problem Solving	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**	**1**	**20**		
		Total hours per Week:		**29**						

S.No	Course Code	Course Title	Category	L	T	P	Credits	CIE	SEE
**SEMESTER – II**									
1	A400002	Ordinary Differential Equations	BSC	3	1	0	4	4	60
2	A400009	Engineering Chemistry	BSC	3	1	0	4	40	60
3	A405301	Data Structures	PCC	3	0	0	3	40	60
4	A402201	Basic Electrical Engineering	ESC	2	0	0	2	40	60
5	A403502	Computer Aided Engineering Drawing	ESC	0	1	2	2	40	60
6	A400502	Engineering Chemistry Lab	BSC	0	0	2	1	40	60
7	A405505	Data Structures Laboratory	PCC	0	0	3	1.	40	60
8	A402502	Basic Electrical Engineering	ESC	0	0	2	1	40	60
9	A400506	Engineering Exploration &	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**							

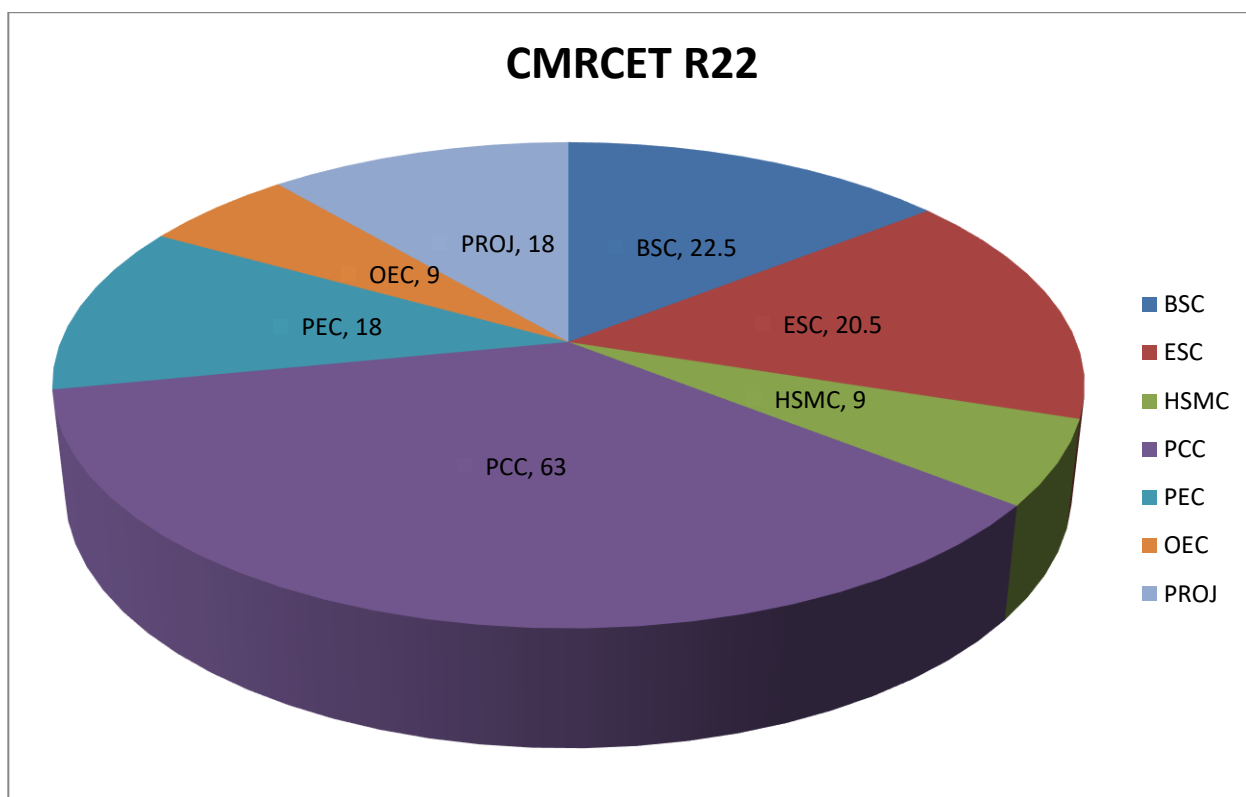|		SEMESTER - III							
Course Code	**Course Title**	**Category**	**Hours per Week**			**Credits**	**Maximum Marks**	
			L	**T**	**P**		**CI**	**SE**
A405306	Discrete Mathematics	PCC	3	0	0	3	40	60
A404204	Digital Electronics	ESC	3	0	0	3	40	60
A404203	Electronic Devices and Circuits	ESC	2	0	0	2	40	60
A405304	Database Management Systems	PCC	3	0	0	3	40	60
A405303	Object Oriented Programming through Java	PCC	3	0	0	3	40	60
A405508	Database Management Systems Lab	PCC	0	0	3	1.5	40	60
A405507	Object Oriented Programming through Java Lab	PCC	0	0	3	1.5	40	60
A405506	Python Programming Laboratory	ESC	0	1	2	2	40	60
A462501/ A400507	Skill Development Course(Data visualization- R Programming/ Power BI/Social Innovation in practice)	PCC	0	0	2	1	40	60
A400701	Environmental Science	MC	2	0	0	0	40	60
			16	1	10	20		
	Total hours per Week:			27				
		SEMESTER - IV							
Course Code	**Course Title**	**Category**	**Hours per Week**			**Credits**	**Maximum Marks**	
			L	**T**	**P**		**CIE**	**SE**
A400006	Computer Oriented Statistical Methods	BSC	3	1	0	4	40	60
A405305	Operating Systems	PCC	3	0	0	3	40	60
A405307	Computer Organization and Architecture	PCC	3	0	0	3	40	60
A462301	Computer Networks	PCC	3	0	0	3	40	60
A462302	Cyber Security	PCC	3	0	0	3	40	60
A462501	Computer NetworksLab	PCC	0	0	2	1	40	60
A405509	Operating Systems Lab	HSMC	0	0	2	1	40	60
A400702	Gender Sensitization	MC	0	0	2	0	-	-
A462801	Real-Time Research Project/Field BasedProject	PROJ	0	0	4	2	40	60
	Total:		15	1	10	20		
	Total hours per Week			26				
	Total Credits in II Year: 40							

SEMESTER - V								
Course Code	**Course Title**	**Category**	**Hours per Week**			**Credits**	**Maximum Marks**	
			L	**T**	**P**		**CIE**	**SEE**
A462303	Network Security and Cryptography	PCC	3	1	0	4		
A405304	Cyber Crime Investigation & Digital Forensics	PCC	3	0	0	3	40	60
A462305	Software Engineering	PCC	3	0	0	3	40	60
A462306	Formal Languages and Automata Theory	PCC	3	0	0	3	40	60
A462401	Professional Elective- I	PEC	3	0	0	3	40	60
A462503	Network Security and Cryptography Lab	PCC	0	0	2	1	40	60
A462504	Cyber Crime Investigation Digital Forensics	PCC	0	0	2	1	40	60
A462505	Cyber Security Lab	PCC	0	0	2	1	40	60
A462505	Skill development Course (UI design- Flutter)	PCC	0	0	2	1	40	60
	Total:		**15**	**1**	**8**	**20**		
	Total hours per Week:		**24**					
SEMESTER - VI								
Course Code	**Course Title**	**Category**	**Hours per Week**			**Credits**	**Maximum Marks**	
			L	**T**	**P**		**CIE**	**SEE**
A462307	Algorithm Design and Analysis	PCC	3	0	0	3	40	60
A462308	Vulnerability Assessment & Penetration Testing	PCC	3	0	0	3	40	60
A462309	Network Management Systems and Operations	PCC	3	0	0	3	40	60
A462310	Full Stack	PCC	2	0	0	2	40	60
A462402	Professional Elective-II	PEC	3	0	0	3	40	60
A462506	Full Stack Lab	PCC	0	0	2	1	40	60
A462507	Vulnerability Assessment & PenetrationTest Lab	PCC	0	0	2	1	40	60
A462508	Network Management Systems &Operations Lab	PCC	0	0	2	1	40	60
A4000504	Advanced English Communication Laboratory	HSMC	0	0	2	1	40	60
A400705	Intellectual property rights	*MC*	2	0	0	0	-	-
A462802	Industrial Oriented Mini Project/ Summer Internship/Skill Development course (Big Data-	PROJ	0	0	4	2	-	100
	Total:		**16**	**0**	**12**	**20**		
	Total hours per Week		**28**					
	Total Credits in III Year: 42							

SEMESTER - VII								
Course Code	**Course Title**	**Category**	**Hours per Week**			**Credits**	**Maximum Marks**	
			L	**T**	**P**		**CIE**	**SEE**
A400102	Business Economics & Financial Analysis	HSMC	3	0	0	3	40	60
	Organizational Behavior	HSMC	2	0	0	2	40	60
A462403	Professional Elective-III	PEC	3	0	0	3	40	60
A462404	Professional Elective-IV	PEC	3	0	0	3	40	60
A462601	Open Elective-I	OEC	3	0	0	3	40	60
A462602	Open Elective-II	OEC	3	0	0	3	40	60
A462509	Skill development Course(Infection Monkey/Conjur)	PCC	0	0	4	0	-	-
A462803	Major Project Phase-I	PROJ	0	0	6	3	40	60
	Total:		**17**	**0**	**10**	**20**		
	Total hours per Week:			**27**				
SEMESTER - VIII								
Course Code	**Course Title**	**Category**	**Hours per Week**			**Credits**	**Maximum Marks**	
			L	**T**	**P**		**CIE**	**SEE**
A462405	Professional Elective- V	PEC	3	0	0	3	40	60
A462406	Professional Elective- VI	PEC	3	0	0	3	40	60
A462603	Open Elective-III	OEC	3	0	0	3	40	60
A462804	Technical Seminar	PROJ	0	0	4	2	100	
A462805	Major Project Phase –II	PROJ	0	0	18	9	40	60
	Total:		**9**	**0**	**22**	**20**		
	Total hours per Week			**31**				
	Total Credits in IV Year: 38							

List of Professional Electives	
Professional Elective-I	
A462401	CompilerDesign
A462401	ArtificialIntelligence
A462401	DatawarehousingandDataMining
A462401	Ad-hoc&SensorNetworks
A462401	Cloud Computing
Professional Elective-II	
A462401	
A462401	EthicalHacking
A462401	DataScience
A462401	DistributedSystems
A462401	CyberLaws
A462401	IoTSecurity
Professional Elective-III	
A462401	MobileApplicationSecurity
A462401	Machine Learning
A462401	DevOps
A462401	MobileApplicationDevelopment
A462401	BlockchainTechnology
Professional Elective-IV	
A462401	EdgeAnalytics
A462401	Web&Database Security
A462401	ComputerSecurity&AuditAssurance
A462401	SocialMediaSecurity
A462401	DeepLearning
Professional Elective-V	
A462401	QuantumComputing
A462401	Data AnalyticsforFraudDetection
A462401	5GTechnologies
A462401	SecurityIncident&ResponseManagement(SOC)
A462401	AuthenticationTechniques
Professional Elective-VI	
A462401	QuantumCryptography
A462401	IoTCloudProcessingandAnalytics
A462401	Cloud Security
A462401	DigitalWatermarkingandSteganography
A462401	Data Privacy
List of Open Electives offering to other departments	
A462601	Fundamentals Of Cyber Security
A462602	Internet Of Things
A462603	Cyber laws and Ethics

Credit Comparision Chart			
Category	CMRCET R22	JNTUH	AICTE
BSC	22.5	22.5	25
ESC	20.5	20.5	24
HSMC	9	10	12
PCC	63	61	48
PEC	18	19	18
OEC	9	9	15
PROJ	18	18	15
Total	160	160	160

CMRCET R22

Pie chart legend:
- BSC
- ESC
- HSMC
- PCC
- PEC
- OEC
- PROJ

Pie chart values:
- BSC, 22.5
- ESC, 20.5
- HSMC, 9
- PCC, 63
- PEC, 18
- OEC, 9
- PROJ, 18

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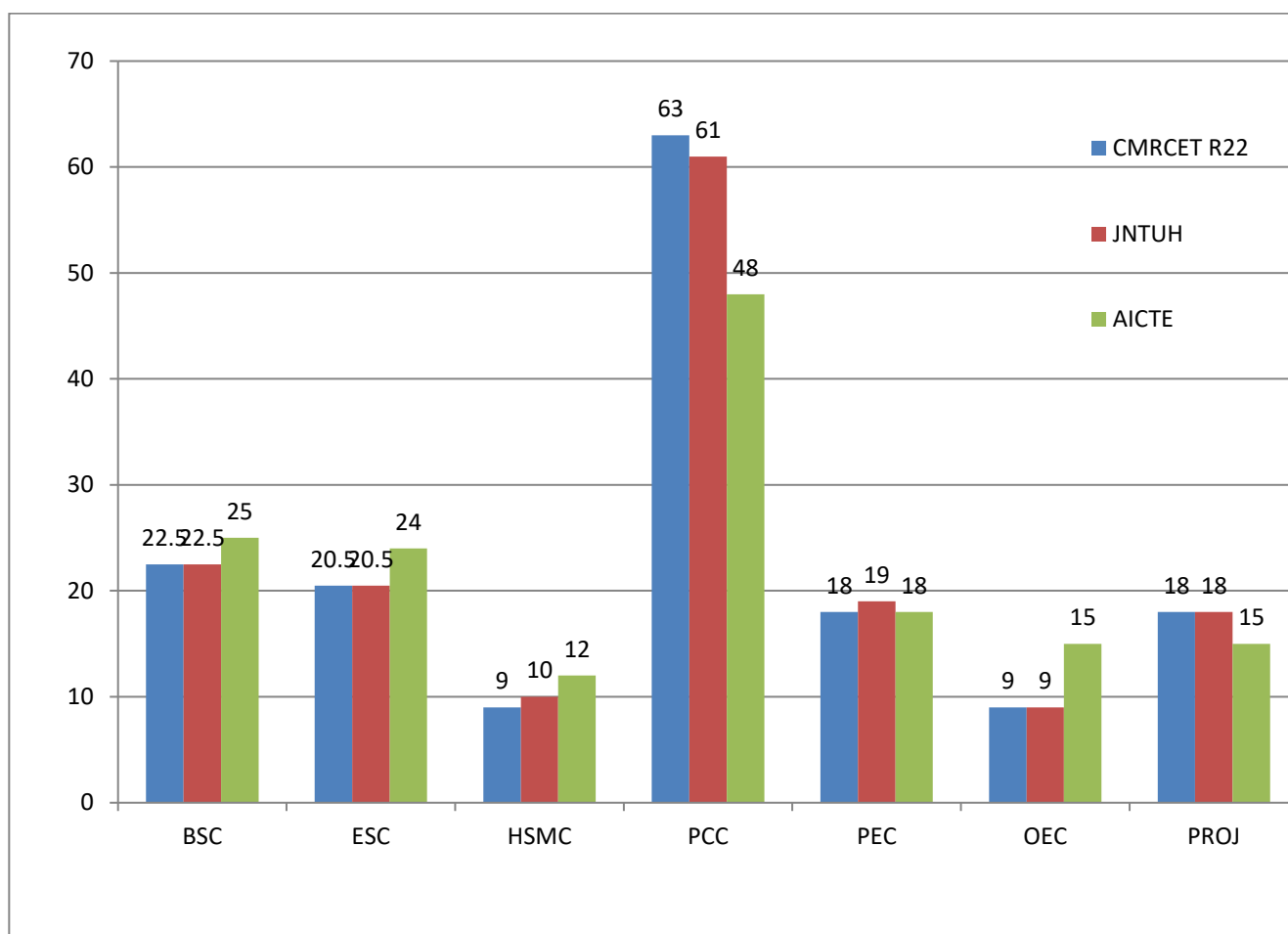
(A400101) ENGLISH FOR SKILL ENHANCEMENT
(Common to all branches)

	L T P C
B.Tech: I Semester	**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 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, (36[th]Edition), B.S. Grewal, Khanna Publishers, 2010.
2. Advanced Engineering Mathematics, (5[th]Edition), 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)

B.Tech: I Semester

L	T	P	C
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&Nano technology(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)

	L	**T**	**P**	**C**
B.Tech: I Semester	**3**	**0**	**0**	**3**

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

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   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 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

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

	L	T	P	C
B.Tech: I Semester	0	0	2	1

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 SkillsObjectives
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 SkillsObjectives
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 LAB

B.Tech: I Semester

L	T	P	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.

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

(A405501) ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING

B.Tech: I Semester	**L**	**T**	**P**	**C**
	0	**0**	**2**	**1**

Course Objective: To provide an overview of the subjects of computer science and engineering.

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 problemsolving.
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.

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, datastructures – definition, types of data structures

UNIT – III
Operating systems: Functions of operating systems, types of operating systems, Device & Resourcemanagement
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, sensornetworks, vehicular networks, 5G communication.
World Wide Web – Basics, role of HTML, CSS, XML, Tools for web designing, Social media, Onlinesocial 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. GerstingUniversity 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.

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

B.Tech I Semester

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L  T  P  C
0  0  3  1.5
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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

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 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

END

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

B.Tech I Semester

	L	T	P	C
	0	0	2	1

[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]

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

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 ……
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+………….+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 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

END

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

	L	T	P	C
B.Tech I Semester	0	0	2	1

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 sector

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
B.Tech I Semester	**2**	**0**	**0**	**0**

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												

END

(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 of cooling,Law of natural growth and decay.

UNIT-II
OrdinaryDifferential EquationsofHigherOrder:

Second and higher order linear differential equations with constant coefficients: Non-Homogeneous terms of thetype e^{ax}, $\sin ax$, $\cos ax$,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:

Vector point functions and scalar point functions,Gradient,Tangent plane and normal line, Directionalderivatives, Divergence and Curl, Solenoidal and Irrotational vectors, 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, (36[th]Edition), B.S. Grewal, Khanna Publishers, 2010.
2. AdvancedEngineeringMathematics, (5[th]Edition),R.K.JainandS.R.K.Iyengar,NarosaPublications,2016.

REFERENCE BOOKS:
1. AdvancedEngineeringMathematics, (9th Edition),Erwinkreyszig,JohnWiley& Sons,2006.
2. Calculus and Analytic geometry, (9[th]Edition), G.B. Thomas and R.L. Finney, Pearson, Reprint, 2002.
3. A text book of Engineering Mathematics, (10[th]Edition), N.P. Bali and Manish Goyal, Laxmi Publications, Reprint, 2019.
4. HigherEngineeringMathematics,(9[th]Edition),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. Evaluate the line,surface and volume integrals and 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

END

(A400009) ENGINEERING CHEMISTRY
(Common to all Branches)

	L	**T**	**P**	**C**
B.Tech II Semester	**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

(A405301) Data Structures
(Common to CSE, IT, CSE-DS, CSE-AI&ML,AI&ML,AI&DS,CSE-CS)

	L	**T**	**P**	**C**
B.Tech II Semester	**3**	**0**	**0**	**3**

Course Objectives
- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
- Introduces sorting and pattern matching algorithms

Course Outcomes
Students shall be able
CO1: Design and Implement Linear Data structures
CO2: Explain the need of Dictionary data structure and implement dictionary data structure using Hash tables and skip lists.
CO3: Design and Implement various forms of tree data structures
CO4: Explain, analyze, and implement various graph traversal, sorting techniques.
CO5: Describe various pattern matching algorithms.

UNIT-I
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-II
Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching. Hash Table Representation: hash functions, collision resolution-separate chaining, open addressinglinear probing, quadratic probing, double hashing, rehashing, extendible hashing

UNIT-III
Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, B- Trees, B+ Trees, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

UNIT-IV
Graphs: Graph Implementation Methods. Graph Traversal Methods. Sorting: Quick Sort, Heap Sort, External Sorting- Model for external sorting, Merge Sort.

UNIT-V
Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries

TEXT BOOKS
1. Fundamentals of Data Structures in C, 2 nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/PearsonEducation.

REFERENCE BOOK
1. Data Structures: A Pseudocode Approach with C, 2 nd Edition, R. F. Gilbergand B.A.Forouzan, Cengage Learning.

END

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

B.Tech. II Sem.   **L   T   P   C**
                                                                 2   0   0   2

Prerequisites: Mathematics

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.

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 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

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

(A403502) COMPUTER AIDED ENGINEERING DRAWING

B.Tech 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 LAB
(Common to all Branches)

	L	**T**	**P**	**C**
B.Tech II Semester	**0**	**0**	**2**	**1**

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											

(A405505) Data Structures LAB

B.Tech II Semester

L	T	P	C
0	0	3	1.5

Course Objectives
- It covers various concepts of C programming language.
- It introduces searching and sorting algorithms.
- It provides an understanding of data structures such as stacks and queues.

Course Outcomes
Students shall be able
CO1: Design and Implement Linked List Data structure.
CO2: Design and Implement Linear Data structures.
CO3. Implement Sorting and Tree traversal techniques.
CO4: Design and Implement Non-Linear Data structures.
CO5: Implement KMP and Boyre-Moore pattern matching algorithms.

List of Experiments
I. Linked List, Stacks, Queues.

Demonstration
1. Write a C program to implement Single linked list i) Insertion ii)Deletion iii)Display
2. Write C programs to implement Stack ADT using Linked List
3. Write C programs to implement Queue ADT using Linked List
4. Write a function to reverse the nodes of a linked list

Experiment
1. Write a program that uses functions to perform the following operations on doubly linked list:
    i) Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that uses functions to perform the following operations on circular linked list:
    i) Creation ii) Insertion iii) Deletion iv) Traversal
4. Write a program that implement stack (its operations) using Arrays
5. Write a program that implement Queue (its operations) using Arrays

II. Dictionaries and Hashing
Demonstration
1.Write a C program to implement different hash methods
2. Write a C program to implement the following collision resolving i) Quadratic probing. ii) Linear Probing

Experiment
1.Implement Dictionary ADT using list data structure.
2. Implement Dictionary ADT using skip list data structure.

III. Search Trees
Demonstration
1.Write a C program to implement Binary search tree
i) Insertion ii) deletion iii) Traversals

Experimentation
1.Write a C program to implement binary search tree Non - recursively traversals
i) Pre- Order ii) Post –Order iii) In-Order

2.
(A) Write a C Program to Check if a Given Binary Tree is an AVL Tree or Not
(B) Write a C program to find height of a Binary tree
(C) Write a C program to count the number of leaf nodes in a tree.
3. Write a C program to implement AVL tree
i) Creation ii) Deletion iii) Traversals

IV. Graphs
Demonstration
1. Write a C program for implementing Graph traversal
i) DFS ii) BFS
2. Write C programs for implementing the following Sorting methods and display the important steps.
i) Quick Sort ii) Heap sort
Experimentation
3. Write C programs for implementing the following Sorting methods and display the important steps.
i) Merge sort ii) External Merge sort.

V. Pattern Matching Algorithms
Demonstration
1. Write a C program for implementing pattern matching algorithms
i) Knuth-Morris-Pratt ii) Brute Force

Experimentation
1.Write a C program for implementing pattern matching algorithms
i.Brute force ii Boyer –Moore

TEXTBOOKS:
1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M. J. Augenstein, PHI/Pearson Education.

REFERENCE BOOK:
1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning.

END

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

B.Tech. II Sem.

L	T	P	C
0	0	2	1

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.

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 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.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12
CO1												
CO2												
CO3												
CO4												
CO5												

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

B.Tech 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 II Semester | **L** | **T** | **P** | **C** |

B.Tech 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.

(A405306) DISCRETE MATHEMATICS

B. Tech III Semester

L   T   P   C

3   0   0   3

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:
1. Understand and construct precise mathematical proofs
2. Apply logic and set theory to formulate precise statements
3. Analyze and solve counting problems on finite and discrete structures
4. Describe and manipulate sequences
5. Apply graph theory in solving computing problems

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.

TEXTBOOKS:
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, Pearson education, 5th edition.
2. Discrete Mathematical Structures: Thomas Kosy, Tata McGraw Hill publishing co.

** END **

(A404204)DIGITAL ELECTRONICS

B. Tech . III Semester

L	T	P	C
3	0	0	3

UNIT-I
BOOLEAN ALGEBRA AND LOGIC GATES: Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.
Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, Digital logic gates.

UNIT-II
GATE – LEVEL MINIMIZATION: The map method, Four-variable map, Five-Variable map, product of sums simplification Don't-care conditions, NAND and NOR implementation other Two-level implementations, Exclusive – Or function.

UNIT-III
COMBINATIONAL LOGIC: Combinational Circuits, Analysis procedure Design procedure, Binary Adder-Subtractor Decimal Adder, Binary multiplier, magnitude comparator, Decoders, Encoders, Multiplexers, HDL for combinational circuits.

UNIT-IV
SEQUENTIAL LOGIC: Sequential circuits, latches, Flip-Flops Analysis of clocked sequential circuits, state Reduction and Assignment, Design Procedure**.** Registers, shift Registers, Ripple counters, synchronous counters, other counters.

UNIT-V
MEMORIES AND ASYNCHRONOUS SEQUENTIAL LOGIC: Introduction, Random-Access Memory, Memory Decoding, Error Detection, and correction Read-only memory, Programmable logic Array programmable Array logic, Sequential Programmable Devices.
Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of state and Flow Tables, Race-Free state Assignment Hazards, Design Example.

TEXT BOOKS:
1. Digital Design – Third Edition, M. Morris Mano, Pearson Education/PHI.
2. Digital Principles and Applications Albert Paul Malvino Donald P. Leach TATA McGraw HillEdition.
3. Fundamentals of Logic Design, Roth, 5th Edition, Thomson.

REFERENCE BOOKS:
1. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
2. Switching and Logic Design, C.V.S. Rao, Pearson Education
3. Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition.
4. Fundamentals of Digital Logic and Microcomputer Design, 5TH Edition, M. Rafiquzzaman John Wiley.

(A404203) ELECTRONIC DEVICES AND CIRCUITS

B. Tech . III Semester

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 of Operation - 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 Outcomes

Upon successful completion of the course, 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.

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

(A405304) DATABASE MANAGEMENT SYSTEMS

B. Tech (CSE) III Semester

L	**T**	**P**	**C**
3	**0**	**0**	**3**

Prerequisites: A course on "Data Structures".

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:

1. Gain knowledge of fundamentals of DBMS, database design and normal forms

2. Master the basics of SQL for retrieval and management of data.

3. Be acquainted with the basics of transaction processing and concurrency control.

4. Familiarity with database storage structures and access techniques

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 (static and extensible hashing) Tree based Indexing, Comparison of File Organizations, Indexes- Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM),B+ Trees: A Dynamic Index Structure.

TEXTBOOKS:

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.

END

(A405303) OBJECT ORIENTED PROGRAMMING THROUGH JAVA

	L	T	P	C
B. Tech III Semester	3	0	0	3

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

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.
Packages: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages
Interfaces: Defining an interface, differences between classes and interfaces, implementing interface, applying interfaces, variables in interface and extending interfaces.

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

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.
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.

UNIT - V

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.
Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Servlets, JDBC, Collection framework, JAVA8 features (Functional Programming and Lambda Functions).

TEXTBOOKS:
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.

END

(A405508) DATABASE MANAGEMENT SYSTEMS LABORATORY

B. Tech III Semester

L	T	P	C
0	0	3	1.5

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

Eid	E.Name	Ph.no	Proj Id	Proj Name	Proj Leader	Emp City	City Zip
101	John	98765623,99 8234123	P03	Project103	Grey	ModelTown	110033
102	John	89023467	P01	Project101	Christian	Badarpur	110044
103	Ryan	76213908	P04	Project104	Hudson	Naraina	110028

3.Normalization

Consider the following table.

| 104 | stephine | 98132452 | P02 | Project102 | Petro | HariNagar | 110064 |

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)

Primarykey(Student id,Project id)
Fd's: Project Id-→ Project name
 country-→ZIP,ZIP
b) Normalize the given Table to the BCNF
Consider the set of Functional Dependencies..
Eid → EName, Ph.no, Empcity, CityZip   PrimaryKey = (EmpId, ProjId)
ProjId → ProjName, ProjLeader
EmpId,ProjId → ProjLeader
EmpCity → CityZip
ProjId → 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.

END

(A405507) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

B.Tech. III Semester.

	L	T	P	C
Course Objectives:	0	0	3	1.5

- To write programs using abstract classes.
- To write programs for solving real world problems using the java collection framework.
- To write multithreaded programs.
- To write GUI programs using swing controls in Java.
- To introduce java compiler and eclipse platform.
- To impart hands-on experience with java programming.

Course Outcomes

1. Able to write programs for solving real world problems using the java collection framework.
2. Able to write programs using abstract classes.
3. Able to write multithreaded programs.
4. Able to write GUI programs using swing controls in Java.

Note:

1. Use LINUX and MySQL for the Lab Experiments. Though not mandatory, encourage the useof the Eclipse platform.

2. The list suggests the minimum program set. Hence, the concerned staff is requested to addmore problems to the list as needed.

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 that implements a multi-thread application that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.

3. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle suchthat each one of the classes extends the class Shape. Each one of the classes contains only the methodprint Area () that prints the area of the given shape.

4. Write a Java program that correctly implements the producer – consumer problem using theconcept of inter thread communication.

5. 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.

6. A) Develop an applet in Java that displays a simple message.

   B) Develop an applet in Java that receives an integer in one text field, and computes its factorialValue and returns it in another text field, when the button named "Compute" is clicked.

7. Write a Java program that creates a user interface to perform integer divisions. The user enters twonumbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throwa Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

8. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, andthe remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.

9. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in the selected color. Initially, there is no message shown.

10. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint:use hash tables).

11. Write a Java program that handles all mouse events and shows the event name at the center of thewindow when a mouse event is fired (Use Adapter classes).

12. Write a Java program to list all the files in a directory including the files present in all itssubdirectories.

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.
END

(A405506) PYTHON PROGRAMMING LABORATORY

B.Tech III semester

	L	T	P	C
	0	1	2	2

Course Objectives
- To train the students in solving computational problems
- To elucidate solving mathematical problems using Python programming language.
- To understand the fundamentals of Python programming concepts and its applications.
- To understand the object-oriented concepts using Python in problem solving.

Course Outcomes

Students shall be able to:

CO1 Design solutions to computational problems using Python programming language constructs.

CO2 Write python programs to manipulate string objects.

CO3 Use appropriate Data structures to organize and manipulate data items.

CO4 Design modular application using python module & package concepts.

CO5 Develop application to read and write from various file formats.

Week 1.

(Python Language Fundamentals-Installation -Identifiers, Reserved Words, Data Types, Type Casting, Immutability)

Demonstration

Experiment-1: Install Anaconda open-source framework for python.

Experiment-2: Write a program to display 'Hello World'.

Experimentation

Experiment-3: Explore various IDEs for python program development.

Experiment-4: The volume of a sphere with radius r is $4/3 \ \pi r^3$. Write a Python program to find the volume of a sphere with radius 5?

Week 2.

(Arithmetic Operators, Relational Operators, Logical operators, Bitwise operators, Assignment operators, Special operators*)*

Demonstration

Experiment-1; Write a python program to find minimum and maximum of given three numbers.

Experiment-2: Suppose the cover price of a book is $24.95, but bookstores get a 40% discount.

Shipping costs $3 for the first copy and 75 cents for each additional copy. Write a python program to compute

the total wholesale cost for 60 copies?.

Experimentation
Experiment-3: Write a Python Program to Find the Square Root of a number with out using sqrt function.
Experiment-4: Python Program to Convert Celsius To Fahrenheit.
Experiment-5: Python program to find the maximum of two numbers using ternary operator

Week 3.
*(*Mathematical Functions, Input and Output statements, Command Line Arguments, String Functions*)*
Demonstration
Experiment-1: Write a Python program to find area of circle.
Experiment-2: Write a program to read Employee data from the keyboard and print that data.

Experimentation
Experiment-3: Write a program to read 3 float numbers from the keyboard with comma separator and print their sum.
Experiment-4: Write a Program to display Command Line Arguments.

Week 4.
*(*Flow Control Statements-Conditional Statements, Transfer Statements, Iterative Statements)
Demonstration
Experiment-1. Write a Python program to take a single digit number from the key board and print is value in English word?.
Experiment-2. Write a Python Program to check whether an n-digit integer is an Armstrong number or not.

Experimentation
Experiment-3. Write a Python program to display *'s in pyramid style(also known as equivalent triangle).
Experiment-4. Write a Python Program to Display the multiplication Table.

Week 5.
(Functions-Built in functions, user defined functions, Parameters, return statement, returning multiple values from function, type of arguments, Types of variables-global, local. Recursive functions, Lambda functions, filter function, reduce function, Function aliasing, Function decorators, Generators)

Demonstration
Experiment-1: Write a python function to find factorial of given number?
Experiment-2: Write a program to create a lambda function to find square of given number?

Experimentation
Experiment-3: Lambda Function to find biggest of given values.
Experiment-4: Program to filter only even numbers from the list by using filter() function?

Week 6.
(Working with Strings-Defining String, Multi-line Strings, Accessing characters of a string, Mathematical operators for strings, Membership operator, Comparison of Strings, Removing spaces from the string, Finding Substring, String replacement, Splitting of Strings, Changing cases of a string, Formatting the strings)

Demonstration

Experiment-1: Write a program to accept some string from the keyboard and display its characters by index wise (both positive and negative index).

Experiment-2: Write a program to access each character of string in forward and backward direction by using while loop?

Experimentation

Experiment-3: Program to display all positions of substring in a given main string.

Experiment-4: Write a program to reverse the given String.

Week 7.

*(*Python Data Structures-List: Creating a list- Accessing elements of a List, Traversing the List, List Manipulation, Ordering the elements of a List, Mathematical Operators for List objects, Membership Operator, Nested Lists, List Comprehensions)

Demonstration

Experiment-1: Write a Python program to display unique vowels present in the given word.

Experiment-2: Write a Python program to Count the Occurrence of an Item in a List.

Experimentation

Experiment-3: Write a Python program to segregate even and odd numbers from the given list of numbers.

Experimnet-4: Write a Python program to find the cumulative sum of elements of the list.

Week 8.

(Python Data Structures-Tuple: Creating a Tuple, Accessing the elements of a tuple, mathematical operators for tuple,

Tuple packing and Unpacking)

Demonstration

Experiment-1: Python program for adding a Tuple to List and Vice-Versa.

Experiment-2: Write a Python program to perform the summation of all elements of each tuple from the list of tuples.

Experimentation

Experiment-3: Write a Python program to multiply adjacent elements of a tuple.

Experiment-4: Write a Python program to find the maximum element in the tuple list.

Week 9.

(Python Data Structures-Set: Creating a Set object, functions of set, Mathematical operations on set, Membership Operators, Set Comprehension, Python Data Structures-Dictionary: Creating a Dictionary Object, accessing data from the dictionary, updating dictionaries, Deleting from dictionary, Functions on dictionary, dictionary comprehension*)*

Demonstration

Experiment-1. Write a Python program to perform set operations.

Experiment-2: Write a program to print different vowels present in the given word?

Experiment-3: Write a Python program to generate powers of 2 using set comprehensions.

Experiment-4: Write a program to eliminate duplicates present in the list using set

Experiment-5: Write a Python program to enter name and percentage marks in a dictionary and display information on the

console.

Experimentation
Experiment-6: Write a program to take dictionary from the keyboard and print the sum of values?
Experiment-7: Write a program to find number of occurrences of each letter present in the given string using dictionary.
Experiment-8: Write a program to accept student name and marks from the keyboard and creates a dictionary. Also display student marks by taking student name as input?

Week 10.
(Python Modules-Creating Modules, Accessing members, module aliasing, member aliasing, reloading a module,
The special variable: __name___. Working with Math, random modules, Python Packages.Python-File Handling-Types of Files, Opening a file, closing a file, properties of File object, writing data to text file, Reading character data from text files, seek (), tell() functions.)

Demonstration
Experiment-1: Create a module **fibo.py** containing Fibonacci(**n**) function(s) and import fibo module in a python script to print Fibonacci series upto **n**.
Experiment-2: Write a python program to print all the contents of a given module.
Experiment-3: Write a python program to create a package containing two or modules.
Experiment-4: Write a python program to import module from a package created in Experiment-3.

Experimentation
Experiment-5: Write a program to check whether the given file exists or not. If it is available then print its content?
Experiment-6: Write a python Program to print the number of lines,words and characters present in the given file?
Experiment-7: Program to read image file and write to a new image file?
Experiment-8: Write a python program to read and write to a   CSV file.

Note:
Experiments under Demonstration section are to be demonstrated by the concerned faculty and the experiments under Experimentation section must be performed by the students individually.

Reference Books:

1.Allen B. Downey, "Think Python", 2nd edition, SPD/O'Reilly, 2016.
2. Martin C.Brown, "The Complete Reference: Python", McGraw-Hill, 2018.
3. Kenneth A. Lambert, B.L. Juneja, "Fundamentals of Python", CENGAGE, 2015.
4. R. Nageswara Rao, "Core Python Programming", 2nd edition, Dreamtech Press, 2019.

Web links:
1. https://docs.python.org/3/tutorial/modules.html#packages
2. https://www.includehelp.com/python/programs.aspx.
3. https://www.anaconda.com/products/individual
4. https://www.jetbrains.com/pycharm/
END

(A462501) SKILL DEVELOPMENT COURSE
(DATA VISUALIZATION - R PROGRAMMING/ POWER BI)

B.Tech. III Semester.

L	T	P	C
0	0	2	1

Course Objectives:
- Effective use of Business Intelligence (BI) technology (Tableau) to apply data visualization
- To discern patterns and relationships in the data.
- To build Dashboard applications.
- To communicate the results clearly and concisely.
- To be able to work with different formats of data sets.

Course Outcomes: At the end of the course a student should be able to
1. Understand How to import data into Tableau.
2. Understand Tableau concepts of Dimensions and Measures.
3. Develop Programs and understand how to map Visual Layouts and Graphical Properties.
4. Create a Dashboard that links multiple visualizations.
5. Use graphical user interfaces to create Frames for providing solutions to real worldproblems.

Lab Problems:
1. Understanding Data, What is data, where to find data, Foundations for building Data Visualizations, Creating Your First visualization?

2. Getting started with Tableau Software using Data file formats, connecting your Data to Tableau, creating basic charts(line, bar charts, Tree maps),Using the Show me panel.

3. Tableau Calculations, Overview of SUM, AVR, and Aggregate features, Creating custom calculations and fields.

4. Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Tools and Menus, Formatting specific parts of the view.

5. Editing and Formatting Axes, Manipulating Data in Tableau data, Pivoting Tableau data.

6. Structuring your data, Sorting and filtering Tableau data, Pivoting Tableau data.

7. Advanced Visualization Tools: Using Filters, Using the Detail panel, using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colors.

8. Creating Dashboards & Storytelling, creating your first dashboard and Story, Design for different displays, adding interactivity to your Dashboard, Distributing & Publishing your Visualization.

9. Tableau file types, publishing to Tableau Online, Sharing your visualizations, printing, and Exporting.

10. Creating custom charts, cyclical data and circular area charts, Dual Axis charts.

REFERENCE BOOKS:
1. Microsoft Power BI cookbook, Brett Powell, 2nd edition.
2. R Programming for Data Science by Roger D. Peng (References)
3. The Art of R Programming by Norman Matloff Cengage Learning India.

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

	L	**T**	**P**	**C**
B.Tech III Sem	**0**	**0**	**2**	**1**

UNIT 1
Identify community issues to be addressed, Requirements Analysis: Extensive User requirements analysis, Generating effective System Requirement document.

UNIT 2
Social Innovation – Case Studies
Presentation of the case studies with a focus on impact and vision on society.

UNIT 3
Process of Social Innovation
Prompts – identifying needs, Proposals – generating ideas, Prototyping – testing the idea in practice,

UNIT 4
Sustaining-developing a business model, Scaling and diffusion-growing social innovations, Systematic change.

UNIT 5
Report writing, Documentation and Panel presentation.

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

Course Outcomes:
On Completion of the course, the students will be able to
1. Summing up several social issues to be addressed
2. Analyse the feasibility and economical factors
3. Develop a scalable business model.

END

(A400701) ENVIRONMENTAL SCIENCES

(MANDATORY COURSE)

B.Tech. III Semester.

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

UNIT-I

Introduction, Definition, scope and importance, Ecosystems: Introduction, types, characteristic features, structure and functions of ecosystems. Bio geo chemical cycle, Classification of Eco system.

UNIT-II

Natural Resources, Classification of Resources, Land resources, Land as resource, Common property resources, Land degradation, Soil erosion and desertification, Effects of modern agriculture, fertilizer – pesticide problems, Forest resources, Use and over-exploitation.Mining and dams – their effects on forest and tribal people, Water resources, Use and over- utilization of surface and groundwater, Floods, droughts, Water logging and salinity, Dams –benefits and costs, Conflicts over Water, Energy resources.

UNIT-III

Bio-diversity and its conservation, Value of bio-diversity -consumptive and productive use, social, ethical, aesthetic and option values, Bio-geographical classification of India – India as a mega diversity habitat, Threats to bio-diversity –Hot-spots, habitat loss, poaching of wild life, loss of species, seeds, etc. Conservation of bio-diversity – Insitu and Ex-situ conservation.

UNIT-IV

Environmental Pollution –Local and Global Issues, Nature of thermal pollution and nuclear hazards, Global warming, Acid rain, Ozone depletion. Environmental case studies.

UNIT-V

Environmental Problems in India, Drinking water, sanitation and public health, Effects of the activities onthe quality of environment, Water scarcity and groundwater depletion, Controversies on major dams – resettlement and rehabilitation of people: problems and concerns, Rain water harvesting, cloud seeding and watershed management. Economy and Environment, The economy and environment interaction, Economics of development, preservation and conservation, Sustainability: theory and practices, Limits to growth, Equitableuse of resources for sustainable life styles, Environmental Impact Assessment.

TEXT BOOKS:
1. Environmental Science - Y. Anjaneyulu, B S Publications.
2. Environmental studies-Deekshadave, Cengage learning India Pvt. Ltd.,
3. Environmental sciences and Engineering - P. Venugopal Rao, PHI learning Pvt. Ltd.,
4. Environmental Science and Technology by M. Anji Reddy, B S Publications.

REFERENCE BOOKS:
1. Clark, R.S., Marine Pollution, Clanderson Press, Oxford, 2002.
2. Cunningham, W.P., et al. Environmental Encyclopedia, Jaico Publishing House, Mumbai, 2003.

COURSE OUTCOMES:
1. Acquire the knowledge on environment
2. Acquire the knowledge of various Natural Resources
3. Develop skills in understanding of various environmental problems
4. Develop skills to protect the Environment

END

(A400508) COMPUTER ORIENTED STATISTICAL METHODS

B. Tech IV Semester

$$\frac{L}{3} \quad \frac{T}{1} \quad \frac{P}{0} \quad \frac{C}{4}$$

UNIT-I
Probability:

Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, ConditionalProbability, Independence, and the Product Rule, Baye's Rule.

Random Variables: Concept of a Random Variable, Discrete and Continuous random Variable.

UNIT-II
Expectation and Discrete Distributions:

Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.

Discrete Probability Distributions: Binomial Distribution, Poisson distribution.

UNIT-III
Continuous Distributions and Sampling Distributions:

Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the NormalDistribution, Normal Approximation to the Binomial Distributions.

Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions: Sampling Distribution of Means and the Central Limit Theorem, t - Distribution, F-Distribution.

UNIT-IV
Sample Estimation & Tests of Hypotheses:

Introduction, Statistical Inference, Classical Methods of Estimation, Single Sample: Estimating the mean, standard error of a point estimate, prediction interval. Two sample: Estimating the differencebetween two means, Single sample: Estimating a proportion, two samples: Estimating the difference between two proportions, Two samples: Estimating the ratio of two variances.

Statistical Hypotheses: General Concepts, testing a Statistical Hypothesis, Single sample: Tests concerning single mean, Two samples: tests on two means, One sample: test on single proportion.Two samples: tests on two proportions, Two- sample tests concerning variances.

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, n-step transition probabilities, Markov chain,Steady state condition, Markov analysis.

TEXTBOOKS:
1. Probability & Statistics fr Engineers & Scientists, (9ᵗʰ Edition), Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Pearson Publishers, 2011.
2. Fundamentals of Mathematical statistics, S C Gupta and V K Kapoor, Khanna publications.

REFERENCE BOOKS:

1. Fundamentals of Probability and Statistics For Engineers, T.T. Soong, John Wiley & Sons, Ltd, 2004.
2. Probability and statistics for Engineers and scientists, (5ᵗʰ Edition), Sheldon M Ross, Academic press, 2014.
3. Probability and Statistics for Engineers, (8ᵗʰ Edition), Miller and Freund's, Pearson Educations, 2015.

COURSE OUTCOMES:
On completion of the course students will be able to
1. Apply the concepts of probability and Random variables to case studies.
2. Formulate and solve problems involving random variables and discrete distributions.
3. Apply sampling techniques for analyzing experimental data.
4. Apply concept of estimation and testing of hypothesis to case studies.
5. Analyze the data using Stochastic process and Markov chains.

END

***

(A405305) OPERATING SYSTEMS

B. Tech (CSE) IV Semester

<u>L</u>	<u>T</u>	<u>P</u>	<u>C</u>
3	0	0	3

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

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

UNIT - I
Operating System - Introduction, Structures - Simple Batch, Multi-programmed, 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.
Disk Scheduling Algorithms

TEXTBOOKS:
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.

END

(A405307) COMPUTER ORGANIZATION AND ARCHITECTURE

B. Tech (CSE) III Semester

L	**T**	**P**	**C**
3	**0**	**0**	**3**

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

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

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 Point Representation.
Computer Arithmetic: Addition and subtraction, Booth's multiplication Algorithms, Restoring and Non-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, Cache Memory, Cache Coherence.

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. Introduction to 8085 Architecture
TEXT BOOK:
1. Computer System Architecture – M. Morris Mano, Third Edition, Pearson/PHI.

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

END

(A462301) COMPUTER NETWORKS

$$\frac{L}{3} \quad \frac{T}{0} \qquad \frac{P}{0} \quad \frac{C}{3}$$

B. Tech IV Semester

 UNIT -I
Introduction: Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet.
Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission.

UNIT –II
Data link layer: Design issues, framing, Error detection and correction. **Elementary data link protocols**: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel.
Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols.
Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

UNIT –III

Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, The Network layer in the internet.

UNIT –IV
Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.

UNIT -V
Application Layer–Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video.

Text Books:

1. Computer Networks, Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI

Reference Books:
1. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education
2. Data Communications and Networking – Behrouz A. Forouzan. 3rd Edition, TMH.

Course Outcomes
The student shall be able
1. Describe the functions of each layer in OSI and TCP/IP model and explain the types of transmission media with real time applications
2. Describe the functions of data link layer and explain the protocols
3. Classify the routing protocols and analyze how to assign the IP addresses for the given network
4. Describe the Transport layer services.
5. Explain the functions of Application layer Protocol.

(A462302) CYBER SECURITY

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B. Tech (CSE-CS) IV Sem

Unit-I
Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIATriad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum of attacks, Taxonomy of various attacks, IP spoofing, Methods of defense, Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.

Unit-II
Cyberspace and the Law & Cyber Forensics: Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace, National Cyber Security Policy. Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics, Special Techniques for Forensics Auditing.

Unit-III

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

Unit-IV

Cyber Security: Organizational Implications: Introduction, cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.

Unit-V

Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethical dimension of cybercrimes the psychology, mindset and skills of hackers and other cyber criminals.

Privacy Issues: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Data linking and profiling, privacy policies and their specifications, privacy policy languages, privacy in different domains- medical, financial, etc.

TEXT BOOK:
1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley
2. B. B. Gupta, D. P. Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.

REFERENCES:
1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.
2. Introduction to Cyber Security, Chwan-Hwa(john) Wu,J. David Irwin, CRC Press T&F Group.

Course Outcomes
After completion of this course, the students shall be able to:
1. Understand, appreciate, employ, design and implement appropriate security technologies and policies to protect computers and digital information.
2. Identify & Evaluate Information Security threats and vulnerabilities in Information Systems and apply security measures to real time scenarios 3.Identify common trade-offs and compromises that are made in the design anddevelopment process of Information Systems
4. Demonstrate the use of standards and cyber laws to enhance information security in the development process and infrastructure protection

END

(A462501)COMPUTER NETWORKS LAB

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B. Tech IV Semester

1. Implement the data link layer framing methods such as character, character-stuffing and bit stuffing.
2. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC, CCIP
3. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
4. Implement Dijsktra's algorithm to compute the shortest path through anetwork
5. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
6. Implement distance vector routing algorithm for obtaining routing tables ateach node.

(A405305) OPERATING SYSTEMS LABORATORY

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B. Tech (CSE) IV Semester

Prerequisites:
1. A course on "Programming for Problem Solving",

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

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

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

List of Experiments:
1. A) Demonstrate the Installation & Configuration of Linux Operating Systems.
   B) Explore the following Linux File System commands.
   i) pwd ii) cd iii) mkdir iv) rmdir v) ls vi) cp vii) mv viii) rm ix) cat x) more xi)grep

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 C programs to simulate the following CPU Scheduling algorithms.
   a) FCFS b) SJF c) Round Robin d) priority
4. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
5. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.
6. Write C programs to illustrate the following IPC mechanisms.
   a) Pipes b) FIFOs c) Message Queues d) Shared Memory
7. Write C programs to simulate the following memory management techniques.
   a) Paging   b) Segmentation
7. Write a C program to simulate the following contiguous memory allocation techniques
   a). First-fit b) Best-fit c) Worst-fit
8. Write C programs to simulate Page replacement policies a) FCFS b) LRU c) Optimal.
9. Simulate the following File Allocation Strategies
   a). Sequential b). Indexed c. Linked
10. Write a shell script that receives any number of file names as arguments checks if every argument
    supplied is a file or directory and reports accordingly. Whenever the arguments is a file it reports number
    of lines present in it.
11. Simulate the following disk scheduling algorithms
    a). SCAN b).CSCAN c).SSTF

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

END

(A400702) GENDER SENSITIZATION

B. Tech . IV Semester	L	T	P	C
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UNIT-I:

Understanding Gender
Lesson 1 – Gender: Why should we study it?
Lesson 2 – Socialization: Making Women,
Making Men
Lesson 12 – Just Relationships: Being together
as Equals

UNIT-II:
Gender and Biology
Lesson 4 – Missing Women: Sex selection and its consequences Lesson 10 –
Gender Spectrum: Beyond the Binary
Lesson 13 – Additional Reading: Our Bodies, Our Health

UNIT-III:
Gender and Labour
Lesson 3 – Housework: The Invisible Labour

Lesson 7 – Women's Work: Its Politics and Economics

UNIT-IV:
Issues of Violence
Lesson 6 – Sexual Harassment: Say No! Lesson 8 – Domestic Violence: Speaking Out Lesson 11 – Thinking about Sexual Violence

UNIT-V:
Gender Studies
Lesson 5 – Knowledge: Through the Lens of Gender
Lesson 9 – Who's History? Questions for Historians and Others.

COURSE OUTCOMES
1. Learners identify realities of gender discrimination prevalent in the society at all levels.
2. Learners infer and discuss historical evidences, historical perspective and historical voices of discrimination against women in all societies and civilizations.
3. Learners recognize their bodies and value its health. Learners demonstrate their rights regarding their bodies.
4. Learners can identify, protest and overcome the evils of body shaming.
5. Learners analyze discrimination and exploitation of women labour in domestic as well as social sphere. Learners can infer women's rights, women's wage disparities, women's issues and demonstrate these grievances through law.
6. Learners identify different types of sexual exploitation; sexual violence and marital violence show empathy towards victims of such violence and generate public opinion in face of any exploitation.

END

(A462601)FUNDAMENTALS OF CYBER SECURITY

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COURSE OBJECTIVES:
• To identify the key components of cyber security in network
• To define types of attacks, cyber offenses and corresponding preventive acts
• To describe Risk management processes and practices
• To access additional external resources to supplement knowledge of cyber laws and acts

COURSE OUTCOMES:
After completion of the course, the student should be able to

CO-1: Categorize cyber-crimes and an understanding of social, political, ethical and psychological dimensions of cyber security
CO-2: Demonstrate cyber offenses tools, methods used in cyber crime
CO-3: Document an appropriate procedure of Risk Management and Security Standards
CO-4: Understand cyber laws and Indian Information Technology Act

UNIT – I: Introduction to Cyber Crime and Security: Introduction Cybercrime: Definition and Origins of the word, Cybercrime and Information Security, CIA Triad, Who are Cybercriminals, Classifications of Cybercrimes, E-mail Spoofing, Spamming, Cyber defamation, Internet Time Theft, Salami Attack/ Salami Technique, Data Diddling, Forgery, Web Jacking, Newsgroup Spam/ Crimes

Emanating from Usenet Newsgroup, Industrial Spying/Industrial Espionage, Hacking, Online Frauds, Software Piracy, Computer Sabotage, E-Mail Bombing/Mail Bombs, Credit Card Frauds.

UNIT – II: Cyber Offenses: How Criminals Plan Them: Introduction, Categories of Cybercrime, How Criminals Plan the Attacks, Reconnaissance, Passive Attacks, Active Attacks, Scamming and Scrutinizing Gathered Information, Attack (Gaining and Maintaining the System Access), Social Engineering, Classification of Social Engineering,

UNIT – III: Tools and Methods Used in Cyber Crime and Security Measures – I: Introduction, Proxy Servers and Anonymizers, Phishing, How Phishing Works, Password Cracking, Online Attacks, Offline Attacks, Strong, Weak and Random Passwords, Random Passwords, Keyloggers and Spywares, Software Keyloggers, Hardware Keyloggers, Antikeylogger.

UNIT – IV: Tools And Methods Used In Cyber Crime and Security Measures – II: DoS and DDoS Attacks, DoS Attacks, Classification of DoS Attacks, Types of Levels of DoS Attack, Tools Used to Launch DoS Attacks, DDoS Attacks, How to protect from DoS/DDoS Attacks, SQL Injection, Steps for SQL Injection Attack, How to Prevent SQL Injection Attacks.

UNIT – V: Cybercrime and Cyberterrorism: Social, Political, Ethical and Psychological Dimensions: Introduction, Intellectual Property in the Cyberspace, Copyright, Patent, Trademarks, Trade Secret, Trade Name, Domain Name, The Ethical Dimension of Cybercrimes, Ethical Hackers: Good Guys in Bad Land, The Psychology, Mindset and Skills of Hackers and Other Cybercriminals.

TEXT BOOKS:
1. Cyber Security- Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and Sunit Belpure, Publication Wiley
2. Cyber Law & Cyber Crimes by Advocate Prashant Mali; Snow White publications, Mumbai

REFERENCES:
1. Management of Information Security, M. E. Whitman, H. J. Mattord, Nelson Education, CENGAGE Learning, 3rd Edition, 2011
2. Guide to Computer Forensics and Investigations, B. Nelson, A. Phillips, F. Enfinger, C. Steuart, Nelson Education / CENGAGE Learning, 4th Edition, 2010
3. Information Technology Law and Practice by Vakul Sharma; Universal Law Publishing Co. Pvt. Ltd

(A462602) INTERNET OF THINGS

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3	0	0	3

UNIT-I

Introduction to IoT Defining IoT, characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs. IoT & M2M Machine to Machine, Difference between IoT and M2M, Software define Network.

UNIT-II

Network & Communication aspects Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination.

UNIT–III
Challenges in IoT Design challenges, Development challenges, Security challenges, Other challenges.

UNIT-IV

Domain specific applications of IoT Home automation, Industry applications, Surveillance applications, Other IoT applications.

UNIT–V

Developing IoTs Introduction to Python, Introduction to different IoT tools, developing applications through IoT tools, developing sensor-based application through embedded system platform, Implementing IoT concepts with python.

TEXT BOOKS:

1. Vijay Madisetti, ArshdeepBahga, Ïnternet of Things, "A Hands-on Approach", University Press
 2. WaltenegusDargie, ChristianPoellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice, Wiley-Blackwell.

REFERENCE BOOKS:

1.Dr. SRN Reddy, RachitThukral and Manasi Mishra, "Introduction to Internet of Things: Apractical Approach", ETI Labs
2.Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC
    Press
 3. Jeeva Jose, "Internet of Things", Khanna Publishing House, Delhi
 4. Adrian McEwen, "Designing the Internet of Things", Wiley
5. Raj Kamal, "Internet of Things: Architecture and Design", McGraw Hill
6. Cuno Pfister, "Getting Started with the Internet of Things", O Reilly Media

COURSE OUTCOMES:
 1. Describe internet of Things and its hardware and software components
2. Interface I/O devices, sensors & communication modules
3. Remotely monitor data and control devices
 4. Develop real life IoT based projects
5. Develop application using IoT tools with python

END

(A462603) CYBER LAWS AND ETHICS
(Open Elective)

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UNIT-I

Evolution of the IT Act: Genesis and Necessity
Salient features of the IT Act, 2000,2008 various authorities under IT Act and their powers. ;
Penalties &Offences, amendments.

UNIT-II

Impact on other related Acts (Amendments) : (a) Amendments to Indian Penal Code.(b) Amendments to Indian Evidence Act.(c) Amendments to Bankers Book Evidence Act.(d) Amendments to Reserve Bank of India Act.
Cyber Space Jurisdiction : (a) Jurisdiction issues under IT Act, 2000, 2008
  (b) Traditional principals of Jurisdiction ,
  (c) Extra terrestrial Jurisdiction ,
  (d) Case Laws on Cyber Space Jurisdiction

UNIT-III

E – commerce and Laws in India:(a) Digital / Electronic Signature in Indian Laws ,(b) E – Commerce;Issues and provisions in Indian Law, (c) E – Governance; concept and practicality in India ,(d) E – Taxation issues in Cyberspace ,(e) E – Contracts and its validity in India ,(f) Cyber Tribunal & AppellateTribunal, (g) Cyber Regulations

UNIT-IV

Sensitive Personal Data or Information (SPDI) in Cyber Law: (a) SPDI Definition and Reasonable Security Practices in India,(b) Reasonable Security Practices – International perspective

UNIT-V

Cloud Computing & Law : International Perspective, (a) EDI: Concept and legal Issues. (b) UNCITRAL Model Law. (c) Electronic Signature Law's of Major Countries,(d) Cryptography Laws, (e)Cyber Law's of Major Countries ,(f) EU Convention on Cyber Crime

TEXT BOOKS:
1. Cyber Law & Cyber Crimes By Advocat Prashant Mali; Snow White publications, Mumbai
2. Cyber Law in India by Farooq Ahmad; Pioneer Books

REFERENCE BOOKS:
1. Information Technology Law and Practice by Vakul Sharma; Universal Law Publishing Co. Pvt. Ltd.
2. The Indian Cyber Law by Suresh T. Vishwanathan; Bharat Law House New Delhi

Course Outcomes:

1. To understand about IT Act.
2. To know about cyber space Jurisdiction
3. To know about E- Commerce and laws
4. To Understand about Intellectual property rights.
5. To know about cyber laws.