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DEPARTMENT OF COMPUTER SCIENCE & DESIGN

I YEAR I SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	MA101BS	Matrices and Calculus	3	1	0	4	40	60	100
2	CH102BS	Engineering Chemistry	3	1	0	4	40	60	100
3	CS105ES	Programming for Problem Solving	3	0	0	3	40	60	100
4	EE106ES	Basic Electrical Engineering	2	0	0	2	40	60	100
5	ME108ES	Computer Aided Engineering Graphics	1	0	4	3	40	60	100
6	CS106ES	Elements of Computer Science & Engineering	0	0	2	1	50	-	50
7	CH104BS	Engineering Chemistry Laboratory	0	0	2	1	40	60	100
8	CS107ES	Programming for Problem Solving Laboratory	0	0	2	1	40	60	100
9	EE108ES	Basic Electrical Engineering Laboratory	0	0	2	1	40	60	100
10		Induction Programme	-	-	-	-	-	-	-
		Total	**12**	**2**	**12**	**20**	**370**	**480**	**850**

I YEAR II SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	MA201BS	Ordinary Differential Equations and Vector Calculus	3	1	0	4	40	60	100
2	AP202BS	Applied Physics	3	1	0	4	40	60	100
3	ME207ES	Engineering Workshop	0	1	3	2.5	40	60	100
4	EN204HS	English for Skill Enhancement	2	0	0	2	40	60	100
5	EC203ES	Electronic Devices and Circuits	2	0	0	2	40	60	100
6	AP203BS	Applied Physics Laboratory	0	0	3	1.5	40	60	100
7	CS205ES	Python Programming Laboratory	0	1	2	2	40	60	100
8	EN205HS	English Language and Communication Skills Laboratory	0	0	2	1	40	60	100
9	CS206ES	IT Workshop	0	0	2	1	40	60	100
		Total	**10**	**4**	**12**	**20**	**360**	**540**	**900**
MANDATORY COURSE (NON – CREDIT)									
10	*CH209MC	Environmental Science	3	0	0	0	100	-	100

***MC – Satisfactory/Unsatisfactory**

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

II YEAR I SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	EC311PC	Digital Electronics	3	0	0	3	40	60	100
2	CS301PC	Data Structures	3	0	0	3	40	60	100
3	MA302BS	Computer Oriented Statistical Methods	3	1	0	4	40	60	100
4	CS304PC	Computer Organization and Architecture	3	0	0	3	40	60	100
5	CS303PC	Object Oriented Programming through Java	3	0	0	3	40	60	100
6	CS307PC	Data Structures Lab	0	0	3	1.5	40	60	100
7	CS308PC	Object Oriented Programming through Java Lab	0	0	3	1.5	40	60	100
8	CS310PC	Data visualization- R Programming/ Power BI	0	0	2	1	40	60	100
		Total	**15**	**1**	**8**	**20**	**320**	**480**	**800**
MANDATORY COURSE (NON – CREDIT)									
9	*GS309MC	Gender Sensitization Lab	0	0	2	0	100	-	100

II YEAR II SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	CS401PC	Discrete Mathematics	3	0	0	3	40	60	100
2	BE404MS	Business Economics & Financial Analysis	3	0	0	3	40	60	100
3	CS402PC	Operating Systems	3	0	0	3	40	60	100
4	CS405PC	Database Management Systems	3	0	0	3	40	60	100
5	CS403PC	Software Engineering	3	0	0	3	40	60	100
6	CS406PC	Operating Systems Lab	0	0	2	1	40	60	100
7	CS407PC	Database Management Systems Lab	0	0	2	1	40	60	100
8	CSG410PC	Real-time Research Project/ Field Based Research Project	0	0	4	2	50	-	50
9	CS411PC	Node JS/ React JS/ Django	0	0	2	1	40	60	100
		Total	**15**	**0**	**10**	20	**370**	**480**	**850**
MANDATORY COURSE (NON – CREDIT)									
10	*CI409MC	Constitution of India	3	0	0	0	100	-	100

***MC – Satisfactory/Unsatisfactory**

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

III YEAR I SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	CSG501PC	Design Thinking	3	1	0	4	40	60	100
2	CS502PC	Computer Networks	3	0	0	3	40	60	100
3	CSG503PC	Computer Graphics	3	0	0	3	40	60	100
4		Professional Elective-I	3	0	0	3	40	60	100
		Professional Elective -II	3	0	0	3	40	60	100
6	CS508PC	Computer Networks Lab	0	0	2	1	40	60	100
7	CSG504PC	Computer Graphics Lab	0	0	2	1	40	60	100
8	EN506HS	Advanced English Communication Skills Lab	0	0	2	1	40	60	100
9	CS507PC	UI design - Flutter	0	0	2	1	40	60	100
		Total	**15**	**1**	**8**	**20**	**360**	**540**	**900**
MANDATORY COURSE (Non – Credit)									
10	IP510MC	Intellectual Property Rights	3	0	0	0	100	-	100

III YEAR II SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	IT602PC	Algorithm Design and Analysis	3	0	0	3	40	60	100
2	CS601PC	Formal Languages and Automata Theory	3	0	0	3	40	60	100
3	CSG603PC	Introduction to Engineering Design	3	0	0	3	40	60	100
4		Professional Elective – III	3	0	0	3	40	60	100
5		Open Elective-I	3	0	0	3	40	60	100
6	CSG604PC	Engineering Design Lab	0	0	4	2	40	60	100
7		Professional Elective-III Lab	0	0	2	1	40	60	100
8	CSG605PC	Industrial Oriented Mini Project/ Internship/Skill Development Course (Google Animation/ Hadoop Flash/ Open Toonz)	0	0	4	2	-	100	100
		Total	**15**	**0**	**10**	**20**	**280**	**520**	**800**
MANDATORY COURSE (NON – CREDIT)									
9	*ES607MC	Environmental Science	3	0	0	0	100	-	100

Environmental Science in III Yr II Sem Should be Registered by Lateral Entry Students Only.

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IV YEAR I SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	CSG701PC	Design Drawing and Visualization	3	0	0	3	40	60	100
2	CS702PC	Compiler Design	3	0	0	3	40	60	100
3		Professional Elective -IV	3	0	0	3	40	60	100
4		Professional Elective -V	3	0	0	3	40	60	100
5		Open Elective - II	3	0	0	3	40	60	100
6	CSG703PC	Design Drawing and Visualization Lab	0	0	2	1	40	60	100
7	CS704PC	Compiler Design Lab	0	0	2	1	40	60	100
8	CSG705PC	Project Stage - I	0	0	6	3	-	-	-
		Total	**15**	**0**	**10**	**20**	**280**	**420**	**700**

IV YEAR II SEMESTER

S. No.	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Internal (CIE)	External (SEE)	Total
1	SM801MS	Organizational Behaviour	3	0	0	3	40	60	100
2		Professional Elective - VI	3	0	0	3	40	60	100
3		Open Elective - III	3	0	0	3	40	60	100
4		Project Stage II Including Seminar	0	0	22	11	40	60	100
		Total	**9**	**0**	**22**	**20**	**160**	**240**	**400**

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LIST OF PROFESSIONAL ELECTIVES

Professional Elective - I

CSG511PE	Quantum Computing
CSG512PE	Design of Interactive Systems
CSG513PE	Data Analytics
CSG514PE	Image Processing
CSG515PE	Systems Management

Professional Elective - II

CSG521PE	Design Process and Prospects
CSG522PE	Embedded Systems
CSG523PE	Information Retrieval Systems
CSG524PE	Distributed Databases
CSG525PE	Natural Language Processing

Professional Elective - III

CSG631PE	Full Stack Development
CSG632PE	Internet of Things
CSG633PE	Scripting Languages
CSG634PE	Mobile Application Development
CSG635PE	Software Testing Methodologies

 # Courses in PE - III and PE - III Lab must be in 1-1 correspondence.

Professional Elective -IV

CSG741PE	Graph Theory
CSG742PE	Virtual Reality
CSG743PE	Soft Computing
CSG744PE	Cloud Computing
CSG745PE	Ad hoc & Sensor Networks

Professional Elective -V

CSG751PE	Computer Game Design and Programming
CSG752PE	Agile Methodology
CSG753PE	Robotic Process Automation
CSG754PE	Simulation and Modelling
CSG755PE	Visual Design and Communications

Professional Elective – VI

CSG861PE	Computer Vision and Robotics
CSG862PE	Computer Aided Geometric design
CSG863PE	Machine Learning
CSG864PE	Human Computer Interaction
CSG865PE	VFX Animation

Open Electives offered by the Department of CSD for Others

Open Elective -1:

CSG611OE	Data Structures
CSG612OE	Database Management Systems

Open Elective -2:

CSG721OE	Operating Systems
CSG722OE	Software Engineering

Open Elective -3:

CSG831OE	Algorithms Design and Analysis
CSG832OE	Introduction to Computer Networks

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.Tech. 1st Year Syllabus (w.e.f AY 2022-23)

MATRICES AND CALCULUS

I B. TECH- I SEMESTER (R 22)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
MA101BS	**B. Tech**	**3**	**1**	**0**	**4**	**40**	**60**	**100**

COURSE OBJECTIVES

To learn

1. Types of matrices and their properties.
2. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
3. Concept of Eigen values and Eigen vectors and to reduce the quadratic form to canonical form
4. Geometrical approach to the mean value theorems and their application to the mathematical problems
5. Evaluation of surface areas and volumes of revolutions of curves.
6. Evaluation of improper integrals using Beta and Gamma functions.
7. Partial differentiation, concept of total derivative
8. Finding maxima and minima of function of two and three variables.
9. Evaluation of multiple integrals and their applications

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
2. Find the Eigen-values and Eigen vectors
3. Reduce the quadratic form to canonical form using orthogonal transformations.
4. Solve the applications on the mean value theorems.
5. Evaluate the improper integrals using Beta and Gamma functions
6. Find the extreme values of functions of two variables with/ without constraints.
7. Evaluate the multiple integrals and apply the concept to find areas, volumes

UNIT-I	**MATRICES**	**Classes: 10**

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 and Non-Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method.

UNIT-II	**EIGEN VALUES AND EIGEN VECTORS**	**Classes:10**

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

UNIT-III	CALCULUS	Classes:10

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), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-IV	MULTIVARIABLE CALCULUS (PARTIAL DIFFERENTIATION AND APPLICATIONS)	Classes: 10

Definitions of Limit and continuity.

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	MULTIVARIABLE CALCULUS (INTEGRATION)	Classes: 10

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.

Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Editon, 2016.

REFERENCE BOOKS

1. Dr. D. Ranadheer Reddy, Mr. K Upender Reddy & Mr. G Chandra Mohan, A First Course in Linear Algebra and Calculus for Engineers, M/s Students Helpline Publishing House Pvt. Ltd, First Edition-2020.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
5. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.

WEB REFERENCES

1. https://www.efunda.com/math/gamma/index.cfm
2. https://mathworld.wolfram.com/CanonicalForm.html
3. https://mathworld.wolfram.com/Binomial.html
4. https://www.mathworld.wolfram.com/

E -TEXT BOOKS

1. https://www.e-booksdirectory.com/listing.php?category=4
2. https://www.e-booksdirectory.com/details.php?ebook=10830

MOOCS COURSE

1. https://onlinecourses.nptel.ac.in/noc22_ma75/preview
2. https://onlinecourses.swayam2.ac.in/cec20_ma22/preview

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ENGINEERING CHEMISTRY

I B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CH102BS	B. Tech	3	1	0	4	40	60	100

COURSE OBJECTIVES

To learn

1. To bring adaptability to new developments in Engineering Chemistry and to acquire the skillsrequired to become a perfect engineer.
2. To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion it's control to protect the structures.
3. To imbibe the basic concepts of petroleum and its products.
4. To acquire required knowledge about engineering materials like cement, smart materials andLubricants.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Students will acquire the basic knowledge of electrochemical procedures related to corrosionand its control.
2. The students are able to understand the basic properties of water and its usage in domesticand industrial purposes.
3. They can learn the fundamentals and general properties of polymers and other engineeringmaterials.
4. They can predict potential applications of chemistry and practical utility in order to become goodengineers and entrepreneurs.

UNIT-I	MOLECULAR STRUCTURE AND THEORIES OF BONDING	Classes: 10

Introduction to hardness of water – Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation- Determination of F^- ion by ion- selective electrode method.

Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange processes. Desalination of water – Reverse osmosis.

UNIT-II	BATTERY CHEMISTRY & CORROSION	Classes: 10

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basicrequirements for commercial batteries. Construction, working and applications of: Zn-air and Lithium ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between batteryand a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.

Corrosion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion.Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current methods.

UNIT-III	POLYMERIC MATERIALS	Classes: 10

Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples – Nylon 6:6, Terylene

Plastics: Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP). **Rubbers:** Natural rubber and its vulcanization.

Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokolrubber.

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

Biodegradable polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

UNIT-IV	ENERGY SOURCES	Classes: 10

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-V	ENGINEERING MATERIALS	Classes: 10

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

Smart materials and their engineering applications

Shape memory materials- Poly L- Lactic acid. Thermoresponse materials- Polyacryl amides, Poly vinylamides

Lubricants: Classification of lubricants with examples-characteristics of a good lubricants - mechanismof 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 by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.
4. Text book of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

REFERENCE BOOKS

1. A.Aditya Prasad , S.Hemambika and N.V.V. PandurangaRao "Engineering Chemistry", Spectrum Medico Plus Pharma Publishers., Hyderabad, 1st edition(2020)
2. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
3. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)
4. Engineering Chemistry by A. Aditya Prasad, S. Hemambika and N. V. V. Panduranga Rao, Spectrum Medico Plus Pharma Publishers., Hyderabad, 1st edition (2020)
5. Engineering Chemistry by Thirumala Chary Laxminarayana, Shashikala, Pearson Publications (2020)

WEB REFERENCES

1. https://www.wileyindia.com/engineering-chemistry-as-per-aicte.html
2. https://www.wileyindia.com/wiley-engineering-chemistry-second-edition.html
3. https://www.wyzant.com/resources/lessons/science/chemistry
4. http://www.chem1.com/acad/webtext/virtualtextbook.html

E -TEXT BOOKS

1. https://www.pdfdrive.com/engineering-chemistry-e33546326.html
2. https://www.pdfdrive.com/engineering-chemistry-fundamentals-and-applications-2nd-edition-e191456798.html
3. https://www.pdfdrive.com/engineering-chemistry-e48867824.html

MOOCS COURSE

1. https://nptel.ac.in/courses/122101001
2. https://nptel.ac.in/courses/105106205

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PROGRAMMING FOR PROBLEM SOLVING

I B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS105ES	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. To learn the fundamentals of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of the C programming language.
4. To learn the usage of structured programming approaches in solving problems.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. To write algorithms and to draw flowcharts for solving problems.
2. To convert the algorithms/flowcharts to C programs.
3. To code and test a given logic in the C programming language.
4. To decompose a problem into functions and to develop modular reusable code.
5. To use arrays, pointers, strings and structures to write C programs.
6. Searching and sorting problems.

UNIT-I	Introduction to Programming	Classes:12

Compilers, compiling and executing a program.

Representation of Algorithm - Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number Flowchart/Pseudocode withexamples, Program design and structured programming

Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion,The main method and command line arguments Bitwise operations: Bitwise AND, OR, XOR and NOT operators

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, Introduction to stdin, stdout and stderr.Command line arguments

UNIT-II	Arrays, Strings, Structures and Pointers	Classes:10

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays
Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings
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)
Enumerationdata type

UNIT-III	Preprocessor and File handling in C	Classes:12

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef 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.

UNIT-IV	Function and Dynamic Memory Allocation	Classes:12

Functions: Designing structured programs, Declaring a function, Signature of 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
Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types

UNIT-V	Searching and Sorting	Classes:10

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

TEXT BOOKS

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, (3rdEdition)

REFERENCE BOOKS

1. Dr.P.Santosh Kumar Patra, “Programming for Problem Solving in C”, AmaravatiPublicatoins.
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall ofIndia
3. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
4. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
5. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
6. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
7. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
8. Byron Gottfried, Schaum’s Outline of Programming with C, McGraw-Hill

WEB REFERENCES
1. https://www.tutorialspoint.com/cprogramming/ 2. https://www.tutorialspoint.com/cplusplus/ 3. https://www.cprogramming.com/tutorial/c-tutorial.html
E –TEXT BOOKS
1. https://www.amazon.com/Problem-Solving-Program-Design-7th/dp/0132936496 2. https://www.goodreads.com/book/show/36011306-c-programming-data-structures-for-jntu-with-cd
MOOCS COURSE
1. nptel.ac.in/courses/106105085/4 2. https://www.quora.com/Are-IIT-NPTEL-videos-good-to-learn-basic-C-programming

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BASIC ELECTRICAL ENGINEERING

I B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EE106ES	B. Tech	2	0	0	2	40	60	100

COURSE OBJECTIVES

To learn

1. To understand DC and Single & Three phase AC circuits
2. To study and understand the different types of DC, AC machines and Transformers.
3. To import the knowledge of various electrical installations and the concept of power, power factor and its improvement.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Understand and analyze basic Electrical circuits
2. Study the working principles of Electrical Machines and Transformers
3. Introduce components of Low Voltage Electrical Installations.

UNIT-I	D.C. CIRCUITS	Classes:12

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

UNIT-II	A.C. CIRCUITS	Classes:12

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	Classes:10

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

UNIT-IV	ELECTRICAL MACHINES	Classes:12

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	Classes:10

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, 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, 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

WEB REFERENCES

1. https://www.electrical4u.com/
2. http://www.basicsofelectricalengineering.com/
3. https://www.khanacademy.org/science/physics/circuits-topic/circuits-resistance/a/ee-voltage-and-current
4. https://circuitglobe.com/

E –TEXT BOOKS

1. https://easyengineering.net/basic-electrical-engineering-by-wadhwa/
2. https://easyengineering.net/objective-electrical-technology-by-mehta/

MOOCS COURSE

1. https://nptel.ac.in/courses/108108076/1
2. https://nptel.ac.in/courses/108102146/
3. https://nptel.ac.in/courses/108108076/35

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COMPUTER AIDED ENGINEERING GRAPHICS

I B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
ME108ES	B. Tech	1	0	4	3	40	60	100

COURSE OBJECTIVES

To learn

1. To develop the ability of visualization of different objects through technical drawings
2. To acquire computer drafting skill for communication of concepts, ideas in the design of engineering products

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Apply computer aided drafting tools to create 2D and 3D objects
2. Sketch conics and different types of solids
3. Appreciate the need of Sectional views of solids and Development of surfaces of solids
4. Read and interpret engineering drawings
5. Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting

UNIT-I	INTRODUCTION TO ENGINEERING GRAPHICS	Classes:15

Principles of Engineering Graphics and their Significance, Scales – Plain & Diagonal, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Introduction to Computer aided drafting – views, commands and conics

UNIT-II	ORTHOGRAPHIC PROJECTIONS	Classes:15

Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures. Auxiliary Planes. Computer aided orthographic projections – points, lines and planes.

UNIT-III	PROJECTIONS OF REGULAR SOLIDS	Classes:15

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views, Computer aided projections of solids – sectional views

UNIT-IV	DEVELOPMENT OF SURFACES OF RIGHT REGULAR SOLIDS	Classes:15

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Development of surfaces using computer aided drafting

UNIT-V	ISOMETRIC PROJECTIONS	Classes:10

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

TEXT BOOKS

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing and graphics Using AutoCAD Third Edition, T. Jeyapoovan, Vikas: S.Chand and company Ltd.

REFERENCE BOOKS

1. Dr.D.V.Sreekanth, Dr.M.BhojendraNaik and S.Amith Kumar, " Engineering Graphics" Spectrum University Press, First Edition,(2020)
2. Engineering Drawing, Basant Agrawal and C M Agrawal, Third Edition McGraw Hill
3. Engineering Graphics and Design, WILEY, Edition 2020
4. Engineering Drawing, M. B. Shah, B.C. Rane / Pearson.
5. Engineering Drawing, N. S. Parthasarathy and Vela Murali, Oxford
6. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

Note: - External examination is conducted in conventional mode and internal evaluation to be done byboth conventional as well as using computer aided drafting.

WEB REFERENCES

1. http://freevideolectures.com/Course/3420/Engineering-Drawing
2. https://www.slideshare.net/search/slideshow?searchfrom=header&q=engineering+drawing
3. https://www.wiziq.com/tutorials/engineering-drawing
4. http://road.issn.org/issn/2344-4681-journal-of-industrial-design-and-engineering-graphics

E –TEXT BOOKS

1. http://rgpv-ed.blogspot.com/2009/09/development-of-surfaces.html
2. http://www.techdrawingtools.com/12/l1201.htm

MOOCS COURSE

1. https://nptel.ac.in/course.php
2. https://swayam.gov.in/explorer

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ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING

I B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS106ES	B. Tech	0	0	2	1	50	-	50

COURSE OBJECTIVES

To learn an overview of the subjects of computer science and engineering

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

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

UNIT-I	BASICS OF A COMPUTER	Classes:8

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	Classes:8

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

UNIT-III	OPERATING SYSTEMS	Classes:8

Operating systems: Functions of operating systems, types of operating systems, Device & Resource management

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

UNIT-IV	COMPUTER NETWORKS	Classes:8

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, Online social networks. Security – information security, cyber security, cyber laws

UNIT-V	AUTONOMOUS SYSTEMS	Classes:8

IoT, Robotics, Drones, Artificial Intelligence – Learning, Game Development, natural language processing, image and video processing.
Cloud Basics

TEXT BOOKS

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

REFERENCE BOOKS

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

WEB REFERENCES

1. https://www.tutorialspoint.com/basics_of_computers/basics_of_computers_introduction.htm
2. https://www.geeksforgeeks.org/basics-of-computer-and-its-operations/
3. https://www.javatpoint.com/software-engineering-tutorial
4. https://www.javatpoint.com/data-structure-tutorial
5. https://www.guru99.com/operating-system-tutorial.html

E –TEXTBOOKS

1. https://www.amazon.com/Invitation-Computer-Science-G-Michael-Schneider/dp/1337561916

MOOCS COURSE

1. https://nptel.ac.in/courses/106103068
2. https://onlinecourses.nptel.ac.in/noc20_cs68/preview
3. https://archive.nptel.ac.in/courses/106/105/106105214/
4. https://onlinecourses.nptel.ac.in/noc22_cs51/preview
5. https://archive.nptel.ac.in/courses/106/105/106105183/

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ENGINEERING CHEMISTRY LABORATORY

I B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CH104BS	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To learn

1. Estimation of hardness of water to check its suitability for drinking purpose.
2. Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods.
3. Students will learn to prepare polymers such as Bakelite and nylon-6 in the laboratory.
4. Students will learn skills related to the lubricant properties such as saponification value, surface tension and viscosity of oils.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
2. Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
3. Students are able to prepare polymers like bakelite and nylon-6.
4. Estimations saponification value, surface tension and viscosity of lubricant oils.

LIST OF EXPERIMENTS

I. Volumetric Analysis: Estimation of Hardness of water by EDTA Complexometry method.

II. Conductometry: Estimation of the concentration of an acid by Conductometry.

III. Potentiometry: Estimation of the amount of Fe^{+2} by Potentiomentry.

IV. pH Metry: Determination of an acid concentration using pH meter.

V. Preparations:

1. Preparation of Bakelite.
2. Preparation Nylon – 6.

VI. Lubricants:

1. Estimation of acid value of given lubricant oil.
2. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.

VII. Corrosion: Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.

VIII. 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.

TEXT BOOKS

1. Senior practical physical chemistry, B. D. Khosla, A. Gulati and V. Garg (R. Chand and Co.,Delhi)
2. An introduction to practical; chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, New Delhi)
3. Vogel's text book of practical organic chemistry, 5th edition

REFERENCE BOOKS

1. S. Hemambika, V. Rajasekhar Reddy, "Engineering Chemistry Lab", Spectrum Publications., Hyderabad, 1st Edition (2020)
2. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications,New Delhi (2022)
3. Vogel's text book of practical organic chemistry 5th Edition
4. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
5. College Practical Chemistry by V. K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

WEB REFERENCES

1. https://www.academia.edu/39911915/Engineering_Chemistry_Laboratory_Manual_and_Observation_Subject_Code_18CHEL16_26
2. https://www.vlab.co.in/broad-area-chemical-engineering

E -TEXT BOOKS

1. https://www.pdfdrive.com/engineering-chemistry-lab-manual-e51801253.html
2. https://www.pdfdrive.com/engineering-chemistry-lab-manual-autonomous-2015-16-e37927940.html

MOOCS COURSE

1. https://www.coursera.org/browse/physical-science-and-engineering/chemistry
2. https://libguides.mines.edu/chem/online-course-resources
3. https://ecampus.oregonstate.edu/online-degrees/undergraduate/online-chemistry-lab-course/

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PROGRAMMING FOR PROBLEM SOLVING LABORATORY

I B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS107ES	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES:

To train students

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

COURSE OUTCOMES:

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

1. formulate the algorithms for simple problems
2. translate given algorithms to a working and correct program
3. correct syntax errors as reported by the compilers
4. identify and correct logical errors encountered during execution
5. represent and manipulate data with arrays, strings and structures
6. use pointers of different types
7. create, read and write to and from simple text and binary files
8. modularize the code with functions so that they can be reused

LIST OF EXPERIMENTS:

Practice sessions:

a. 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.

b. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.

Simple numeric problems:

a. Write a program for finding the max and min from the three numbers.

b. Write the program for the simple, compound interest.

c. Write a program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70% =First class, >= 70% = Distinction.Read percentage from standard input.

d. Write a program that prints a multiplication table for a given number and the number of rows inthe table. For example, for a number 5 and rows = 3, the output

should be:

e. 5 x 1 = 5
f. 5 x 2 = 10
g. 5 x 3 = 15
h. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Expression Evaluation:

a. 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^2where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).
b. 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)
c. Write a program that finds if a given number is a prime number
d. Write a C program to find the sum of individual digits of a positive integer and test given numberis palindrome.
e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
f. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
g. Write a C program to find the roots of a Quadratic equation.
h. Write a C program to calculate the following, where x is a fractional value.i. 1-x/2 +x^2/4-x^3/6
j. 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.

Arrays, Pointers and Functions:

a. Write a C program to find the minimum, maximum and average in an array of integers.
b. Write a function to compute mean, variance, Standard Deviation, sorting of n elements in asingle dimension array.
c. Write a C program that uses functions to perform the following:
d. Addition of Two Matrices
e. Multiplication of Two Matrices
f. Transpose of a matrix with memory dynamically allocated for the new matrix as row and columncounts may not be the same.
g. Write C programs that use both recursive and non-recursive functions
h. To find the factorial of a given integer.
i. To find the GCD (greatest common divisor) of two given integers.
j. To find x^n
k. Write a program for reading elements using a pointer into an array and display the values usingthe array.
l. Write a program for display values reverse order from an array using a pointer.
m. Write a program through a pointer variable to sum of n elements from an array.

Files:

a. Write a C program to display the contents of a file to standard output device.
b. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.

c. Write a C program to count the number of times a character occurs in a text file. The file nameand the character are supplied as command line arguments.

d. 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 aregiven 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 shouldbe changed to the new value in the file. (hint: use fseek function)
The program should then read all 10 values and print them back.

e. 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).

Strings:

a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
c. Write a C program that uses functions to perform the following operations:
d. To insert a sub-string into a given main string from a given position.
e. To delete n Characters from a given position in a given string.
f. 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.)
g. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn't contain ch.
h. Write a C program to count the lines, words and characters in a given text.

Miscellaneous:

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

```
1          *          1          1          *
1 2        * *        2 3        2 2        * *
1 2 3      * * *      4 5 6      3 3 3      * *
                                             *
                                4 4 4 4    * *
                                           *
```

Sorting and Searching:

a. 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.
b. Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using binary search method.
c. Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
d. Write a C program that sorts the given array of integers using selection sort in descending order
e. Write a C program that sorts the given array of integers using insertion sort in ascending order
f. Write a C program that sorts a given array of names

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. D.Krishna and S.Mallibabu,"Programming for Problem Solving Lab Record", Spectrum Publications, 1st Edition (2020).
2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI
3. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
4. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
5. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
6. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
7. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
8. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

WEB REFERENCES

1. https://www.tutorialspoint.com/cprogramming/
2. https://www.w3schools.in/c-tutorial/
3. https://www.cprogramming.com/tutorial/c-tutorial.html
4. www.studytonight.com/c/

E -TEXT BOOKS

1. http:///programming-with-c
2. https://developerinsider.co/best-c-programming-book-for-beginners/

MOOCS COURSE

1. https://nptel.ac.in/courses/106105085/4
2. https://www.coursera.org/courses?query=c%20programming

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Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EE108ES	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES:

To learn

1. To measure the electrical parameters for different types of DC and AC circuits usingconventional and theorems approach.
2. To study the transient response of various R, L and C circuits using different excitations.
3. To determine the performance of different types of DC, AC machines and Transformers.

COURSE OUTCOMES:

Upon successful completion of the course, the student is able to

1. Verify the basic Electrical circuits through different experiments.
2. Evaluate the performance calculations of Electrical Machines and Transformers throughvarious testing methods.
3. Analyze the transient responses of R, L and C circuits for different input conditions.

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 aSingle-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. Three Phase Transformer: Verification of Relationship between Voltages and Currents(Star-Delta, Delta-Delta, Delta-star, Star-Star)
3. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
4. Measurement of Active and Reactive Power in a balanced Three-phase circuit
5. No-Load Characteristics of a Three-phase Alternator

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, 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.

WEB REFERENCES

1. https://www.electrical4u.com/
2. http://www.basicsofelectricalengineering.com/
3. https://www.khanacademy.org/science/physics/circuits- topic/circuits-resistance/a/ee-voltage-and-current
4. https://circuitglobe.com/

E –TEXT BOOKS

1. https://easyengineering.net/basic-electrical-engineering-by-wadhwa/
2. https://easyengineering.net/objective-electrical-technology-by-mehta/

MOOCS COURSE

1. https://nptel.ac.in/courses/108108076/1
2. https://nptel.ac.in/courses/108102146/
3. https://nptel.ac.in/courses/108108076/35

I B. TECH - II SEMESTER (R 22)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
MA201BS	**B. Tech**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
		3	**1**	**0**	**4**	**40**	**60**	**100**

COURSE OBJECTIVES

To learn

1. Methods of solving the differential equations of first and higher order.
2. Concept, properties of Laplace transforms.
3. Solving ordinary differential equations using Laplace transforms techniques.
4. The physical quantities involved in engineering field related to vector valued functions.
5. The basic properties of vector valued functions and their applications to line, surface and volume integrals.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Identify whether the given differential equation of first order is exact or not
2. Solve higher differential equation and apply the concept of differential equation to real world problems.
3. Use the Laplace transforms techniques for solving ODE's.
4. Evaluate the line, surface and volume integrals and converting them from one to another

UNIT-I	**FIRST ORDER ODE**	**Classes: 10**

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

UNIT-II	**ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDER**	**Classes: 10**

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, sin ax, cos ax, polynomials in x, $e^{ax}V(x)$ and $x\,V(x)$, method of variation of parameters, Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation. Applications: Electric Circuits

UNIT-III	LAPLACE TRANSFORMS	Classes:10
Laplace Transforms: Laplace Transform of standard functions, First shifting theorem, Second shifting theorem, Unit step function, Dirac delta function, Laplace transforms of functions when they are multiplied and divided by 't', Laplace transforms of derivatives and integrals of function, 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	**VECTOR DIFFERENTIATION**	**Classes: 10**
Vector point functions and scalar point functions, Gradient, Divergence and Curl, Directional derivatives, Tangent plane and normal line, Vector Identities, Scalar potential functions, Solenoidal and Irrotational vectors.		
UNIT-V	**VECTOR INTEGRATION**	**Classes: 10**
Line, Surface and Volume Integrals, Theorems of Green, Gauss and Stokes (without proofs) and their applications.		

TEXT BOOKS

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.

REFERENCE BOOKS

1. Dr. D. Ranadheer Reddy, Dr. S. Someshwar & Mrs. M. Jhansi Lakshmi, Advanced Calculus for Engineers, M/s Students Helpline Publishing House Pvt. Ltd, First Edition-2020.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint,2002.
4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and CompanyLimited, New Delhi.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,Reprint, 2008.

WEB REFERENCES

1. https://www.efunda.com/math/gamma/index.cfm
2. https://www.mathworld.wolfram.com/
3. https://www.efunda.com/math/laplace_transform/index.cfm?search_string=laplace%20transforms

E -TEXT BOOKS

1. https://www.e-booksdirectory.com/listing.php?category=4
2. https://www.e-booksdirectory.com/details.php?ebook=10830

MOOCS COURSE

1. https://archive.nptel.ac.in/content/storage2/courses/122104018/node69.html
2. https://archive.nptel.ac.in/courses/111/106/111106139/
3. https://onlinecourses.nptel.ac.in/noc22_ma75/preview

APPLIED PHYSICS

I B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
AP202BS	B. Tech	3	1	0	4	40	60	100

COURSE OBJECTIVES

To learn

1. Understand the basic principles of quantum physics and band theory of solids.
2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
3. Study the fundamental concepts related to the dielectric, magnetic and energy materials.
4. Identify the importance of nanoscale, quantum confinement and various fabrications techniques.
5. Study the characteristics of lasers and optical fibers.

COURSE OUTCOMES

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

1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
2. Identify the role of semiconductor devices in science and engineering Applications.
3. Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
4. Appreciate the features and applications of Nanomaterials.
5. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

UNIT-I	QUANTUM PHYSICS AND SOLIDS	Classes: 12

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 - Davisson and Germer experiment –Heisenberg uncertainty principle - Born interpretation of the wave function – time independent Schrodinger wave equation - particle in one dimensional potential box.

Solids: Symmetry in 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	Classes: 12

Intrinsic and extrinsic semiconductors – Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode and bipolar junction transistor (BJT)–LED, PIN diode, avalanche photo diode (APD) and solar cells, their structure, materials, working principle and characteristics.

UNIT-III	DIELECTRIC, MAGNETIC AND ENERGY MATERIALS	Classes: 12

Dielectric Materials: Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric, and pyroelectric materials – applications – liquid crystal displays (LCD) and crystal oscillators.
Magnetic Materials: Hysteresis - soft and hard magnetic materials - magnetostriction, magnetoresistance - applications - bubble memory devices, magnetic field sensors and multiferroics. Energy Materials: Conductivity of liquid and solid electrolytes- superionic conductors - materials and electrolytes for super capacitors - rechargeable ion batteries, solid fuel cells.

UNIT-IV	NANOTECHNOLOGY	Classes: 12

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

UNIT-V	LASER AND FIBER OPTICS	Classes: 12

Lasers: Laser beam characteristics-three quantum processes-Einstein coefficients and their relations-lasing action - pumping methods- ruby laser, He-Ne laser , CO2 laser, Argon ion Laser, Nd: YAG laser- semiconductor laser-applications of laser.

Fiber Optics: Introduction to 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.

TEXT BOOKS

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy" A Text book of Engineering Physics"-
   S. Chand Publications, 11th Edition 2019.
2. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication,2019
3. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill,4thEdition,2021.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2ndEdition, 2022.
5. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical CreativesNANO DIGEST, 1st Edition, 2021.

REFERENCE BOOKS

1. Dr. K. Venkanna and Dr. P. NageswarRao, Applied Physics, Seven Hills International Publishers, 2021.
2. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012.
3. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons,11th Edition, 2018.
4. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
5. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
6. A.K. Bhandhopadhya - Nano Materials, New Age International, 1stEdition, 2007.
7. Energy Materials a Short Introduction to Functional Materials for Energy Conversion andStorage Aliaksandr S. Bandarenka, CRC Press Taylor & Francis Group
8. Energy Materials, Taylor & Francis Group, 1st Edition, 2022.

WEB REFERENCES
1. https://ocw.tudelft.nl/courses/solid-state-physics/subjects/3-quantum-theory-of-solids/ 2. https://byjus.com/physics/semiconductor-devices/ 3. https://www.nano.gov/nanotech-101/what/definition 4. https://www.studocu.com/in/document/delhi-technological-university/engineering-physics/fiber-optics-laser-notes/26618092
E -TEXT BOOKS
1. https://www.pdfdrive.com/physics-for-scientists-engineers-modern-physics-9th-ed-e51722698.html 2. https://www.pdfdrive.com/physics-for-scientists-engineers-modern-physics-9th-ed-e43567270.html
MOOCS COURSE
1. https://swayam.gov.in/nd1_noc19_ph13/preview 2. https://alison.com/courses?&category=physics

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ENGINEERING WORKSHOP

I B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
ME207ES	B. Tech	0	1	3	2.5	40	60	100

COURSE OBJECTIVES

1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineeringproducts.
3. To provide hands on experience about use of different engineering materials, tools, equipmentsand processes those are common in the engineering field.
4. To develop a right attitude, team working, precision and safety at work place.
5. It explains the construction, function, use and application of different working tools, equipmentand machines.
6. To study commonly used carpentry joints.
7. To have practical exposure to various welding and joining processes.
8. Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

COURSE OUTCOMES

Upon successful completion of the course, the student is able

1. Study and practice on machine tools and their operations
2. Practice on manufacturing of components using workshop trades including pluming, fitting,carpentry, foundry, house wiring and welding.
3. Identify and apply suitable tools for different trades of Engineering processes including drilling,material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

I. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
II. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
III. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
IV. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
V. Welding Practice – (Arc Welding & Gas Welding)
VI. House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
VII. Black Smithy – (Round to Square, Fan Hook and S-Hook)

2. TRADES FOR DEMONSTRATION & EXPOSURE
Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working
TEXT BOOKS
1. Workshop Practice /B. L. Juneja / Cengage 2. Workshop Manual / K. Venugopal / Anuradha.
REFERENCE BOOKS
1. Work shop Manual - R.HanumaNaik/R.SuvaranaBabu/Sun Techno Publications 2. Work shop Manual - P. Kannaiah/ K.L. Narayana/ Scitech 3. Workshop Manual / Venkat Reddy/ BSP
WEB REFERENCES
1. https://nptel.ac.in/courses/112105126/ 2. https://nptel.ac.in/downloads/112105127/ 3. https://nptel.ac.in/courses/112107145/ 4. https://nptel.ac.in/courses/122104015/
E -TEXT BOOKS
1. http://103.135.169.82:81/fdScript/RootOfEBooks/MED/Introduction Workshop%20Technology 2. https://www.quora.com/Download-free-mechanical-engineering-ebooks-sites
MOOCS COURSE
1. http://www.nits.ac.in/workshops/Workshop_on_MOOCS_26082017.pdf 2. https://www.nitttrc.ac.in/swayam/index.html

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ENGLISH FOR SKILL ENHANCEMENT

I B. TECH- II SEMESTER (R 22)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
EN204HS	**B.Tech**	**2**	**0**	**0**	**2**	**40**	**60**	**100**

COURSE OBJECTIVES

To learn

1. Improve the language proficiency of students in English with an emphasis on Vocabulary,Grammar, Reading and Writing skills.
2. Develop study skills and communication skills in various professional situations.
3. Equip students to study engineering subjects more effectively and critically using the theoreticaland practical components of the syllabus.

COURSE OUTCOMES

Upon successful completion of the course, the student is able

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 and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
6. Acquire basic proficiency in reading and writing modules of English.

UNIT-I	Chapter entitled '***Toasted English***' **by R.K.Narayan** from ***"English: Language, Context andCulture"*** published by Orient BlackSwan, Hyderabad.	**Classes: 10**

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes - Acquaintance withPrefixes 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 of ProperPunctuation- Techniques for Writing precisely – Paragraph Writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT-II	Chapter entitled **'Appro JRD' by Sudha Murthy** from ***"English: Language, Context and Culture" published*** by Orient BlackSwan, Hyderabad.	**Classes:10**

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 – Exercises for Practice

Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence.

UNIT-III	Chapter entitled **'Lessons from Online Learning' by F.Haider Alvi, Deborah Hurst et al** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.	**Classes:10**
Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses. **Reading:** Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises for Practice. **Writing:** Format of a Formal Letter-Writing Formal Letters eg., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume.		
UNIT-IV	Chapter entitled **'Art and Literature' by Abdul Kalam** from ***"English: Language, Context andCulture"*** published by Orient BlackSwan, Hyderabad.	**Classes: 10**
Vocabulary: Standard Abbreviations in English **Grammar:** Redundancies and Clichés in Oral and Written Communication. **Reading**: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice **Writing:** Writing Practices- Essay Writing-Writing Introduction and Conclusion -Précis Writing.		
UNIT-V	Chapter entitled **'Go, Kiss the World' by Subroto Bagchi** from ***"English: Language, Context andCulture"*** published by Orient BlackSwan, Hyderabad.	**Classes: 10**
Vocabulary: Technical Vocabulary and their Usage **Grammar:** Common Errors in English (*Covering all the other aspects of grammar which were notcovered in the previous units*) **Reading:** Reading Comprehension-Exercises for Practice **Writing:** Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.		

Note: ***Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum are coveredin the syllabus of ELCS Lab Course.***

- **Note: 1**. As the syllabus of English given in AICTE *Model Curriculum-2018 for B.Tech First Year is* ***Open-ended***, besides following the prescribed textbook, it is required to prepare teaching/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 flexible to adopt Blended Learning in dealing with the course contents. They are advised to teach 40 percent of each topic from the syllabus in blended mode.

TEXT BOOKS

1 “English: Language, Context and Culture” by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

REFERENCE BOOKS

1. Mr. G. Laxmikanth, Dr. Ramchandra Kumar R, and Mr. Ch. BhaskaraRao, Professional English, Sun Techno Publications, 1st Edition, 2020
2. Effective Academic Writing by Liss and Davis (OUP)
3. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press
4. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
5. Chaudhuri, Santanu Sinha. (2018). Learn English: A Fun Book of Functional Language,Grammar and Vocabulary. (2nd ed.,). Sage Publications India Pvt. Ltd.
6. (2019). Technical Communication. Wiley India Pvt. Ltd.
7. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students.Mc Graw-Hill Education India Pvt. Ltd.
8. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.

WEB REFERENCES

1. www.edufind.com
2. www.myenglishpages.com
3. http://grammar.ccc.comment.edu
4. http://owl.english.prudue.edu

E -TEXT BOOKS

1. http://bookboon.com/en/communication-ebooks-zip
2. http://learningenglishvocabularygrammar.com/files/idiomsandphraseswithmeanin gsandexamlespdf.pdf

MOOCS COURSE

1. https://mooec.com/courses/grammar-guru-1
2. https://mooec.com/courses/learning-styles

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ELECTRONIC DEVICES AND CIRCUITS

I B. TECH- II SEMESTER (R 22)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
EC203ES	**B. Tech**	**2**	**0**	**0**	**2**	**40**	**60**	**100**

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

Upon successful completion of the course, the student is able

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.

UNIT-I	**DIODES**	**Classes: 10**

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

UNIT-II	**DIODE APPLICATIONS**	**Classes:10**

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)**	**Classes:10**

Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Transistor as a switch, switching times

UNIT-IV	**JUNCTION FIELD EFFECT TRANSISTOR (FET)**	**Classes:10**

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**	**Classes:10**

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.

WEB REFERENCES

1. https://www.physics-and-radio-electronics.com/electronic-devices-and-circuits.html
2. https://www.electronics-tutorials.ws/transistor/tran_5.html
3. http://www.gvpcew.ac.in/LN-CSE-IT-22-32/ECE/2-Year/ECA-All-Units.pdf
4. https://www.electronics-notes.com/articles/analogue_circuits/fet-field-effect-transistor/common-source-amplifier-circuit.php

E -TEXT BOOKS

1. https://ia902709.us.archive.org/13/items/ElectronicDevicesAndCircuitTheory/Electronic%20Devices%20and%20Circuit%20Theory.pdf
2. https://www.researchgate.net/publication/275408225_Electronic_Devices_and_Circuits

MOOCS COURSE

1. https://nptel.ac.in/courses/117103063/2
2. https://nptel.ac.in/courses/117106087/4
3. https://nptel.ac.in/courses/117106087/20

APPLIED PHYSICS LABORATORY

I B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
AP203BS	B. Tech	0	0	3	1.5	40	60	100

COURSE OBJECTIVES

To learn

1. Capable of handling instruments related to the Hall effect and photoelectric effect experiments and their measurements.
2. Understand the characteristics of various devices such as PN junction diode, Zener diode, BJT, LED, solar cell, lasers and optical fiber and measurement of energy gap and resistivity of semiconductor materials.
3. Able to measure the characteristics of dielectric constant of a given material.
4. Study the behavior of B-H curve of ferromagnetic materials.
5. Understanding the method of least squares fitting.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

1. Know the determination of the Planck's constant using Photo electric effect and identify thematerial whether it is n-type or p-type by Hall experiment.
2. Appreciate quantum physics in semiconductor devices and optoelectronics.
3. Gain the knowledge of applications of dielectric constant.
4. Understand the variation of magnetic field and behavior of hysteresis curve.
5. Carried out data analysis.

LIST OF EXPERIMENTS

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. Input and output characteristics of BJT (CE, CB & CC configurations)
6. a) V-I and L-I characteristics of light emitting diode (LED)
   b) V-I Characteristics of solar cell
7. Determination of Energy gap of a semiconductor.
8. Determination of the resistivity of semiconductor by two probe method.
9. Study B-H curve of a magnetic material.
10. Determination of dielectric constant of a given material
11. a) Determination of the beam divergence of the given LASER beam
    b) Determination of Acceptance Angle and Numerical Aperture of an optical fiber.
12. Understanding the method of least squares – torsional pendulum as an example.

NOTE: Any 8 experiments are to be performed

TEXT BOOKS

1. B.K. Pandey, S. Chaturvedi, Engineering Physics, Cengage Learning.
2. Halliday and Resnick, Physics, Wiley.
3. Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar, A Textbook of Engineering Physics, S. Chand Publishers.

REFERENCE BOOKS

1.Dr. K. Venkanna and T. Vamshi Prasad, Applied Physics Lab Book. Spectrum Publishers, 2021.

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

WEB REFERENCES

1. Fundamental concepts of semi conductors: https://nptel.ac.in/courses/115102025/
2. Semi conductor Optoelectronics:https://nptel.ac.in/courses/115102103/

E -TEXT BOOKS

1. http://www.lehman.edu/faculty/kabat/F2019-166168.pdf
2. https://www.scribd.com/doc/143091652/ENGINEERING-PHYSICS-LAB-MANUAL

MOOCS COURSE

1. Swayam:https://swayam.gov.in/nd1_noc19_ph13/preview
2. Alison: https://alison.com/courses?&category=physics

PYTHON PROGRAMMING LABORATORY

I B. TECH- II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS205ES	B. Tech	0	1	2	2	40	60	100

COURSE OBJECTIVES

1. To install and run the Python interpreter
2. To learn control structures.
3. To Understand Lists, Dictionaries in python
4. To Handle Strings and Files in Python

COURSE OUTCOMES

Upon successful completion of the course, the student is able

1. Develop the application specific codes using python.
2. Understand Strings, Lists, Tuples and Dictionaries in Python
3. Verify programs using modular approach, file I/O, Python standard library
4. Implement Digital Systems using Python

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

LIST OF EXPERIMENTS

Week -1:

1. i) Use a web browser to go to the Python website http://python.org. This page contains information about Python and links to Python-related pages, and it gives you the ability to search the Python documentation.
   ii) Start the Python interpreter and type help() to start the online help utility.
2. Start a Python interpreter and use it as a Calculator.
3. I) Write a program to calculate compound interest when principal, rate and numbers of periods aregiven.
   ii) Given coordinates (x1, y1), (x2, y2) find the distance between two points
4. Read name, address, email and phone number of a person through keyboard and print the details.

Week - 2:

1. Print the below triangle using for loop.5
   4 4
   3 3 3
   2 2 2 2
   1 1 1 1 1
2. Write a program to check whether the given input is digit or lowercase character or uppercasecharacter or a special character (use 'if-else-if' ladder)
3. Python Program to Print the Fibonacci sequence using while loop
4. Python program to print all prime numbers in a given interval (use break)

Week - 3:

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

Week - 4:

1. Write a function called is_sorted that takes a list as a parameter and returns true if the list is sortedin ascending order and False otherwise.
2. Write a function called has_duplicates that takes a list and returns True if there is any element thatappears more than once. It should not modify the original list.

   i). Write a function called remove_duplicates that takes a list and returns a new list with only theunique elements from the original. Hint: they don't have to be in the same order.

   ii). The word list I provided, words.txt, doesn't contain single letter words. So you might want to add"I", "a", and the empty string.

   iii). Write a python code to read dictionary values from the user. Construct a function to invert itscontent. i.e., keys should be values and values should be keys.
3. i) Add a comma between the characters. If the given word is 'Apple', it should become 'A,p,p,l,e'

   ii) Remove the given word in all the places in a string?

   iii) Write a function that takes a sentence as an input parameter and replaces the first letter of everyword with the corresponding upper case letter and the rest of the letters in the word by corresponding letters in lower case without using a built-in function?
4. Writes a recursive function that generates all binary strings of n-bit length

Week - 5:

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

Week-6:

1. a. Write a function called draw_ rectangle that takes a Canvas and a Rectangle as arguments and draws a representation of the Rectangle on the Canvas.

   b. Add an attribute named color to your Rectangle objects and modify draw_ rectangle so that ituses the color attribute as the fill color.

   c. Write a function called draw _point that takes a Canvas and a Point as arguments and draws are presentation of the Point on the Canvas.

   d. Define a new class called Circle with appropriate attributes and instantiate a few Circle objects.Write a function called draw _circle that draws circles on the canvas.
2. Write a Python program to demonstrate the usage of Method Resolution Order (MRO) in multiplelevels of Inheritances.
3. Write a python code to read a phone number and email-id from the user and validate it for correctness.

Week- 7

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

Week - 8:

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

TEXT BOOKS

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

REFERENCE BOOKS

1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
2. Python Programming A Modular Approach with Graphics, Database, Mobile, and WebApplications, Sheetal Taneja, Naveen Kumar, Pearson
3. Programming with Python, A User's Book, Michael Dawson, Cengage Learning, India Edition
4. Think Python, Allen Downey, Green Tea Press
5. Core Python Programming, W. Chun, Pearson
6. Introduction to Python, Kenneth A. Lambert, Cengage

WEB REFERENCES

1. https://www.tutorialspoint.com/python3/
2. https://www.udemy.com/machine-learning-using-r-and-python/
3. https://www.udemy.com/r-programming-language/
4. https://www.simpliv.com/itcertification/data-analytics-using-r-programming
5. https://books.goalkicker.com/PythonBook/

E -TEXT BOOKS

1. https://www.amazon.in/Advanced-Python-Programming-Brian-Overland/dp/0135159946
2. https://www.oreilly.com/library/view/learning-python-5th/9781449355722/

MOOCS COURSE

1. https://nptel.ac.in/courses/106106145
2. https://nptel.ac.in/courses/106106182

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

I B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EN205HS	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To learn

1. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent,intonation and rhythm
3. To bring about a consistent accent and intelligibility in students' pronunciation ofEnglish by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize the impact ofdialects.
5. To train students to use language appropriately for public speaking, group discussions and interviews

COURSE OUTCOMES

Upon successful completion of the course, the student is 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

Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab
b. Interactive Communication Skills (ICS) Lab

LISTENING SKILLS

Objectives

1. To enable students develop their listening skills so that they may appreciate the role in the LSRWskills approach to language and improve their pronunciation
2. To equip students with necessary training in listening, so that they can comprehend the speechof people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

SPEAKING SKILLS:

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professionalcontexts

• 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- Consonant Clusters- 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 Communication- Presentation 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 40 students with 40 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 audio-visual 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 contentsof the syllabus.

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10th Edition.
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge UniversityPress.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All
- Orell Digital Language Lab (Licensed Version)

REFERENCE BOOKS

1. English Language Communication Skills (2022) – Lab Manual cum Workbook. Cengage Learning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). Communicative English – A workbook. Cambridge University Press
3. Kumar, Sanjay & Lata, Pushp. (2019). Communication Skills: A Workbook. Oxford University Press
4. Board of Editors. (2016). ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities.Orient Black Swan Pvt. Ltd.
5. Mishra, Veerendra et al. (2020). English Language Skills: A Practical Approach. Cambridge University Press

WEB REFERENCES

1. https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935321&section=References

2. https://www.englishlab.co.in/blog/types-of-communication-skills-lab-english-language-lab/

E -TEXT BOOKS

1. https://www.pdfdrive.com/basic-english-grammar-for-english-language-learners-basic-english-grammar-for-english-language-learners-e158730664.html
2. https://www.pdfdrive.com/english-language-communication-skills-e53852464.html

MOOCS COURSE

1. https://www.coursera.org/specializations/improve-english
2. https://www.edx.org/professional-certificate/upvalenciax-upper-intermediate- english

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IT WORKSHOP

I B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS206ES	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To learn

The IT Workshop for engineers is a training lab course spread over 60 hours. Themodules include training on PC Hardware, Internet & World Wide Web and Productivity tools includingWord, Excel, Power Point and Publisher.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

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

PC HARDWARE

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

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

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

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot 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 proxysettings, 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 browsersto 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) officeor equivalent (FOSS) tool word: Importance of LaTeX and MS office or equivalent (FOSS) tool Word asword 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, Paragraphsand Mail Merge in word.
EXCEL
Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources. **Task 1: Creating a Scheduler -** Features to be covered: Gridlines, Format Cells, Summation, auto fill,Formatting Text **Task 2 : Calculating GPA** - .Features to be covered:- Cell Referencing, Formulae in excel – average,std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP **Task 3:** Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditionalformatting
POWERPOINT

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

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

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

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, *WILEYDreamtech*
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.*

WEB REFERENCES

1. https://rajagopalaraja.blogspot.com/2021/02/it-workshop-ay2020-21.html
2. https://support.microsoft.com/en-us/office/linear-format-equations-using-unicodemath-and-latex-in-word-2e00618d-b1fd-49d8-8cb4-8d17f25754f8

E -TEXT BOOKS

1. https://www.pdfprof.com/PDF_Image.php?idt=72510&t=27
2. https://www.ebooknetworking.net/ebooks/it-402-by-vikas-gupta.html

MOOCS COURSE

1. https://www.classcentral.com/course/edx-latex-for-students-engineers-and-scientists-15201
2. https://www.learnlatex.org/en/

ENVIRONMENTAL SCIENCE

I B. TECH- II SEMESTER (R 22)								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
***CH209MC**	**B. Tech**	**3**	**0**	**0**	**0**	**40**	**60**	**100**

COURSE OBJECTIVES

To learn

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

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

UNIT-I	ECOSYSTEMS	Classes: 10

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

UNIT-II	NATURAL RESOURCES	Classes: 10

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

UNIT-III	BIODIVERSITY AND BIOTIC RESOURCES	Classes: 10

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

UNIT-IV	ENVIRONMENTAL POLLUTION AND CONTROL TECHNOLOGIES	Classes: 10

Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.
Overview of air pollution control technologies, Concepts of bioremediation. **Global**

Environmental Issues and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT-V	ENVIRONMENTAL POLICY, LEGISLATION & EIA	Classes: 10

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

TEXT BOOKS

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS

1. A. Aditya Prasad, S.Hemambika, A.Rambabu, "Environmental Science", Spectrum Educational Books., Hyderabad,1stedition(2021)
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHILearning Pvt. Ltd.
4. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
5. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
6. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
7. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.

WEB REFERENCES

1. https://education.nationalgeographic.org/resource/ecosystem
2. https://byjus.com/chemistry/natural-resources-pdf/

E –TEXTBOOKS

1. https://www.pdfdrive.com/biodiversity-inventories-in-high-gear-dna-barcoding-facilitates-a-rapid-biotic-survey-of-a-temperate-d149274581.html
2. https://www.pdfdrive.com/pollution-causes-effects-and-control-e159560577.html

MOOCS COURSE

1. https://nptel.ac.in/courses/120108004
2. https://archive.nptel.ac.in/content/storage2/courses/122102006/mod1/Overview%20of%20ecology.htm

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DEPARTMENT OF COMPUTR SCIENCE AND DESIGN

DIGITAL ELECTRONICS

II B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EC311PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

This course aims at through understanding of binary number system, logic gates, combination logic and synchronous and asynchronous logic.

COURSE OUTCOMES

Upon completing this course, the students will be able to

1. Acquire the knowledge on numerical information in different forms and Boolean algebra theorems.
2. Simplify expression using Karnaugh map method.
3. Design the combinational circuits
4. Design and analyze sequential circuits and counters.
5. Differentiate various types of memories.

UNIT-I	BOOLEAN ALGEBRA AND LOGIC GATES	Classes: 10

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	Classes: 08

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	Classes: 10

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	Classes: 08

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	Classes: 08

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 Hill Edition.
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.

WEB REFERENCES

1. Analog Electronics Authors- L.K. MAHESWARI, M.M.S.ANAND. 2009
2. Electronic Communication System Author- Kennedy
3. Integrated Electronics Analog And Digital & System Author – Jacob Millman. Christos C. Halkias
4. https://www.analog.com › education › education-library › tutorials

E -TEXT BOOKS

1. The Scientist & Engineer's Guide to Digital Signal Processing, 1999
2. Application-Specific Integrated Circuits Michael J. Smith

MOOCS COURSES

1. https://www.mooc-list.com › tags › analogue-electronics
2. https://www.mooc-list.com › course › electronic-systems-and-digital-electronics

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DEPARTMENT OF COMPUTR SCIENCE AND DESIGN

DATA STRUCTURES

II B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS301PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to select the data structures that efficiently model the information in a problem.
2. Ability to assess efficiency trade-offs among different data structure implementations or combinations.
3. Implement and know the application of algorithms for sorting and pattern matching.
4. Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.

UNIT-I	INTRODUCTION	Classes: 08

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 AND HASH TABLE REPRESENTATION	Classes: 08

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching.

Hash Table Representation: hash functions, collision resolution-separate chaining, open addressing- linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

UNIT-III	SEARCH TREES	Classes: 08

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 AND SORTING	Classes: 08

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	Classes: 08

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/Pearson Education.

REFERENCE BOOKS

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

WEB REFERENCES

1. https://learntocodewith.me/posts/data-structures/
2. http://cgm.cs.mcgill.ca/~godfried/teaching/algorithms-web.html
3. https://www.javatpoint.com/data-structure-tutorial
4. https://www.geeksforgeeks.org/data-structures/

E -TEXT BOOKS

1. https://www.freetechbooks.com/algorithms-and-data-structures-f11.html
2. https://opendatastructures.org/

MOOCS COURSES

1. https://nptel.ac.in/courses/106102064/
2. https://swayam.gov.in/explorer?searchText=data+structures

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DEPARTMENT OF COMPUTR SCIENCE AND DESIGN

COMPUTER ORIENTED STATISTICAL METHODS

II B. TECH- I SEMESTER (R20)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
MA302BS	B. Tech	3	1	0	4	40	60	100

COURSE OBJECTIVES

To learn

1. The theory of Probability, Probability distributions of single and multiple random variables
2. The sampling theory, testing of hypothesis and making statistical inferences
3. Stochastic process and Markov chains.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Apply the concepts of probability and distributions to case studies.
2. Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.
3. Apply concept of estimation and testing of hypothesis to case studies.
4. Correlate the concepts of one unit to the concepts in other units.

UNIT-I	PROBABILITY	Classes: 08

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

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

UNIT-II	EXPECTATION AND DISCRETE DISTRIBUTIONS	Classes: 08

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 AND SAMPLING DISTRIBUTIONS	Classes: 08

Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, 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	Classes: 10

Introduction, Statistical Inference, Classical Methods of Estimation, Single Sample: Estimating the mean, standard error of a point estimate, prediction interval. Two sample: Estimating the difference between 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 a single mean, Two samples: tests on two means, One sample: test on a single proportion. Two samples: tests on two proportions, Two- sample tests concerning variances.

UNIT-V	STOCHASTIC PROCESSES AND MARKOV CHAINS	Classes: 08

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.

TEXT BOOKS

1. Ronald E.Walpole, Raymond H.Myers, SharonL.Myers, keyingYe, Probability and statistics for engineers and scientists, 9thEdition, Pearson Publications
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.

REFERENCE BOOKS

1. Dr. D. Ranadheer Reddy, Mr. K. UpenderReddy & Mr. C. Vamshi Krishna, Computer Oriented Statistical Methods, M/s S International Publishers. First Edition-2021.
2. T.T. Soong, Fundamentals of Probability And Statistics For Engineers, John Wiley & Sons Ltd, 2004.
3. Sheldon M Ross, Probability and statistics for Engineers and scientists, Academic Press.
4. S. D. Sharma, Operations Research, Kedarnath and Remnant Publishers, Meerut, Delhi

WEB REFERENCES

1. https://www.efunda.com/math/gamma/index.cfm
2. https://www.efunda.com/math/Random variables /index.cfm
3. https://www.efunda.com/math/sampling distributions /index.cfm

E -TEXT BOOKS

1. https://www.e-booksdirectory.com/listing.php?category=4
2. https://www.e-booksdirectory.com/details.php?ebook=10830

MOOCS COURSES

1. https://swayam.gov.in/
2. https://swayam.gov.in/NPTEL

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DEPARTMENT OF COMPUTR SCIENCE AND DESIGN

COMPUTER ORGANIZATION AND ARCHITECTURE

II B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS312PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. The purpose of the course is to introduce principles of computer organization and the basic architectural concepts.
2. It begins with basic organization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
3. 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, REGISTER TRANSFER LANGUAGE AND MICRO OPERATIONS AND BASIC COMPUTER ORGANIZATION AND DESIGN	Classes: 10

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 AND CENTRAL PROCESSING UNIT	Classes: 08

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 AND COMPUTER	Classes: 08

	ARITHMETIC	
Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation. Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.		
UNIT-IV	**INPUT-OUTPUT ORGANIZATION**	**Classes: 08**
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.		
UNIT-V	**REDUCED INSTRUCTION SET COMPUTER**	**Classes: 08**
Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics. Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor. Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor communication and synchronization, Cache Coherence.		

TEXT BOOKS

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

REFERENCE BOOKS

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, 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.

WEB REFERENCES

1. "Computer Organization and Design: The Hardware/Software Interface" by David A Patterson and John L Hennessy
2. "Computer Organization" by Zvonco Vranesic and Safwat Zaky.
3. "Computer Architecture and Organization" by John P Hayes.

E -TEXT BOOKS

1. Fundamentals of Computer organization and Design by Shivarama Dandamudi.
2. Computer Architecture: Complexity and Correctness by Mueller and Paul

MOOCS COURSES

1. https://www.mooc-list.com › tags › computer-architecture
2. https://www.edx.org › course › computation-structures-3-computer-mitx-6

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DEPARTMENT OF COMPUTR SCIENCE AND DESIGN

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

II B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS303PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Demonstrate the behaviour 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	Classes: 10

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	Classes: 10

Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding,

abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring java.io.

UNIT-III	EXCEPTION HANDLING AND MULTITHREADING	Classes: 08

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

UNIT-IV	EVENT HANDLING	Classes: 08

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, checkbox groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT-V	APPLETS	Classes: 08

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

TEXT BOOKS

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

REFERENCE BOOKS

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

WEB REFERENCES

1. http://www.developer.com/icom_includes/feeds/developer/dev-25.xml
2. http://www.ibm.com/developerworks/views/java/rss/libraryview.jsp
3. http://www.javaworld.com/rss/index.html
4. http://feeds.feedburner.com/DevxLatestJavaArticles

E -TEXT BOOKS

1. HTTP Programming Recipes for Java Bots by Jeff Heaton - Heaton Research, Inc.
2. Java Distributed Computing by Jim Farley - O'Reilly Media
3. Java Precisely by Peter Sestoft - IT University of Copenhagen
4. Java for Absolute Beginners: Learn to Program the Fundamentals the Java 9+ Way
5. Fundamentals of the Java Programming Language, Java SE 6
6. JAVA: Easy Java Programming for Beginners, Your Step-By-Step Guide to
7. Learning Java Programming
8. Android App Development in Android Studio: Java+Android Edition for Beginners

MOOCS COURSES

1. https://www.mooc-list.com › tags › java-programming
2. https://www.mooc-list.com › tags › java
3. https://www.edx.org › learn › java
4. https://www.quora.com › What-are-the-best-MOOCs-for-learning-Java
5. https://www.udacity.com › course › java-programming-basics--ud282
6. https://www.futurelearn.com › courses › begin-programming.

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DEPARTMENT OF COMPUTR SCIENCE AND DESIGN

DATA STRUCTURES LAB

II B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS307PC	B. Tech	0	0	3	1.5	40	60	100

COURSE OBJECTIVES

To learn

1. It covers various concepts of C programming language
2. It introduces searching and sorting algorithms
3. It provides an understanding of data structures such as stacks and queues.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
2. Ability to Implement searching and sorting algorithms

LIST OF EXPERIMENTS

1. Write a program that uses functions to perform the following operations on singly linked list.:
   i) Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list.:
   i) Creation ii) Insertion iii) Deletion iv) Traversal
3. 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
   i)Arrays ii) Pointers
5. Write a program that implement Queue (its operations) using
   i)Arrays ii) Pointers
6. Write a program that implements the following sorting methods to sort a given list of integers in ascending order
   i)Quick sort ii) Heap sort iii) Merge sort
7. Write a program to implement the tree traversal methods(Recursive and Non Recursive).
8. Write a program to implement
   i)Binary Search tree ii) B Trees iii) B+ Trees iv) AVL trees v) Red - Black trees
9. Write a program to implement the graph traversal methods.
10. Implement a Pattern matching algorithms using Boyer- Moore, Knuth-Morris-Pratt

TEXT BOOKS
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 BOOKS
1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A. Forouzan, Cengage Learning.
WEB REFERENCES
1 https://www.javatpoint.com/singly-linked-list 2 https://www.programiz.com/dsa/circular-queue.
E -TEXT BOOKS
1. "Data Structures and Algorithms Made Easy: Data Structures and Algorithmic Puzzles" by Narasimha Karumanchi. 2. Data Structures & Algorithms in Java, 2e by lafore
MOOCS COURSES
1 https://www.mooc-list.com/tags/data-structures 2 https://www.coursera.org/specializations/data-structures-algorithms

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

II B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS308PC	B. Tech	0	0	3	1.5	40	60	100

COURSE OBJECTIVES

To learn

1. To write programs using abstract classes.
2. To write programs for solving real world problems using the java collection framework.
3. To write multithreaded programs.
4. To write GUI programs using swing controls in Java.
5. To introduce java compiler and eclipse platform.
6. 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 use of the Eclipse platform.
2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more 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 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.

3. 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 factorial Value and returns it in another text field, when the button named “Compute” is clicked.

4. Write a Java program that creates a user interface to perform integer divisions. The user

enters two numbers 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 throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5. 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.

6. Write a Java program for the following:
   Create a doubly linked list of elements.
   Delete a given element from the above list.
   Display the contents of the list after deletion.

7. 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.

8. 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 such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the 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.

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

11. 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).

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

13. Write a Java program to list all the files in a directory including the files present in all its subdirectories.

TEXT BOOKS

1. Arnold Ken, Gosling J, “The Java Programming Language”, Addison Wesley.
2. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education.
3. Thinking in Java, Bruce Eckel, Pearson Education.
4. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.

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.

WEB REFERENCES

1. Head First Java: A Brain-Friendly Guide 2nd Edition,Kindle Edition by Kathy Sierra.
2. Effective Java: A Programming Language Guide (Java Series) 2nd Edition, Kindle Edition by Joshua Bloch.
3. AI Algorithms, Data Structures, and Idioms in Prolog, Lisp, and JavaPaperback – Import, 25 Aug 2008 by George F. Luger (Author), William A Stubblefield (Author).

E -TEXT BOOKS

1. Introduction to Java Programming and Data Structures, Comprehensive Version (11th Edition) 11th Edition by Y. Daniel Liang.
2. Java How to Program, Early Objects (11th Edition) (Deitel: How to Program) 11th Edition by Paul J. Deitel (Author), Harvey Deitel (Author).

MOOCS COURSES

1. https://www.mooc-list.com › tags › java-programming
2. https://www.mooc-list.com › tags › java
3. https://www.edx.org › learn › java
4. https://www.quora.com › What-are-the-best-MOOCs-for-learning-Java

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DEPARTMENT OF COMPUTR SCIENCE AND DESIGN

DATA VISUALIZATION - R PROGRAMMING/ POWER BI

II B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS310PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To learn

1. Effective use of Business Intelligence (BI) technology (Tableau) to apply data visualization
2. To discern patterns and relationships in the data.
3. To build Dashboard applications.
4. To communicate the results clearly and concisely.
5. 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 world problems.

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.

TEXT BOOKS

1. Thomas Rahlf. Data Visualisation with R. Springer International Publishing, New York, 2017. ISBN 978-3-319-49750-1.
2. Lawrence Leemis. Learning Base R. Lightning Source, 2016. ISBN 978-0-9829174-80
3.

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.

WEB REFERENCES

1. R Programming for Beginners Paperback – 21 Jul 2017.

E -TEXT BOOKS

1. R For Beginners by Emmanuel Paradise.
2. R Inferno by Patrick Burns.

MOOCS COURSES

1. https://www.coursera.org › learn › r-programming
2. https://www.classcentral.com/course/open2study-chemistry-building-blocks-of-the-world-1297

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

GENDER SENSITIZATION LAB

II B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
*GS309MC	B. Tech	0	0	2	0	100	-	100

COURSE DESCRIPTION

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

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

COURSE OBJECTIVES

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

COURSE OUTCOMES

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labor and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.

- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

UNIT-I	**UNDERSTANDING GENDER**	**Classes: 08**

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

UNIT-II	**GENDER ROLES AND RELATIONS**	**Classes: 08**

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

UNIT-III	**GENDER AND LABOUR**	**Classes: 08**

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work.

-Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

UNIT-IV	**GENDER - BASED VIOLENCE**	**Classes: 08**

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No!-Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "Chupulu".

Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

UNIT-V	**GENDER AND CULTURE**	**Classes: 08**

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks- The Brave Heart.

Note: Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

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

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

ASSESSMENT AND GRADING:

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

TEXTBOOKS:

1. A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, GoguShyamala, Deepa Sreenivas and Susie Tharu, The Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" writtenby published by Telugu Akademi, Telangana Government (2015).
2. Raj Pal Singh, Anupama Sihag, "Gender Sensitization: A World of Equals", Raj Publications (Dist.), ISBN: 9789386695123, 938669512X (2019)

REFERENCE BOOKS:

1. S.Benhabib. Situating the Self: Gender, Community, Gender and Post modernism in Contemporary Ethics, London; Routledge, 1992.

WEBREFERENCES:

1. https://www.researchgate.net/publication/329541569_EMPOWERING_WOMEN_THROUGH_GENDER_SENSITIZATION
2. https://eige.europa.eu/gender-mainstreaming/toolkits/gender-sensitive-parliaments/references-and-resources

E –TEXTBOOKS:

1. https://harpercollins.co.in/BookDetail.asp?BookCode=3732
2. https://unesdoc.unesco.org/ark:/48223/pf0000158897_eng

MOOCSCOURSE:

1. https://www.mooc-list.com/course/sustainable-development-goal-5-gender-equality-canopylab
2. https://www.coursera.org/learn/gender-sexuality

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DISCRETE MATHEMATICS

II B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS401PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. Introduces the elementary discrete mathematics for computer science and engineering.
2. Topics include formal logic notation, methods of proof, induction, sets, relations, graph theory, Permutations and combinations, counting principles; recurrence relations and generating functions.

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

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	Classes: 08

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	Classes: 08

Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions.

UNIT-III	ALGEBRAIC STRUCTURES	Classes: 08

Introduction, Algebraic Systems, Semi groups and Monoids, Lattices as Partially Ordered Sets, Boolean Algebra.

UNIT-IV	ELEMENTARY COMBINATORICS	Classes: 08

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	Classes: 08

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

TEXT BOOKS

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

REFERENCE BOOKS

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

WEB REFERENCES

1. "Discrete Mathematics and its Applications" by Kenneth H Rosen
2. "Elements of Discrete Mathematics" by C L Liu
3. "Discrete Mathematics" by Norman L Biggs
4. "Discrete Mathematics for Computer Science" by Kenneth Bogart and Robert L Drysdale
5. "Discrete Mathematics with Applications" by Thomas Koshy
6. "Discrete Mathematics (Schaum's Outlines)" by Seymour Lipschutz and Marc Laras Lipson

E -TEXT BOOKS

1. Combinatorics And Graph Theory Sarkar, Bikash Kanti , Chakraborty, Swapan Ku Discrete Mathematics Chandrasekaran, N., Umaparvathi, M. Mar
2. Discrete Mathematics And Graph Theory Biswal, Purna Chandra
3. Advanced Discrete Mathematics Rajput, Uday Singh

MOOCS COURSES

1. https://www.mooc-list.com › tags › discrete-mathematics
2. https://www.mooc-list.com › tags › discrete-mathematics
3. https://www.mooc-list.com › course › discrete-mathematics-coursera
4. https://www.coursera.org › learn › discrete-mathematics

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DEPARTMENT OF COMPUTR SCIENCE AND DESIGN

BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

II B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
BE404MS	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn the basic business types, impact of the economy on Business and Firms specifically. To analyse the Business from the Financial Perspective.

COURSE OUTCOMES

The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company.

UNIT-I	INTRODUCTION TO BUSINESS AND ECONOMICS	Classes: 10

Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply and Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT-II	DEMAND AND SUPPLY ANALYSIS	Classes: 08

Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.
Supply Analysis: Determinants of Supply, Supply Function and Law of Supply.

UNIT-III	PRODUCTION, COST, MARKET STRUCTURES & PRICING	Classes: 08

Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions.
Cost analysis: Types of Costs, Short run and Long run Cost Functions.
Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, Monopolistic Competition. Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, Cost Volume Profit Analysis.

UNIT-IV	FINANCIAL ACCOUNTING	Classes: 08

Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, Preparation of Final Accounts (Simple Problems).

UNIT-V	FINANCIAL RATIOS ANALYSIS	Classes: 08

Financial Ratios Analysis: Concept of Ratio Analysis, Importance and Types of Ratios, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios – Analysis and Interpretation (simple problems).

TEXT BOOKS

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, InternationalBook House Pvt. Ltd. 2013
2. Dhanesh K Khatri, Financial Accounting, Tata Mc –Graw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata Mc Graw Hill Education Pvt. Ltd. 2012

REFERENCE BOOKS

1. K. Sudha, K. Sathish, A. Sarveswarareddy, Business Economics and Financial Analysis-M/S Spectrum Publications, First Edition 2021.
2. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
3. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications, 2013.
4. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.

WEB REFERENCES

1. https://nptel.ac.in/courses/110106050/17
2. https://nptel.ac.in/courses/110106050/39
3. https://nptel.ac.in/courses/110106050/38

E -TEXT BOOKS

1. https://www.sciencedirect.com/book/9780750644549/business-economics
2. http://www.freebookcentre.net/Business/Economics-Books.html

MOOCS COURSES

1. https://nptel.ac.in/courses/110106050/
2. https://nptel.ac.in/courses/110106050/11

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

OPERATING SYSTEMS

II B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS402PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
2. Introduce the issues to be considered in the design and development of operating system
3. Introduce basic Unix commands, system call interface for process management, inter process 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	Classes: 10

Operating System - Introduction, Structures - Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls
Process - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads

UNIT-II	CPU SCHEDULING	Classes: 10

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	Classes: 08

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	Classes: 08

	MEMORY	
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**	**Classes: 08**
File System Interface and Operations -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.		

TEXT BOOKS

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

REFERENCE BOOKS

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

WEB REFERENCES

1. Operating System Principles by Silberschatz, Galvin, Gagne
2. Operating Systems: Internals and Design Principles, 7e by Stallings

E -TEXT BOOKS

1. http://www.freebookcentre.net/ComputerScience-Books-Download/Operating-Systems-and-Middleware-Supporting-Controlled-Interaction.html
2. http://www.freebookcentre.net/ComputerScience-Books-Download/Operating-System-by-Gopi-Sanghani.html

MOOCS COURSES

1. https://www.mooc-list.com/tags/os
2. https://nptel.ac.in/courses/106106144/2

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DEPARTMENT OF COMPUTR SCIENCE AND DESIGN

DATABASE MANAGEMENT SYSTEMS

II B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS405PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. To understand the basic concepts and the applications of database systems.
2. To master the basics of SQL and construct queries using SQL.
3. 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 AND INTRODUCTION TO DATABASE DESIGN	Classes: 13

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	Classes: 12

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 AND SCHEMA REFINEMENT	Classes: 12

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**	**Classes: 12**
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**	**Classes: 12**
Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree based Indexing, Comparison of File Organizations, Indexes- Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.		

TEXT BOOKS

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

REFERENCE BOOKS

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

WEB REFERENCES

1. http://www.freebookcentre.net/Database/Free-Database-Systems-Books-Download.html
2. https://www.gatevidyalay.com/transaction-states-in-dbms/

E -TEXT BOOKS

1. http://www.ebooks-for-all.com/bookmarks/detail/Database-Management-Systems/onecat/0.html.
2. http://freecomputerbooks.com/dbSystemsBooks.html

MOOCS COURSES

1. https://swayam.gov.in/nd2_cec19_cs05/preview
2. https://swayam.gov.in/nd2_nou19_lb03/preview

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DEPARTMENT OF COMPUTR SCIENCE AND DESIGN

SOFTWARE ENGINEERING

II B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS403PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

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

UNIT-I	INTRODUCTION TO SOFTWARE ENGINEERING	Classes: 08

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

UNIT-II	SOFTWARE REQUIREMENTS	Classes: 08

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

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

UNIT-III	DESIGN ENGINEERING	Classes: 08

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

UNIT-IV	TESTING STRATEGIES	Classes: 08

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.

Metrics for Process and Products: Software measurement, metrics for software quality.

UNIT-V	RISK MANAGEMENT	Classes: 08

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

TEXT BOOKS

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

REFERENCE BOOKS

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

WEB REFERENCES

1. http://www.developer.com/icom_includes/feeds/developer/dev-25.xml
2. http://www.ibm.com/developerworks/views/java/rss/libraryview.jsp
3. http://www.javaworld.com/rss/index.html
4. http://feeds.feedburner.com/DevxLatestJavaArticles

E -TEXT BOOKS

1. HTTP Programming Recipes for Java Bots by Jeff Heaton - Heaton Research, Inc.
2. Java Distributed Computing by Jim Farley - O'Reilly Media
3. Java Precisely by Peter Sestoft - IT University of Copenhagen
4. Java for Absolute Beginners: Learn to Program the Fundamentals the Java 9+ Way
5. Fundamentals of the Java Programming Language, Java SE 6
6. JAVA: Easy Java Programming for Beginners, Your Step-By-Step Guide to
7. Learning Java Programming
8. Android App Development in Android Studio: Java+Android Edition for Beginners

MOOCS COURSES

1. https://www.mooc-list.com › tags › java-programming
2. https://www.mooc-list.com › tags › java
3. https://www.edx.org › learn › java

4. https://www.quora.com › What-are-the-best-MOOCs-for-learning-Java
5. https://www.udacity.com › course › java-programming-basics--ud282
6. https://www.futurelearn.com › courses › begin-programming.

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

OPERATING SYSTEMS LAB

II B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS406PC	B. Tech	0	0	2	1	40	60	100

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, inter process 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. Write C programs to simulate the following CPU Scheduling algorithms a) FCFS b) SJF c) Round Robin d) priority
2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close, fcntl, seek, stat, opendir, readdir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.
5. Write C programs to illustrate the following IPC mechanisms a) Pipes b) FIFOs c) Message Queues d) Shared Memory
6. Write C programs to simulate the following memory management techniques a) Paging b) Segmentation
7. Write C programs to simulate Page replacement policies a) FCFS b) LRU c) Optimal.

TEXT BOOKS

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

REFERENCE BOOKS

1. Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition–

2005, Pearson Education/PHI

2. Operating System - A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum, 2nd edition, Pearson/PHI
4. UNIX Programming Environment, Kernighan and Pike, PHI/Pearson Education
5. UNIX Internals: The New Frontiers, U. Vahalia, Pearson Education

WEB REFERENCES

1. "TestFrame: An Approach to Structured Testing" by Chris C Schotanus
2. "Logistic Core Operations with SAP: Inventory Management, Warehousing, Transportation, and Compliance" by Jens Kappauf and Bernd Lauterbach
3. "Supply Chain Management Based on SAP Systems: Order Management in Manufacturing Companies (SAP Excellence)" by Gerhard F Knolmayer and Peter Mertens

E -TEXT BOOKS

1. Operating System: From 0 to 1 by Tu, Do Hoang - Github , 2017
2. Operating Systems Tata McGraw-Hill E
3. Introducing Windows 8: An Overview for IT Professionals by Jerry Honeycutt - Microsoft Press , 2012 education, 1997
4. Microsoft Windows Server System Deployment Guide for Midsize Businesses - Microsoft Press , 2005

MOOCS COURSES

1. https://www.classcentral.com › tag › operating-systems
2. https://www.my-mooc.com › mooc › introduction-to-operating-systems--u.
3. https://www.computersciencezone.org › computer-science-education-free-.
4. https://www.classcentral.com › tag › operating-systems.

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DEPARTMENT OF COMPUTR SCIENCE AND DESIGN

DATABASE MANAGEMENT SYSTEMS LAB

II B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS407PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

1. Design database schema for a given application and apply normalization
2. Acquire skills in using SQL commands for data definition and data manipulation.
3. Develop solutions for database applications using procedures, cursors and triggers

LIST OF EXPERIMENTS

1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. A. Querying (using ANY, ALL, UNION, INTERSECT, JOIN, Constraints etc.)
   B. Nested, Correlated subqueries
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors

TEXT BOOKS

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, 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.

WEB REFERENCES

1. https://swayam.gov.in/nd1_noc19_cs41/preview
2. https://swayam.gov.in/nd1_noc19_mg47/preview
3. https://swayam.gov.in/nd1_noc19_cs40/preview

E -TEXT BOOKS

1. https://www.tutorialspoint.com/dbms/
2. https://www.youtube.com/watch?v=Dl_dz1FOvcY&list=PLHT9VxUGxZRshJ-edzjLZ72HfSta8s5f

MOOCS COURSES

1. https://www.coursera.org/learn/dbms/
2. https://www.edx.org/ dbms/

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DEPARTMENT OF COMPUTR SCIENCE AND DESIGN

NODE JS/ REACT JS/ DJANGO

II B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS411PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To learn

1. To implement the static web pages using HTML and do client side validation using JavaScript.
2. To design and work with databases using Java
3. To develop an end to end application using java full stack.
4. To introduce Node JS implementation for server side programming.
5. To experiment with single page application development using React.

COURSE OUTCOMES

At the end of the course, the student will be able to,

1. Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.
2. Demonstrate Advanced features of JavaScript and learn about JDBC
3. Develop Server – side implementation using Java technologies like
4. Develop the server – side implementation using Node JS.
5. Design a Single Page Application using React.

Exercises:

1. Build a responsive web application for shopping cart with registration, login, catalog and cart pages using CSS3 features, flex and grid.
2. Make the above web application responsive web application using Bootstrap framework.
3. Use JavaScript for doing client – side validation of the pages implemented in experiment 1 and experiment 2.
4. Explore the features of ES6 like arrow functions, callbacks, promises, async/await. Implement an application for reading the weather information from openweathermap.org and display the information in the form of a graph on the web page.
5. Develop a java stand alone application that connects with the database (Oracle / mySql) and perform the CRUD operation on the database tables.
6. Create an xml for the bookstore. Validate the same using both DTD and XSD.
7. Design a controller with servlet that provides the interaction with application developed in experiment 1 and the database created in experiment 5.
8. Maintaining the transactional history of any user is very important. Explore the various session tracking mechanism (Cookies, HTTP Session)
9. Create a custom server using http module and explore the other modules of Node JS like OS, path, event.
10. Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman)
11. For the above application create authorized end points using JWT (JSON Web Token).

12. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.
13. Create a service in react that fetches the weather information from openweathermap.org and the display the current and historical weather information using graphical representation using chart.js
14. Create a TODO application in react with necessary components and deploy it into github.

TEXT BOOKS

1. William S. Vincent, Django for Beginners, 2nd Edition, A Press 2021

REFERENCE BOOKS

1. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Wrox Publications, 2010
2. Bryan Basham, Kathy Sierra and Bert Bates, Head First Servlets and JSP, O'Reilly Media, 2nd Edition, 2008.
3. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, A Press.

WEB REFERENCES

1. https://www.w3schools.com/nodejs/
2. https://www.tutorialspoint.com/nodejs/index.htm

E -TEXT BOOKS

1. https://ict.iitk.ac.in/node-js-books/
2. https://www.digitalocean.com/community/books/how-to-code-in-node-js-ebook
3. https://medium.com/javarevisited/5-best-react-js-books-for-beginners-and-experienced-web-developers-e7b90b1ab9d2
4. https://hackr.io/blog/django-books

MOOCS COURSES

1. https://www.coursera.org/lecture/django-database-web-apps/why-django-wGSVs
2. https://www.youtube.com/watch?v=rHux0gMZ3Eg
3. https://www.youtube.com/watch?v=nTeuhbP7wdE

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DEPARTMENT OF COMPUTR SCIENCE AND DESIGN

CONSTITUTION OF INDIA

II B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
*CI409MC	B. Tech	3	0	0	0	100	-	100

COURSE OBJECTIVES

Students will be able to:

1. Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
2. To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
3. To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

COURSE OUTCOMES

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 and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution
4. Discuss the passage of the Hindu Code Bill of 1956.

UNIT-I		Classes: 08

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

UNIT-II		Classes: 08

Philosophy of the Indian Constitution- Preamble Salient Features

UNIT-III		Classes: 08

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-IV	ORGANS OF GOVERNANCE	Classes: 08

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-V	LOCAL ADMINISTRATION	Classes: 08

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

Unit - VI	ELECTION COMMISSION	Classes: 08

Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

TEXT BOOKS

1. H.M. Seervai: Constitutional Law of India
2. M.P. Jain: Indian Constitutional Law
3. Mahendra P. Singh: V. N. Shukla's Constitution of India
4. Granville Austin: The Indian Constitution: Cornerstone of a Nation

REFERENCE BOOKS

1. A. Sarveswarareddy, K. Sathish, K. Sudha, Constitution of India, M/S Spectrum Publications, First Edition 2021.
2. An Introduction to the Constitution of India by Dr.Durga Das Basu
3. An Introduction to the Constitution of India by M.V.Pylee
4. Indian Constitutional Law by M.P. Jain

WEB REFERENCES

1. https://www.wdl.org/en/item/2672/
2. https://nptel.ac.in/courses/109103135/24

E -TEXT BOOKS

1. https://iasexamportal.com/ebook/the-constitution-of-india
2. https://www.india.gov.in/my-government/documents/e-books

MOOCS COURSES

1. http://nludelhi.ac.in/images/moocs/moocs-courses.pdf
2. https://www.classcentral.com/tag/constitutional-law

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DEPARTMENT OF COMPUTR SCIENCE AND DESIGN

DESIGN THINKING

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/ Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG501PC	B. Tech	3	0	0	4	40	60	100

COURSE OBJECTIVES

1To inculcate core design principles and applied creativity to develop innovative strategies that better connect engineers with their end users
2 To build mindset leading to flow of creative ideas, validating those ideas and prioritizing the best ones
3 To incorporate tools that designers need to take a design project from inspiration and insights to ideation and implementation
4 To instill full scope of organizational innovation and strategy through knowledge, insight and analytical skills

COURSE OUTCOMES

Upon successful completion of the course, the student is able to

1. Use design thinking and hypothesis-driven innovation processes to develop viable solutions to user challenges
2. Use multiple brainstorming techniques to find innovative solutions
3. Develop and test a business model or business case to support the viability of the solution
4. Prototype a solution to a user challenge
5. Investigate the cultural, emotional, technological and business factors relevant to developing new product or service design concept

UNIT-I	Introduction to Design Thinking	CLASS 12

Introduction to Design Thinking: Design Thinking: Features - Principles of Design Thinking- Creating Ideal Conditions- Need of Design in Engineering; The 7 Steps of the Engineering Design thinking Process- Define, Ask, Imagine, Plan, Prototype, Test, Improve.
Creative thinking as basis of innovation; Empathy process for deep understanding of challenge with practical ingenuity; Making sense of observations and insights

UNIT-II	Ideation Process	CLASS :12

Clear Articulation of problem statement with focus on latent needs; Brainstorming potential solutions;

Ideation methods with case-study based approach to using Systematic Inventive Thinking (SIT)

Methods such as Addition, Subtraction, Multiplication, Division and Task Unification
Strategic Innovation for competition in future: Linear Innovation vs. non-linear innovation, Understanding and identifying weak signals, 3-box thinking, 3-Box framework and Box-3 ideation

UNIT-III	Designing Customer Experience	CLASS :12

Understanding Innovation through Design Thinking; Use of Diagrams and Maps in Design Thinking – Empathy map. Affinity diagram, mind map, journey map, combining ideas into complex innovation concepts.

Enhancing Customer Experience; Service Design and Development Process, Service Experience Cycle and Case Studies

UNIT-IV	Sustainable Design Approaches	CLASS: 12

Concern for Environment and Sustainability in Design, Case Studies to understand good Design for Environment (DFE) Decisions; Design Considerations in the five stages of the Product Life Cycle.

UNIT-V	Integrative Engineering Design Solutions	CLASS :12

Identifying and resolving issues with working in diverse teams, Modularising, prototype building by different engineering disciplines within the team, validated learning with accessible metrics Capstone Project (Interdisciplinary)

Applying Design Thinking Principles and Methods for Ideation and Prototyping, Testing Solution, Refining Solution, and Taking the Solution to the Users.

TEXT BOOKS

1. 101 Design Methods: A Structured Approach for Driving Innovation in Your Organization, Vijay Kumar, John Wiley & Sons, ISBN: 978-1118083468, 2012
2. Living with Complexity, Donald A Norman, MIT Press, ISBN: 978-0262528948, 2016
3. Design Thinking for Entrepreneurs and Small Businesses: Putting the Power of Design to Work,
Beverly Rudkin Ingle, A Press, ISBN: 978-1430261810, 2013

REFERENCE BOOKS

1 Emotionally Durable Design: Objects, Experiences and Empathy, Jonathan Chapman, 2nd Edition, Routledge, ISBN: 978-0415732161, 2015
2. Innovation Design: How Any Organization Can Leverage Design Thinking to Produce Change, Drive New Ideas, and Deliver Meaningful Solutions, Thomas Lockwood, Edgar Papke, New Page Books, ISBN: 978-1632651167, 2017
3. Design Thinking Business Analysis: Business Concept Mapping Applied, Thomas Frisendal, Springer, ISBN: 978-3642434822, 2012
4. Chapter 1: A Simple Framework for Leading Innovation, The Three Box Solution, HBR Press, 2016
5. Design a Better Business: New Tools, Skills and Mindset for Strategy and Innovation, Patrick Van Der Pijl, Justin Lokitz, Lisa Kay Solomon, Erik van der Pluijm, Maarten van Lieshout, Wiley, ISBN: 978-8126565085,2016

WEB REFERENCES

1. http://www.tutorial .com/icom_ includes/feeds/developer/dev-25.xml

E -TEXT BOOKS

1. eBook for Design Thinking: A framework for applying Design Thinking in Problem Solving

MOOCS COURSES

1. https://www.mooc-list.com › tags › design thinking

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COMPUTER NETWORKS

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS502PC	B. Tech	3	0	0	3	40	60	100

PREREQUISITES:

1. A course on Programming for problem solving
2. A course on Data Structures

COURSE OBJECTIVES

Students will be able to:

1. The objective of the course is to equip the students with a general overview of the concepts and fundamentals of computer networks.
2. Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers

COURSE OUTCOMES

Students will be able to:

1. Gain the knowledge of the basic computer network technology.
2. Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
3. Obtain the skills of submitting and routing mechanisms.
4. Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.

UNIT-I	INTRODUCTION	CLASS:12

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. Data link layer: Design issues, framing, Error detection and correction.

UNIT-II	PROTOCOLS	CLASS:12

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	CLASS:12

Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of

Service, Internet working, The Network layer in the internet.		
UNIT-IV	**TRANSPORT LAYER**	**CLASS :12**
Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.		
UNIT-V	**APPLICATION LAYER**	**CLASS:12**
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. Dr. P. Santosh Kumar Patra, Dr. N. Satheesh, Computer Networks, M/S Spectrum Techno Press, First Edition, 2022
2. An Engineering Approach to Computer Networks-.Keshav, 2nd Edition, Pearson Education
3. Data Communications and Networking–Behrouz A. Forouzan. Third Edition TMH.

WEB REFERENCES

1. https://www.geeksforgeeks.org/what-is-Computer-Networks/
2. https://searchsecurity.techtarget.com/definition/Computer-Networksinfosec
3. https://www.cisco.com/

E -TEXT BOOKS

1. http://study-ccna.com
2. https://open.umn.edu/opentextbooks/textbooks/353
3. https://www.amazon.in/Computer-Networks-Systems-Approach-ISSN-ebook/dp/B08VGJQ36L
4. https://intronetworks.cs.luc.edu/

MOOCS COURSES

1. https://nptel.ac.in/courses/106105081/
2. https://www.geeksforgeeks.org/computernetwork-routing-protocols-set-1-distancevector/
3. https://www.tutorialspoint.com/errorcontrol-in-data-link-layer

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COMPUTER GRAPHICS

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG503PC	B. Tech	3	0	0	3	40	60	100

PREREQUISITES:

1.A course on Programming for problem solving
2 A course on Data Structures

COURSE OBJECTIVES

Students will be able to:

1. Provide the basics of graphics systems including Points and lines, line drawing algorithms, 2D, 3D objective transformations.

COURSE OUTCOMES

Students will be able to:

1. Explore applications of computer graphics
2. Understand 2D, 3D geometric transformations and clipping algorithms
3. Understand 3D object representations, curves, surfaces, polygon rendering methods, color models
4. Analyze animation sequence and visible surface detection methods.

UNIT-I	INTRODUCTION	CLASS:12

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random-scan systems, graphics monitors and work stations and input devices

Output primitives: Points and lines, line drawing algorithms (DDA and Bresenham's Algorithm) circle generating algorithms and ellipse - generating algorithms

Polygon Filling: Scan-line algorithm, boundary-fill and flood-fill algorithms

UNIT-II	2-D geometric transformations	CLASS :12

2-D geometric transformations: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems

2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, clipping operations, point clipping, Line clipping-Cohen Sutherland algorithms, Polygon clipping-Sutherland Hodgeman polygon clipping algorithm..

UNIT-III	3-D object representation	CLASS:12

3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces, Polygon rendering methods, color models and color applications..

UNIT-IV	3-D Geometric transformations	CLASS:12

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D viewing: Viewing pipeline, viewing coordinates, projections, view volume and general projection transforms and clipping**.**

UNIT-V	Computer animation:	CLASS:12

Computer animation: Design of animation sequence, general computer animation functions, raster animations, computer animation languages, key frame systems, motion specifications.
Visible surface detection methods: Classification, back-face detection, depth-buffer method, BSP-tree method, area sub-division method and octree method.

TEXT BOOKS

1. "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson Education

REFERENCE BOOKS

1. Dr. P. Santosh Kumar Patra, Dr. N. KRISHNIAN COMPUTER GRAPHICS , M/S Spectrum Techno Press, First Edition, 2022
2. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
3. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
4. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
5 "Computer Graphics Principles & practice", second edition in C, Foley, Van Dam, Feiner and Hughes, Pearson Education.
Computer Graphics, Steven Harrington, TMH.

WEB REFERENCES

1. https://www.geeksforgeeks.org/what-is-Computer-Graphicss/
2. https://searchsecurity.techtarget.com/definition/Computer-graphicssinfosec
3. https://www.cisco.com/

E -TEXT BOOKS

https://www.oreilly.com/library/view/computer-graphics/9781482215571/

MOOCS COURSES

1. https://nptel.ac.in/courses/106105081/
2. https://www.geeksforgeeks.org/computergrahics-routing-protocols-set-1-distancevector/
3. https://www.tutorialspoint.com/computegraphics

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

QUANTUM COMPUTING

(PROFESSIONAL ELECTIVE I)

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/ Week	Credits			Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG511PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

Students will be able to:

1. Introduce the fundamentals of quantum computing
2. The problem-solving approach using finite dimensional mathematics

COURSE OUTCOMES

Students will be able to:

1. Understand basics of quantum computing
2. Understand physical implementation of Qubit
3. Understand Quantum algorithms and their implementation
4. Understand The Impact of Quantum Computing on Cryptography

UNIT-I	HISTORY OF QUANTUM COMPUTING	CLASS:12

History of Quantum Computing: Importance of Mathematics, Physics and Biology. Introduction to Quantum Computing: Bits Vs Qubits, Classical Vs Quantum logical operations

UNIT-II	BACKGROUND MATHEMATICS	CLASS:12

Background Mathematics: Basics of Linear Algebra, Hilbert space, Probabilities and measurements. Background Physics: Paul's exclusion Principle, Superposition, Entanglement and super-symmetry, density operators and correlation, basics of quantum mechanics, Measurements in bases other than computational basis. Background Biology: Basic concepts of Genomics and Proteomics (Central Dogma)

UNIT-III	QUBIT & QUANTUM CIRCUITS	CLASS:12

Qubit: Physical implementations of Qubit. Qubit as a quantum unit of information. The Bloch sphere, Quantum Circuits: single qubit gates, multiple qubit gates, designing the quantum circuits. Bell states

UNIT-IV	QUANTUM ALGORITHMS	CLASS:12

Quantum Algorithms: Classical computation on quantum computers. Relationship between quantum and classical complexity classes. Deutsch's algorithm, Deutsch's-Jozsa algorithm, Shor's factorization algorithm, Grover's search algorithm.

UNIT-V	NOISE AND ERROR CORRECTION	CLASS:12

Noise and error correction: Graph states and codes, Quantum error correction, fault-tolerant computation. Quantum Information and Cryptography: Comparison between classical and quantum information theory. Quantum Cryptography, Quantum teleportation

TEXT BOOKS

1. Nielsen M. A., Quantum Computation and Quantum Information, Cambridge

REFERENCE BOOKS

1. Quantum Computing for Computer Scientists by Noson S. Yanofsky and Mirco A. Mannucci
2. Benenti G., Casati G. and Strini G., Principles of Quantum Computation and Information, Vol.I: Basic Concepts, Vol II
3. Basic Tools and Special Topics, World Scientific. Pittenger A. O., An Introduction to Quantum Computing Algorithms

WEB REFERENCES

1. https://www.w3school.com/ Theory Of Quantum Computation/
2. https://www.tutorialspoint.com/ Quantum Computing/
3. https://www.javatpoint.com/Introduction to Quantum Computing/

E -TEXT BOOKS

1. Wim Van Dam, Theory Of Quantum Computation, Communication And Cryptography, First Edition, 2020.
2. Ray LaPierre, Introduction to Quantum Computing, Springer Cham, First Edition, 2021.

MOOCS COURSES

1. https://www.mooc-list.com/tags/quantum-computing
2. https://www.edx.org/learn/quantum-computing

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DESIGN INTERACTIVE SYSTEMS

(PROFESSIONAL ELECTIVE I)

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week	Credits		Maximum Marks			
		L	T	P	C	CIE	SEE	Total
CSG512PE	B. Tech	3	0	0	3	40	60	100

Pre-requisites:

Basic Understanding of Human-Computer Interaction methodology and GUI styles

COURSE OBJECTIVES

Students will be able to:

1. To focus on creating interfaces, systems and analyze the devices revolving around user behaviour, explore the interaction design process and the tools used for principles of interactive systems.

COURSE OUTCOMES

Students will be able to:

1. Understand the devices revolving around user behaviour
2. List the interaction of design process and the devices
3. Understand the creation of interfaces and systems
4. Recognize the designers work and the tools they use for interaction design

UNIT-I	Usability of Interactive Systems	CLASS :12

Usability of Interactive Systems: Introduction, Usability Requirements, Usability Measures, Universal Usability, Goals for our Profession

Guidelines, Principles and Theories: Introduction, Guidelines, Principles, Theories, Object-Action Interface Model

UNIT-II	Managing Design Processes	CLASS:12

Managing Design Processes: Introduction, Organizational Design to Support Usability, The Three Pillars of Design, Development Methodologies, Ethnographic Observation, Participatory Design, Scenario Development, Social Impact Statement for Early Design Review, Legal Issues

Evaluating Interface Designs: Introduction, Expert Reviews, Usability Testing and Laboratories, Survey Instruments, Acceptance Tests, Evaluation During Active Use, Controlled Psychologically Oriented Experiments

Software Tools: Introduction, Specification Methods, Interface-Building Tools, Evaluation and Critiquing Tools

UNIT-III	Direct Manipulation and Virtual Environments	CLASS:12

Direct Manipulation and Virtual Environments: Introduction, Examples of Direct Manipulation, Discussion of Direct Manipulation, 3D interfaces, Tele-operation, Virtual and Augmented Reality

Menu Selection, Form Filling, and Dialog Boxes: Introduction, Task-Related Menu Organization, Single Menus, Combinations of Multiple Menus, Content Organization, Fast Movement Through Menus, Data Entry with Menus, Audio Menus and Menus for Small Displays

Command and Natural Languages: Introduction, Functionality to Support Users' Tasks, Command-Organization Strategies, The Benefits of Structure, Naming and Abbreviations, Natural Language in Computing

UNIT-IV	Interaction Devices	CLASS:12

Interaction Devices: Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory Interfaces, Displays-Small and Large, Printers
Collaboration: Introduction, Goals of Collaboration, Asynchronous Distributed Interfaces, Synchronous Distributed Interfaces, Face-to-Face Interfaces
Quality of Service: Introduction, Models of Response-Time Impacts, Expectations and Attitudes, User Productivity, Variability in Response Time, Frustrating Experiences.

UNIT-V	Balancing Function and Fashion	CLASS:12

Balancing Function and Fashion: Introduction, Error Messages, Non-anthropomorphic Design, Display Design, Window Design, Color
User Manuals, Online Help, and Tutorials: Introduction, Paper versus Online Manuals, Reading from Paper Versus from Displays, Shaping the Content of the Manuals, Online Manuals and Help, Online Tutorials, Demonstrations, and Guides, Online Communities for User Assistance, The Development Process
Information Search and Visualization: Introduction, Search in Textual Documents and Database Querying, Multimedia Document Searches, Advanced Filtering and Search Interfaces, Information Visualization

TEXT BOOKS

1 Ben Shneiderman, " Designing the User Interface", Fourth Edition, Addison-Wesley, 2010

REFERENCE BOOKS

1. Barfied, Lon, "The User Interface: Concepts and Design", Addison – Wesley.
2. Wilbert O. Galiz, "The Essential guide to User Interface Design", Wiley Dreamtech.
3. Jacob Nielsen, "Usability Engineering", Academic Press.
4. Alan Dix et al, "Human - Computer Interaction", Prentice Hall, 2012

WEB REFERENCES

1. https://www.w3school.com/ Design interactive system/
2. https://www.tutorialspoint.com/ Design interactive system/

E -TEXT BOOKS

https://www.booksfree.org/designing-interactive-systems-by-david-benyon-pdf-free-download/.

MOOCS COURSES

1. https://www.mooc-list.com/tags/designinteractivesytem
2. https://www.edx.org/learn/designinteractivesystem

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DATA ANALYTICS

(PROFESSIONAL ELECTIVE I)

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG513PE	B. Tech	3	0	0	3	40	60	100

Prerequisites

1. A course on Database Management Systems.
2. Knowledge of probability and statistics.

COURSE OBJECTIVES

Students will be able to:

1. To explore the fundamental concepts of data analytics.
2. To learn the principles and methods of statistical analysis
3. Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.
4. To understand the various search methods and visualization techniques.

COURSE OUTCOMES

Students will be able to:

1. Understand the impact of data analytics for business decisions and strategy
2. Carry out data analysis/statistical analysis
3. To carry out standard data visualization and formal inference procedures
4. Design Data Architecture
5. Understand various Data Sources

UNIT-I	DATA MANAGEMENT	CLASS;12

Data Management: Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/Signals/GPS etc. Data Management, Data Quality(noise, outliers, missing values, duplicate data) and Data Processing & Processing

UNIT-II	DATA ANALYTICS	CLASS:12

Data Analytics: Introduction to Analytics, Introduction to Tools and Environment, Application of Modeling in Business, Databases & Types of Data and Variables, Data Modelling Techniques, Missing Imputations etc. Need for Business Modelling.

UNIT-III	REGRESSION	CLASS:12

Regression – Concepts, Blue property assumptions, Least Square Estimation, Variable

Rationalization and Model Building etc.

Logistic Regression: Model Theory, Model fit Statistics, Model Construction, Analytics applications to various Business Domains etc.

UNIT-IV	OBJECT SEGMENTATION	CLASS:12

Object Segmentation: Regression Vs Segmentation – Supervised and Unsupervised Learning, Tree Building – Regression, Classification, Overfitting, Pruning and Complexity, Multiple Decision Trees etc.

Time Series Methods: Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average Energy etc and Analyze for prediction.

UNIT-V	DATA VISUALIZATION	CLASS:12

Data Visualization: Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations.

TEXT BOOKS

1. Student's Handbook for Associate Analytics – II, III.

2. Data Mining Concepts and Techniques, Han, Kamber, 3rd Edition, Morgan Kaufmann Publishers.

REFERENCE BOOKS

1. Dr P. Santosh Kumar Patra , Dr Govinda Rajulu. Dr. B. Rajalingam Data Analytics MS Specturum
2 Introduction to Data Mining, Tan, Steinbach and Kumar, Addision Wisley, 2006.
2. Data Mining Analysis and Concepts, M. Zaki and W. Meira
3. Mining of Massive Datasets, Jure Leskovec Stanford Univ. Anand Rajaraman Milliway Labs Jeffrey D Ullman Stanford Univ.

WEB REFERENCES

1. https://www.ncertbooks.guru/big-data-analytics/
2. https://www.mastersindatascience.org/learning/what-is-data-analytics/
3. https://nptel.ac.in/noc/courses/noc17/SEM2/noc17-mg24/

E -TEXT BOOKS

1. https://www.datapine.com/blog/best-big-data-and-data-analytics-books/
2. https://files.eric.ed.gov/fulltext/ED536788.pdf

MOOCS COURSES

1. https://www.mooc-list.com/tags/data-analytics
2. https://www.mooc-course.com/subject/data-science/data-analysis/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

IMAGE PROCESSING

(PROFESSIONAL ELECTIVE I)

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG514PE	B. Tech	3	0	0	3	40	60	100

PREREQUISITES

1. Students are expected to have knowledge in linear signals and systems, Fourier Transform, basic linear algebra, basic probability theory and basic programming techniques; knowledge of digital signal processing is desirable.
2. A course on Computational Mathematics
3. A course on Computer Oriented Statistical Methods

COURSE OBJECTIVES

Students will be able to:

1. Provide a theoretical and mathematical foundation of fundamental Digital Image Processing concepts.
2. The topics include image acquisition; sampling and quantization; pre-processing; enhancement; restoration; segmentation; and compression.

COURSE OUTCOMES

Students will be able to:

1. Demonstrate the knowledge of the basic concepts of two-dimensional signal acquisition, Sampling, and quantization.
2. Demonstrate the knowledge of filtering techniques.
3. Demonstrate the knowledge of 2D transformation techniques.
4. Demonstrate the knowledge of image enhancement, segmentation, restoration and compression techniques.

UNIT-I	DIGITAL IMAGE FUNDAMENTALS	CLASS :12

Digital Image Fundamentals: Digital Image through Scanner, Digital Camera. Concept of Gray Levels. Gray Level to Binary Image Conversion. Sampling and Quantization. Relationship between Pixels. Imaging Geometry. 2D Transformations-DFT, DCT, KLT and SVD.

UNIT-II	IMAGE ENHANCEMENT	CLASS:12

Image Enhancement in Spatial Domain Point Processing, Histogram Processing, Spatial Filtering, Enhancement in Frequency Domain, Image Smoothing, Image Sharpening.		
UNIT-III	**IMAGE RESTORATION**	**CLASS:12**
Image Restoration Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.		
UNIT-IV	**IMAGE SEGMENTATION**	**CLASS:12**
Image Segmentation Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region Oriented Segmentation.		
UNIT-V	**IMAGE COMPRESSION**	**CLASS:12**
Image Compression Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Source Encoder and Decoder, Error Free Compression, Lossy Compression.		

TEXT BOOKS

1. Digital Image Processing: R.C. Gonzalez & R. E. Woods, Addison Wesley/ Pearson Education,2nd Edition, 2004.

REFERENCE BOOKS

1. Fundamentals of Digital Image Processing: A. K. Jain, PHI.
2. Digital Image Processing using MAT LAB: Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins: Pearson Education India, 2004.
3. Digital Image Processing: William K. Pratt, John Wiley, 3rd Edition, 2004

WEB REFERENCES

1. https://www.ijert.org/image-processing-using-web-2-0-2
2. https://iopscience.iop.org/article/10.1088/1742-6596/1087/5/052024/pdf
3. https://en.wikipedia.org/wiki/Digital_image_processing

E -TEXT BOOKS

1. http://sdeuoc.ac.in/sites/default/files/sde_videos/Digital%20Image%20Processing%203r
2. https://sisu.ut.ee/imageprocessing/book/1

MOOCS COURSES

1. http://nptel.ac.in/
2. https://www.coursera.org2/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

SYSTEMS MANAGEMENT

(PROFESSIONAL ELECTIVE I)

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG515PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

Students will be able to:

1 Knowledge on concepts of systems management.

COURSE OUTCOMES

Students will be able to:

1. Understand the need of executive support and organizing for systems management
2. Analyse requirements of good customer service and ITIL Processes
3. Illustrate desired traits and measuring traits of availability
4. Identify various preferred characteristics of performance and tuning.
5. Demonstrate the appropriate approach for change management

UNIT-I	Acquiring Executive Support	CLASS:10

Acquiring Executive Support: Introduction, Systems Management: A Proposed Definition, Executive Support in today's environment, Building a Business Case for Systems Management, Educating Executives on the Value of Systems Management. Organizing for Systems Management - Introduction, Factors to Consider in Designing IT Organizations, Factors to Consider in Designing IT Infrastructures

UNIT-II	Customer Service	CLASS:12

Customer Service: Introduction, How IT Evolved into a Service Organization, The Four Key Elements of Good Customer Service, Integrating the Four Key Elements of Good Customer Service, The Four Cardinal Sins that Undermine Good Customer Service. Comparison to ITIL Processes - Introduction, Developments Leading Up To ITIL, IT Service Management, The Origins of ITIL, Quality Approach and Standards, Criteria to Differentiate Infrastructure Processes, Comparison of Infrastructure Processes, Ten Common Myths Concerning the Implementation of ITIL**.**

UNIT-III	Availability	CLASS:14

Availability: Introduction, Definition of Availability, Differentiating Availability from Uptime, Differentiating Slow, Response from Downtime, Differentiating Availability from High Availability, Desired Traits of an Availability Process Owner, Methods for Measuring Availability, The Seven Rs of High Availability, Assessing an Infrastructure's Availability Process, Measuring and Streamlining the Availability Process**.**

UNIT-IV	Performance and Tuning	CLASS:12

Performance and Tuning: Introduction, Differences between the Performance and Tuning Process and Other Infrastructure Processes, Definition of Performance and Tuning, Preferred Characteristics of a Performance and Tuning Process Owner, Performance and Tuning Applied to the Five Major Resource Environments, Server Environment, Disk Storage Environment, Database Environment, Network Environment, Desktop Computer Environment, Assessing an Infrastructure's Performance and Tuning Process, Measuring and

Streamlining the Performance and Tuning Process		
UNIT-V	**Change Management**	**CLASS:12**
Change Management: Introduction, Definition of Change Management, Drawbacks of Most Change Management Processes, Key Steps Required in Developing a Change Management Process, Emergency Changes Metric, Assessing an Infrastructure's Change Management Process, Measuring and Streamlining the Change Management Process		

TEXT BOOKS

1. Rich Schiesser, IT Systems Management, 2nd edition, Pearson Education, 2017

REFERENCE BOOKS

1Murdick, Robert G, Information Systems for Modern Management, 3rd edition, Prentice Hall India Learning Private Limited.
2. Suman Mann Seema Shokeen, Pooja Singh, Information Systems Management, Wiley Publications

WEB REFERENCES

1. https://www.ijert.org/systemmanagement-using-web-2-0-2

E -TEXT BOOKS

https://www.everand.com/book/486485998/Fundamentals-of-Systems-Management

MOOCS COURSES

1. http://nptel.ac.in/
2. https://www.coursera.org2/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DESIGN PROCESS AND PRACTICES

(PROFESSIONAL ELECTIVE II)

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG521PE	B. Tech	3	0	0	3	40	60	100

Pre-Requisites:
1. Software Engineering
2. Software design methodologies
3. Object Oriented Analysis and Design

COURSE OBJECTIVES

Students will be able to:
1. Design a software using appropriate design process to achieve modularity, maintainability and Quality performance.

COURSE OUTCOMES

Students will be able to:
1. Understand the various software design processes.
2. Identify the need for transforming design knowledge
3. Describe the design process with design methods and design patterns.
4. Analyze the various design practices or processes for a successful product development

UNIT-I	The Software Design Process	CLASS:12

The Software Design Process: definition-design, The role of the design activity, Design as a problem solving process, building models, transferring design knowledge, Constraints upon the design process and product, recording design decisions, A context for design, Linear development processes, Incremental development processes, Economic factors, Assessing design quality, Quality attributes of the design product

UNIT-II	Transferring Design Knowledge	CLASS:12

Transferring Design Knowledge: Representing abstract ideas, Design viewpoints for software, Forms of notation, The need to share knowledge, The architecture concept, Design methods, Design patterns, A problem of selection, Black box notations, White box notations, Developing a diagram

UNIT-III	Software Design Method:	CLASS:12

Software Design Method: software design method, The support that design methods provide, Limitations of methods, Problem domains and their influence, The role of strategy in methods, Describing the design process – the D-Matrix, Design by top-down decomposition, Design by composition, Organizational influences upon design, Design by template and design reuse, The design pattern, Designing with patterns

UNIT-IV	Design Practices-I:	CLASS:14

Design Practices-I: Stepwise Refinement- The role of stepwise refinement, Architectural consequences, Strengths and weaknesses of the stepwise strategy. Incremental Design- Black box to white box in stages, Prototyping, An example – DSDM, Structured Systems Analysis and Structured Design- Representation forms for SSA/SD, The SSA/SD process, The role of heuristics in SSA/SD, SSA/SD: an outline example..

UNIT-V	Design Practices - II:	CLASS:10

Design Practices - II: Jackson Structured Programming- Introduction to JSP, JSP representation forms, The JSP process, Some JSP heuristics. Jackson System Development- The JSD model, JSD representation forms, The JSD process, JSD heuristics. Designing with Objects- The 'object concept', Object-Oriented frameworks, Object-based design, Object-Oriented design. Component-Based Design- The component concept, designing with components, Designing components.

TEXT BOOKS

David Budgen, Software Design, 2nd Edition, Pearson Addison-Wesley, 2003.

REFERENCE BOOKS

1. Hasan Gomma, Software Modelling and Design, Cambridge, 2010.
2. John K Ousterhout, A Philosophy of Software Design, Pearson Publications.
3. Chenglie Hu, An Introduction to Software Design Concepts, Principles, Methodologies, and Techniques, Springer.

WEB REFERENCES

1. https://web.stanford.edu/class/ee478/references.html
2. https://www.tutorialsduniya.com/notes/design process and practicesr

E -TEXT BOOKS

1. https://www.netguru.com/resources/design-processhttps://books.askvenkat.org/computer graphics/

MOOCS COURSES

1. https://nptel.ac.in/courses/108/108/108108168/
2. https://web.iitd.ac.in/~rbose/initiative/MOOCS.pdf

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

EMBEDDED SYSTEMS

(PROFESSIONAL ELECTIVE II)

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG522PE	B. Tech	3	0	0	3	40	60	100

REREQUISITES

1. A course on "Digital Logic Design and Microprocessors"
2. A course on "Computer Organization and Architecture"

COURSE OBJECTIVES

Students will be able to:

1. To provide an overview of principles of Embedded System
2. To provide a clear understanding of role of firmware, operating systems in correlation with hardware systems.

COURSE OUTCOMES

Students will be able to:

1. Expected to understand the selection procedure of processors in the embedded domain.
2. Design procedure of embedded firm ware.
3. Expected to visualize the role of real-time operating systems in embedded systems.
4. Expected to evaluate the correlation between task synchronization and latency issues

UNIT-I	INTRODUCTION TO EMBEDDED SYSTEMS	CLASS:14

Introduction to Embedded Systems: Processor embedded into a system, Embedded Hardware units and devices in a system, Embedded software in a system, Design process of an embedded system, classification of embedded systems, characteristics and quality attributes of an embedded systems

UNIT-II	MICROCONTROLLER ARCHITECTURE	CLASS:12

Introduction to processor/microcontroller architecture, Real world interfacing, processor and memory organization, memory types, memory maps and addresses, interrupt sources and interrupt service mechanism**.**

UNIT-III	ON BOARD COMMUNICATION BASICS	CLASS:12

On board Communication Basics: serial; communication devices, Parallel devices, Wireless devices, Real time clock, Serial bus communication Protocols - I2C, SPI; Parallel buss communication - ISA, PCI

UNIT-IV	EMBEDDED FIRMWARE DEVELOPMENT	CLASS:10

Embedded Firmware Development: Overview of programming concepts - in assembly language and in high level language 'C', C Program elements- Heads, Source files, Processor Directives, Macros, Functions, Data types and Data Structures

UNIT-V	OS BASED EMBEDDED SYSTEMS	CLASS:12

OS Based Embedded Systems: OS services - Process/Task Management, Memory Management, I/O subsystem manager, Inter Process/Task communications - Tasks, Task states, Shared data, Signals, Message Queues, Mailbox, Pipes and concepts of Semaphores

TEXT BOOKS

1. Embedded Systems, Raj Kamal, 2nd edition, Tata Mc Graw Hill
2. Shibu K V, "Introduction to Embedded Systems", Second Edition, Mc Graw Hill

REFERENCE BOOKS

1. Rajkamal, Embedded Systems Architecture, Programming and Design, Tata McGraw-Hill
2. Frank Vahid and Tony Givargis, "Embedded Systems Design" - A Unified Hardware/Software Introduction, John Wiley
3. Lyla, "Embedded Systems" –Pearson
4. David E. Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.

WEB REFERENCES

1. https://www.omnisci.com/technical-glossary/embedded-systems
2. https://www.tutorialspoint.com/embedded_systems/es_overview.html
3. https://internetofthingsagenda.techtarget.com/definition/embedded-system

E -TEXT BOOKS

1. https://freecomputerbooks.com/Introduction-to-Embedded-Systems.html
2. https://ptolemy.berkeley.edu/books/leeseshia/releases/LeeSeshia_DigitalV2_2.pdf
3. https://www.electronicsforu.com/resources/eight-free-ebooks-embedded-systems

MOOCS COURSES

1. https://www.coursera.org/learn/introduction-embedded-systems
2. https://www.coursera.org/courses?query=embedded%20systems
3. https://www.edx.org/course/embedded-systems-shape-the-world-microcontroller-i

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

INFORMATION RETRIEVAL SYSTEMS

(PROFESSIONAL ELECTIVE II)

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG523PE	B. Tech	3	0	0	3	40	60	100

PREREQUISITES

1. Data Structures

COURSE OBJECTIVES

Students will be able to:

1. To learn the concepts and algorithms in Information Retrieval Systems
2. To understand the data/file structures that are necessary to design, and implement information retrieval (IR) systems.

COURSE OUTCOMES

Students will be able to:

1. Ability to apply IR principles to locate relevant information large collections of data
2. Ability to design different document clustering algorithms
3. Implement retrieval systems for web search tasks.
4. Design an Information Retrieval System for web search tasks.

UNIT-I	INTRODUCTION TO INFORMATION RETRIEVAL SYSTEMS	CLASS:12

Introduction to Information Retrieval Systems: Definition of Information Retrieval System, Objectives of Information Retrieval Systems, Functional Overview, Relationship to Database Management Systems, Digital Libraries and Data Warehouses Information Retrieval System Capabilities: Search Capabilities, Browse Capabilities, Miscellaneous Capabilities

UNIT-II	CATALOGING AND INDEXING	CLASS:12

Cataloguing and Indexing: History and Objectives of Indexing, Indexing Process, Automatic Indexing, Information Extraction Data Structure: Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-Gram Data Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures, Hidden Markov Models.

UNIT-III	AUTOMATIC INDEXING	CLASS:12

Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hypertext Linkages

Document and Term Clustering: Introduction to Clustering, Thesaurus Generation, Item Clustering, Hierarchy of Clusters

UNIT-IV	USER SEARCH TECHNIQUES & INFORMATION VISUALIZATION	CLASS:12

User Search Techniques: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the INTERNET and Hypertext

Information Visualization: Introduction to Information Visualization, Cognition and Perception, Information Visualization Technologies

UNIT-V	TEXT SEARCH ALGORITHMS & INFORMATION RETRIEVAL	CLASS:12

Text Search Algorithms: Introduction to Text Search Techniques, Software Text Search Algorithms, Hardware Text Search Systems

Multimedia Information Retrieval: Spoken Language Audio Retrieval, Non-Speech Audio Retrieval, Graph Retrieval, Imagery Retrieval, Video Retrieval

TEXT BOOKS

1. Information Storage and Retrieval Systems – Theory and Implementation, Second Edition, Gerald J. Kowalski, Mark T. Maybury, Springer

REFERENCE BOOKS

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
2. Information Storage & Retrieval by Robert Korfhage – John Wiley & Sons.
3. Modern Information Retrieval by Yates and Neto Pearson Education

WEB REFERENCES

1. https://books.google.co.in/books?id=tZYdEDDDDQBAJ
2. https://books.askvenkat.org/irs-books/
3. https://www.kopykitab.com/irs-Notes-eBook

E -TEXT BOOKS

1. https://www.datapine.com/blog/best-Information
2. https://files.eric.ed.gov/fulltext/ED536788.pdf

MOOCS COURSES

1. https://www.mooc-list.com/tags/Information Retrieval Systems/
2. https://www.mooc-course.com/subject/ Information Retrieval Systems/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DISTRIBUTED DATABASES

(PROFESSIONAL ELECTIVE II)

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG524PE	B. Tech	3	0	0	3	40	60	100

PREREQUISITES

1. A course on "Database Management Systems"

COURSE OBJECTIVES

Students will be able to:

1. The purpose of the course is to enrich the previous knowledge of database systems and expose the need for distributed database technology to confront the deficiencies of the centralized database systems.
2. Introduce basic principles and implementation techniques of distributed database systems.
3. Equip students with principles and knowledge of parallel and object-oriented databases.
4. Topics include distributed DBMS architecture and design; query processing and optimization; distributed transaction management and reliability; parallel and object database management systems.

COURSE OUTCOMES

Students will be able to:

1. Understand theoretical and practical aspects of distributed database systems.
2. Study and identify various issues related to the development of distributed database systems.
3. Understand the design aspects of object-oriented database systems and related developments

UNIT-I	INTRODUCTION, ARCHITECTURE & DESIGN	CLASS:12

Introduction; Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas.
Distributed DBMS Architecture: Architectural Models for Distributed DBMS, DDMBS Architecture.
Distributed Database Design: Alternative Design Strategies, Distribution Design issues, Fragmentation, Allocation.

UNIT-II	QUERY PROCESSING AND DECOMPOSITION	CLASS:12

Query processing and decomposition: Query processing objectives, characterization of query processors, layers of query processing, query decomposition, localization of distributed data. Distributed query Optimization: Query optimization, centralized query optimization, distributed query optimization algorithms.

UNIT-III	TRANSACTION MANAGEMENT	CLASS:12

Transaction Management: Definition, properties of transaction, types of transactions, distributed concurrency control: serializability, concurrency control mechanisms & algorithms, time - stamped & optimistic concurrency control Algorithms, deadlock Management.

UNIT-IV	DISTRIBUTED DBMS RELIABILITY	CLASS:12

Distributed DBMS Reliability: Reliability concepts and measures, fault-tolerance in distributed systems, failures in Distributed DBMS, local & distributed reliability protocols, site failures and network partitioning.
Parallel Database Systems: Parallel database system architectures, parallel data placement, parallel query processing, load balancing, database clusters.

UNIT-V	DISTRIBUTED OBJECT DATABASE MANAGEMENT SYSTEMS	CLASS:12

Distributed Object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query Processing.

Object Oriented Data Model: Inheritance, object identity, persistent programming languages, persistence of objects, comparison OODBMS and ORDBMS

TEXT BOOKS

1. M. Tamer OZSU and Patuck Valduriez: Principles of Distributed Database Systems, Pearson Edn. Asia, 2001.
2. Stefano Ceri and Giuseppe Pelagatti: Distributed Databases, McGraw Hill.

REFERENCE BOOKS

1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: “Database Systems: The Complete Book”, Second Edition, Pearson International Edition.

WEB REFERENCES

1. https://vulms.vu.edu.pk/Courses/CS712/Downloads/Principles%20of%20Distributed%20Database%20Systems.pdf

E -TEXT BOOKS

1. https://onlinelibrary.wiley.com/doi/book/10.1002/9780470602379
2. https://vulms.vu.edu.pk/Courses/CS712/Downloads/Principles%20of%20Distributed%20Database%20Systems.pdf

MOOCS COURSES

1. https://www.mooc-list.com/tags/database%distributed%databases
2. https://www.mooc-course.com/subject/database/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

NATURAL LANGUAGE PROCESSING

(PROFESSIONAL ELECTIVE II)

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG525PE	B. Tech	3	0	0	3	40	60	100

PREREQUISITES

1. Data structures and compiler design

COURSE OBJECTIVES

Students will be able to:

1. Introduction to some of the problems and solutions of NLP and their relation to linguistics and statistics.

COURSE OUTCOMES

Students will be able to:

1. Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
2. Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems
3. Manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.
4. Design, implement, and analyze NLP algorithms; and design different language modelling Techniques.

UNIT-I	INTRODUCTIONTO NATURAL LANGUAGE PROCESSING	CLASS:12

Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models

Finding the Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches, Features

UNIT-II	SYNTAX I	CLASS:12

Syntax I: Parsing Natural Language, Treebank's: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms

UNIT-III	SYNTAX II	CLASS:12

Syntax II: Models for Ambiguity Resolution in Parsing, Multilingual Issues

Semantic Parsing I: Introduction, Semantic Interpretation, System Paradigms, Word Sense

UNIT-IV	SEMANTIC PARSING II	CLASS:12

Semantic Parsing II: Predicate-Argument Structure, Meaning Representation Systems

UNIT-V	LANGUAGE MODELING	CLASS:12

Language Modeling: Introduction, N-Gram Models, Language Model Evaluation, Bayesian parameter estimation, Language Model Adaptation, Language Models- class based, variable length, Bayesian topic based, Multilingual and Cross Lingual Language Modeling

TEXT BOOKS

1. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M. Bikel and Imed Zitouni, Pearson Publication.

REFERENCE BOOKS

1. Natural Language Processing - Dr P. Santosh Kumar Patra, Dr Srinivas Spectrum Publication
2. Speech and Natural Language Processing - Daniel Jurafsky & James H Martin, Pearson Publications.
3. Natural Language Processing and Information Retrieval: Tanvier Siddiqui, U.S. Tiwary.

WEB REFERENCES

1. http://www.freebookcentre.net/Free- natural Language Processing.-BooksDownload.html
2. https://www.gatevidyalay.com/ natural Language Processing/

E -TEXT BOOKS

1. http://www.ebooks-for-all.com/bookmarks/detail/
2. http://freecomputerbooks.com/nlpBooks.html

MOOCS COURSES

1. https://swayam.gov.in/nd2_cec19_cs05/preview
2. https://swayam.gov.in/nd2_nou19_lb03/preview

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DEPARTMENT OF COMPUTER SCIENCE DESIGN

COMPUTER NETWORKS LAB

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS508PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

Students will be able to:

1. To understand the working principle of various communication protocols.
2. To understand the network simulator environment and visualize a network topology and observe its performance
3. To analyze the traffic flow and the contents of protocol frames.

COURSE OUTCOMES

Students will be able to:

1. Implement data link layer farming methods
2. Analyze error detection and error correction codes.
3. Implement and analyze routing and congestion issues in network design.
4. Implement Encoding and Decoding techniques used in presentation layer
5. To be able to work with different network tools

List of Experiments

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 a network

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 at each node.

7. Implement data encryption and data decryption

8. Write a program for congestion control using Leaky bucket algorithm.

9. Write a program for frame sorting techniques used in buffers.

10. Wireshark

    i. Packet Capture Using Wire shark

    ii. Starting Wire shark

    iii. Viewing Captured Traffic

    iv. Analysis and Statistics & Filters.

How to run Nmap scan

Operating System Detection using Nmap

Do the following using NS2 Simulator

i. NS2 Simulator-Introduction

ii. Simulate to Find the Number of Packets Dropped

iii. Simulate to Find the Number of Packets Dropped by TCP/UDP

iv. Simulate to Find the Number of Packets Dropped due to Congestion

v. Simulate to Compare Data Rate & Throughput.

vi. Simulate to Plot Congestion for Different Source/Destination

vii. Simulate to Determine the Performance with respect to Transmission of Packets

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.

WEB REFERENCES

1. https://www.geeksforgeeks.org/what-is-Computer-Networks/
2. https://searchsecurity.techtarget.com/definition/Computer-Networksinfosec
3. https://www.cisco.com/

E -TEXT BOOKS

1. http://study-ccna.com
2. https://open.umn.edu/opentextbooks/textbooks/353

MOOCS COURSES

1. https://nptel.ac.in/courses/106105081/
2. https://www.geeksforgeeks.org/computernetwork-routing-protocols-set-1-distancevector/
3. https://www.tutorialspoint.com/errorcontrol-in-data-link-layer

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COMPUTER GRAPHICS LAB

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG504PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

Students will be able to:

1. Provide the basics of graphics systems including Points and lines, line drawing algorithms, 2D, 3D objective transformations.

COURSE OUTCOMES

Students will be able to:

1. Explore applications of computer graphics.
2. Understand 2D, 3D geometric transformations and clipping algorithms.
3. Understand 3D object representations, curves, surfaces, polygon rendering methods, color models.
4. Analyze animation sequence and visible surface detection methods.

List of Experiments

1. Write a program to implement DDA line drawing algorithm
2. Write a program to implement Bressenham's line drawing algorithm
3. Write a program to implement Circle generation algorithm
4. Write a program to implement Mid point Circle generation algorithm
5. Write a program to implement Ellipse generation algorithm
6. Write a program to implement Mid point Ellipse generation algorithm
7. Write a program to implement Scan line algorithm
8. Write a program to implement Boundary fill algorithm
9. Write a program to implement flood fill algorithm
10. Write a program to implement Cohen Sutherland line clipping algorithm
11. Write a program to implement Sutherland Hodgeman polygon clipping algorithm
12. Write a program to implement Hermite curve
13. Write a program to implement Bezier curve and surface
14. Write a program to implement B-Spline curve and surface
15. Write a program of Translation, Rotation, and Scaling using Composite Transformation.
16. Write Program to implement Standard Perspective Projection in 3-Dimensions
17. Write Program to implement parallel Projection in 3-Dimensions
18. Write a program to implement BSP tree method
19. Write a program to implement area subdivision method

TEXT BOOKS

1. Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson Education.

REFERENCE BOOKS

1. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
2. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
3. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
4. "Computer Graphics Principles & practice", second edition in C, Foley, Van Dam, Feiner and Hughes, Pearson Education.
6. Computer Graphics, Steven Harrington, TMH.

WEB REFERENCES

1. https://www.geeksforgeeks.org/what-is-Computer-Networks/
2. https://searchsecurity.techtarget.com/definition/Computer-Networksinfosec
3. https://www.cisco.com/

E -TEXT BOOKS

1. http://tutorial.com

MOOCS COURSES

1. https://nptel.ac.in/courses/106105081/
2. https://www.geeksforgeeks.org/coomputergraphics

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ADVANCED ENGLISH COMMUNICATION SKILLS LAB

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EN506HS	B. Tech	0	0	2	1	40	60	100

1. INTRODUCTION:

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalized context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

1) Gathering ideas and information to organize ideas relevantly and coherently.

2) Engaging in debates.

3) Participating in group discussions.

4) Facing interviews.

5) Writing project/research reports/technical reports.

6) Making oral presentations.

7) Writing formal letters.

8) Transferring information from non-verbal to verbal texts

9) Taking part in social and professional communication.

2. OBJECTIVES:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

1) To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

2) Further, they would be required to communicate their ideas relevantly and coherently in writing.

3) To prepare all the students for their placements.

3. SYLLABUS:

The following course content to conduct the activities is prescribed for the Advanced English

Communication Skills (AECS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** -

Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin,

business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2**. Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading& effective googling.

3. **Activities on Writing Skills** – Structure and presentation of different types of writing – letter writing/Resume writing/ e-correspondence/Technical report writing/ – planning for writing – improving one's writing.

4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/ emails/assignments etc.

5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

4. MINIMUM REQUIREMENT:

The Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural

facilities to accommodate at least 35 students in the lab:

1) Spacious room with appropriate acoustics.

2) Round Tables with movable chairs

3) Audio-visual aids

4) LCD Projector

5) Public Address system

6) P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ

7)T. V, a digital stereo & Camcorder

8) Headphones of High quality

5. SUGGESTED SOFTWARE:

The software consisting of the prescribed topics elaborated above should be procured and used.

1) Oxford Advanced Learner's Compass, 7th Edition

2) DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.

3) Lingua TOEFL CBT Insider, by Dream tech

4) TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

TEXT BOOKS

1. Effective Technical Communication by M Asharaf Rizvi. McGraw Hill Education (India) Pvt. Ltd. 2nd Edition
2. Academic Writing: A Handbook for International Students by Stephen Bailey, Routledge, 5th Edition.

REFERENCE BOOKS

1. Learn Correct English – A Book of Grammar, Usage and Composition by Shiv K. Kumar and Hemalatha Nagarajan. Pearson 2007
2. Professional Communication by Aruna Koneru, McGraw Hill Education (India) Pvt. Ltd, 2016.
3. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.

4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. English Vocabulary in Use series, Cambridge University Press 2008.
6. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.

WEB REFERENCES

1. https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935321&section=Refere
2. Blumer, Herbert. Symbolic interaction: Perspective and method. Engle wood Cliffs; NJ: Prentice Hall.1969

E -TEXT BOOKS

1. Mc corry Laurie Kelly Mc Corry Jeff Mason, Communication Skills forthe st Healthcare Professional, 1 edition,ISBN:1582558140, ISBN-13:9781582558141
2. Robert E Owens, Jr, Language Development, 9 th edition, ISBN:0133810364, 9780133810363

MOOCS COURSES

1. https://www.coursera.org/specializations/improve-english
2. https://www.edx.org/professional-certificate/upvalenciax-upper-intermediate-english

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

UI DESIGN –FLUTTER LAB

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS507PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

Students will be able to:

1. Learns to Implement Flutter Widgets and Layouts
2. Understands Responsive UI Design and with Navigation in Flutter
3. Knowledge on Widgets and customize widgets for specific UI elements, Themes
4. Understand to include animation apart from fetching data

COURSE OUTCOMES

Students will be able to:

1. Implements Flutter Widgets and Layouts
2. Responsive UI Design and with Navigation in Flutter
3. Create custom widgets for specific UI elements and also Apply styling using themes and custom styles.
4. Design a form with various input fields, along with validation and error handling
5. Fetches data and write code for unit Test for UI components and also animation

List of Experiments

1. a) Install Flutter and Dart SDK.
   b) Write a simple Dart program to understand the language basics.
2. a) Explore various Flutter widgets (Text, Image, Container, etc.).
   b) Implement different layout structures using Row, Column, and Stack widgets.
3. a) Design a responsive UI that adapts to different screen sizes.
   b) Implement media queries and breakpoints for responsiveness.
4. a) Set up navigation between different screens using Navigator.
   b) Implement navigation with named routes.
5. a) Learn about stateful and stateless widgets.
   b) Implement state management using set State and Provider.
6. a) Create custom widgets for specific UI elements.
   b) Apply styling using themes and custom styles.
7. a) Design a form with various input fields.
   b) Implement form validation and error handling.
8. a) Add animations to UI elements using Flutter's animation framework.
   b) Experiment with different types of animations (fade, slide, etc.).
9. a) Fetch data from a REST API.

b) Display the fetched data in a meaningful way in the UI.

10. a) Write unit tests for UI components.

b) Use Flutter's debugging tools to identify and fix issues.

TEXT BOOKS

1. Marco L. Napoli, Beginning Flutter: A Hands-on Guide to App Development, 1st edition, Wrox publisher.

REFERENCE BOOKS

1. Flutter for Beginners: An introductory guide to building cross-platform mobile applications with Flutter and Dart 2, Packt Publishing Limited.
2. Rap Payne, Beginning App Development with Flutter: Create Cross-Platform Mobile Apps, 1st edition, Apress.
3. Frank Zammetti, Practical Flutter: Improve your Mobile Development with Google's Latest Open-Source SDK, 1st edition, Apress.

WEB REFERENCES

1. https://www.immagic.com/eLibrary/ARCHIVES/GENERAL/UXPIN_PL/U141030B.pdf
2. https://www.diva-portal.org/smash/get/diva2:1217480/FULLTEXT01.pdf
3. https://www.cerritos.edu/dwhitney/SitePages/CIS201/Lectures/IM-7ed-Chapter08.pdf

E -TEXT BOOKS

1. https://www.designingui.com/designing_interfaces_12_x.pdf
2. https://bpb-eu-w2.wpmucdn.com/sites.aub.edu.lb/dist/c/13/files/2019/06/the-basics-of-ux-design.pdf

MOOCS COURSES

1. https://www.mooc-list.com/tags/user-interface-design
2. https://www.mooc-list.com/tags/ux-design

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

INTELLECTURAL PROPERTY RIGHTS

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
*IP510MC	B. Tech	3	0	0	0	100	-	100

COURSE OBJECTIVES

Students will be able to:

1. Significance of intellectual property and its protection
2. Introduce various forms of intellectual property

COURSE OUTCOMES

Students will be able to:

1. Distinguish and Explain various forms of IPRs.
2. Identify criteria to fit one's own intellectual work in particular form of IPRs.
3. Apply statutory provisions to protect particular form of IPRs.
4. Appraise new developments in IPR laws at national and international level

UNIT-I	INTRODUCTION TO INTELLECTUAL PROPERTY

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT-II	TRADE MARKS	CLASS:12

Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting, and evaluating trade mark, trade mark registration processes.

UNIT-III	LAW OF COPYRIGHTS	CLASS:12

Law of copyrights: Fundamental of copyright law, originality of material, rights of reproduction, rights to perform the work publicly, copyright ownership issues, copyright registration, notice of copyright, International copyright law.

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer.

UNIT-IV	TRADE SECRETS & UNFAIR COMPETITION	CLASS:12

Trade Secrets: Trade secret law, determination of trade secret status, liability for misappropriations of trade secrets, protection for submission, trade secret litigation.
Unfair competition: Misappropriation right of publicity, false advertising.

UNIT-V	NEW DEVELOPMENT & INTERNATIONAL OVERVIEW	CLASS:12

New development of intellectual property: new developments in trade mark law; copyright law, patent law, intellectual property audits.

International overview on intellectual property, international – trade mark law, copyright law, international patent law, and international development in trade secrets law.

TEXT BOOKS

1. Intellectual property right, Deborah. E. Bouchoux, Cengage learning.

REFERENCE BOOKS

1. Intellectual property right – Unleashing the knowledge economy, Prabuddha Ganguli, Tata
McGraw Hill Publishing company ltd.

WEB REFERENCES

1. http://libgen.rs/book/index.php?md5=C4A6559ECCAEFC767CE71BD91A1BAD41
2. http://libgen.rs/book/index.php?md5=6463CAD16544B347B19335FB19D6917C

E -TEXT BOOKS

1. http://libgen.rs/book/index.php?md5=13C4B3A45B1C95B4A388F94729CCCFBC
2. https://maklaw.in/intellectualpropertyrights/?gclid=EAIaIQobChMIsprsv_WI7QIVilVg

MOOCS COURSES

1. https://nptel.ac.in/courses/110/105/110105139/
2. https://nptel.ac.in/courses/109/106/109106137/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ALGORITHM DESIGN AND ANALYSIS

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT602PC	B. Tech	3	0	0	3	40	60	100

Prerequisites: Programming for problem solving and Data Structures.

Course Objectives:

1Introduces the notations for analysis of the performance of algorithms.
2 Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic programming, greedy, branch and bound methods) and mention problems for which each technique is appropriate;
3 Describes how to evaluate and compare different algorithms using worst, average, and best-case analysis.
4 Explains the difference between tractable and intractable problems, and introduces the problems that are P, NP and NP complete.

Course Outcomes:

1 Analyze the performance of algorithms
2 Choose appropriate data structures and algorithm design methods for a specified application
3 Understand the choice of data structures and the algorithm design methods

UNIT-I	Introduction	CLASS:14

Introduction: Algorithm, Performance Analysis-Space complexity, Time complexity, Asymptotic. Notations- Big oh notation, Omega notation, Theta notation and Little oh notation.

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT-II	Disjoint Sets	CLASS:12

Disjoint Sets: Disjoint set operations, union and find algorithms, Priority Queue- Heaps, Heapsort
Backtracking: General method, applications, n-queen's problem, sum of subsets problem, graph Coloring, Hamiltonian cycles**.**

UNIT-III	Dynamic Programming	CLASS:12

Dynamic Programming: General method, applications- Optimal binary search tree, 0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

UNIT-IV	Greedy Method	CLASS:12

Greedy Method: General method, applications- Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.
Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs, Connected components, Biconnected components**.**

UNIT-V	Branch and Bound	CLASS:10

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem - LC Branch and Bound solution, FIFO Branch and Bound solution.
NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP - Hard and NP-Complete classes, Cook's theorem.

TEXT BOOKS

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, University Press..

REFERENCE BOOKS

1. Dr. P. Santosh Kumar Patra, Dr Srinivas, algorithm design and analysis, M/S Spectrum Publishing House, First Edition 2022.
2. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
3. Introduction to Algorithms, second edition, T. H. Cormen, C.E. Leiserson, R. L. Rivest, and C. Stein, PHI Pvt. Ltd./ Pearson Education.
4. Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R. Tamassia, John Wiley and sons..

WEB REFERENCES

1. https://www.tutorialpoint.com

E -TEXT BOOKS

1. https://courses.cs.duke.edu/fall08/cps230/Book.pdfED

MOOCS COURSES

1. https://www.mooc-list.com/course/designandanlysis

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

FORMAL LANGUAGES AND AUTOMATA THEORY

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS601PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. To provide introduction to some of the central ideas of theoretical computer science from the perspective of formal languages.
2. To introduce the fundamental concepts of formal languages, grammars and automata theory.
3. Classify machines by their power to recognize languages.
4. Employ finite state machines to solve problems in computing.
5. To understand deterministic and non-deterministic machines.
6. To understand the differences between decidability and undecidability.

COURSE OUTCOMES

Students will be able to:

1. Understand the concept of abstract machines and their power to recognize the languages.
2. Employ finite state machines for modeling and solving computing problems.
3. Design context free grammars for formal languages.
4. Distinguish between decidability and undecidability.

UNIT-I	INTRODUCTION TO FINITE AUTOMATA	CLASS:14

Introduction to Finite Automata: Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems.

Nondeterministic Finite Automata: Formal Definition, an application, Text Search, Finite Automata with Epsilon-Transitions

Deterministic Finite Automata: Definition of DFA, How A DFA Process Strings, The language of DFA, Conversion of NFA with €-transitions to NFA without €-transitions. Conversion of NFA to DFA, Moore and Melay machines

UNIT-II	REGULAR EXPRESSIONS	CLASS:12

Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions.

Pumping Lemma for Regular Languages, Statement of the pumping lemma, Applications of the Pumping Lemma.

Closure Properties of Regular Languages: Closure properties of Regular languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata.

UNIT-III	CONTEXT-FREE GRAMMARS	CLASS:12

Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Sentential Forms, Parse Trees, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages.

Push Down Automata: Definition of the Pushdown Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's, Acceptance by final state, Acceptance by empty stack, Deterministic Pushdown Automata. From CFG to PDA, From PDA to CFG.

UNIT-IV	CONTEXT-FREE LANGUAGES	CLASS:12

Normal Forms for Context- Free Grammars: Eliminating useless symbols, Eliminating €-Productions. Chomsky Normal form Greibach Normal form.
Pumping Lemma for Context-Free Languages: Statement of pumping lemma, Applications
Closure Properties of Context-Free Languages: Closure properties of CFL's, Decision Properties of CFL's Turing Machines: Introduction to Turing Machine, Formal Description, Instantaneous description, The language of a Turing machine

UNIT-V	TYPES OF TURING MACHINE	CLASS:10

Types of Turing machine: Turing machines and halting

Undecidability: Undecidability, A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines, Recursive languages, Properties of recursive languages, Post's Correspondence Problem, Modified Post Correspondence problem, Other Undecidable Problems, Counter machines.

TEXT BOOKS

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

REFERENCE BOOKS

1. Dr. P. Santosh Kumar Patra, Mrs. P. Devasudha, Dr. R. Nagaraju, Mr. D. Banu Rao, Formal Languages and Automata Theory, M/S Spectrum Publishing House, First Edition 2022.
2. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
3. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
4. A Textbook on Automata Theory, P. K. Srimani, Nasir S. F. B, Cambridge University Press.
5. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, Cengage Learning.
6. Introduction to Formal languages Automata Theory and Computation Kamala Krithivasan, Rama R, Pearson.

WEB REFERENCES

1. https://www.oreilly.com/library/view/introduction-to-automata/9788131793510/xhtml/references.xhtml
2. https://en.wikipedia.org/wiki/Automata_theory
3. https://www-2.dc.uba.ar/staff/becher/Hopcroft-Motwani-Ullman-2001.pdf
4. https://catalog.lib.uchicago.edu/vufind/Record/4400514/TOC

E -TEXT BOOKS

1. https://www.cambridge.org/core/books/textbook-on-automata-theory/AA158510D9AB7A916C5BA8B96CD865ED
2. https://cstheory.stackexchange.com/questions/1955/books-on-automata-theory-for-self-study
3. https://www.pearsoned.co.in/prc/book/john-e-hopcroft-introduction-automata-theory-languages-computation-3e-3/9788131720479

MOOCS COURSES

1. https://www.classcentral.com/course/coding-stanford-university-automata-theory-376
2. https://www.mooc-list.com/course/automata-coursera

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

INTRODUCTION TO ENGINEERING DESIGN

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG603PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

Knowledge on significance of Engineering design and its concepts.

COURSE OUTCOMES

Students will be able to:

1. Understand the engineering design process and various types of design
2. Illustrate identification of needs and gathering information from different sources
3. Analyze different methods of creative thinking and TRIZ Inventive principles
4. Understand Embodiment and industrial design.

UNIT-I	Engineering Design	CLASS:12

Introduction, Engineering Design Process, Ways to Think About the Engineering Design Process, Considerations of a Good Design, Description of Design Process, Conceptual Design, Embodiment Design, Detail Design, Planning for Manufacture, Planning for Distribution, Planning for Use, Planning for Retirement of the Product, Computer-Aided Engineering, Designing to Codes and Standards, Design Review

UNIT-II	Problem Definition and Need Identification	CLASS:12

Problem Definition and Need Identification

Introduction, Identifying Customer Needs, Customer Requirements, Establishing the Engineering Characteristics, Quality Function Deployment, Product Design Specification Gathering Information The Information Challenge, Types of Design Information, Sources of Design Information, Library Sources of Information, Government Sources of Information, Information From the Internet, Professional Societies and Trade Associations, Codes and Standards.

UNIT-III	Concept Generation	CLASS:12

Concept Generation

Introduction to Creative Thinking, Creative Methods for Design, Morphological Methods, Morphological Method for Design, Generating Concepts from Morphological Chart, TRIZ: The Theory of Inventive Problem Solving, Invention: Evolution to Increased Ideality, Innovation by Overcoming Contradictions, TRIZ Inventive Principles, The TRIZ Contradiction Matrix, Axiomatic Design.

UNIT-IV	Embodiment Design	CLASS:14

Embodiment Design

Introduction, Comments on Nomenclature Concerning the Phases of the Design Process, Oversimplification of the Design Process Model, Product Architecture, Types of Modular Architectures, Configuration Design, Best Practices for Configuration Design, Parametric Design- Systematic Steps in Parametric Design, A Parametric Design Example: Helical Coil Compression Spring

UNIT-V	Industrial Design	CLASS:10

Industrial Design

Visual Aesthetics, Human Factors Design, Design for the Environment, Prototyping and Testing, Prototype and Model Testing Throughout the Design Process, Building Prototypes, Rapid Prototyping, RP Processes, Testing, Statistical Design of Testing, Design for X (DFX).

TEXT BOOKS

1.George E. Dieter, Linda C. Schmidt, Engineering Design, Fourth Edition, McGraw-Hill.

REFERENCE BOOKS

1 Dr. P. Santosh Kumar Patra, Dr. Govinda Rajulu Introduction to Engineering Design ry, M/S Spectrum Publishing House, First Edition 2024

2 Andrew Samuel, John Weir, Introduction to Engineering Design, Butterworth-Heinemann

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1. https://www.oreilly.com/library/view/introduction-to-automata/9788131793510/xhtml/references.xhtml
2. https://en.wikipedia.org/wiki/engineeringdesign

E -TEXT BOOKS

1 https://link.springer.com/book/10.1007/978-3-031-02093-3

MOOCS COURSES

1. https://www.classcentral.com/course/coding-stanford-university-automata-theory-376
2. https://www.mooc-list.com/course/engineeringdesign

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

FULL STACK DEVELOPMENT

(PROFESSIONAL ELECTIVE III)

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG631PE	B. Tech	3	0	0	3	40	60	100

PREREQUISITES:

1. Object Oriented Programming
2. Web Technologies.

COURSE OBJECTIVES

1. Students will become familiar to implement fast, efficient, interactive and scalable web Applications using run time environment provided by the full stack components.

COURSE OUTCOMES

Students will be able to:

1. Understand Full stack components for developing web application.
2. Apply packages of NodeJS to work with Data, Files, Http Requests and Responses.
3. Use MongoDB data base for storing and processing huge data and connects with NodeJS application.
4. Design faster and effective single page applications using Express and Angular.
5. Create interactive user interfaces with react components.

UNIT-I	INTRODUCTION TO FULL STACK DEVELOPMENT	CLASS:12

Introduction to Full Stack Development: Understanding the Basic Web Development Framework- User, Browser, Webserver, Backend Services, Full Stack Components - Node.js, MongoDB, Express, React, Angular. Java Script Fundamentals, NodeJS- Understanding Node.js, Installing Node.js, Working with Node Packages, creating a Node.js Application, Understanding the Node.js Event Model, Adding Work to the Event Queue, Implementing Callbacks

UNIT-II	NODE.JS	CLASS:12

Node.js: Working with JSON, Using the Buffer Module to Buffer Data, Using the Stream Module to Stream Data, Accessing the File System from Node.js- Opening, Closing, Writing, Reading Files and other File System Tasks. Implementing HTTP Services in Node.js- Processing URLs, Processing Query Strings and Form Parameters, Understanding Request, Response, and Server Objects, Implementing HTTP Clients and Servers in Node.js, Implementing HTTPS Servers and Clients. Using Additional Node.js Modules-Using the os Module, Using the util Module, Using the dns Module, Using the crypto Module.

UNIT-III	MONGODB	CLASS:12

MongoDB: Need of NoSQL, Understanding MongoDB, MongoDB Data Types, Planning Your Data Model, Building the MongoDB Environment, Administering User Accounts, Configuring

Access Control, Administering Databases, Managing Collections, Adding the MongoDB Driver to Node.js, Connecting to MongoDB from Node.js, Understanding the Objects Used in the MongoDB Node.js Driver, Accessing and Manipulating Databases, Accessing and Manipulating Collections

UNIT-IV	EXPRESS AND ANGULAR	CLASS:14

Express and Angular: Getting Started with Express, Configuring Routes, Using Requests Objects, Using Response Objects. Angular: importance of Angular, Understanding Angular, creating a Basic Angular Application, Angular Components, Expressions, Data Binding, Built-in Directives, Custom Directives, Implementing Angular Services in Web Applications.

UNIT-V	REACT	CLASS:10

React: Need of React, Simple React Structure, The Virtual DOM, React Components, Introducing React Components, Creating Components in React, Data and Data Flow in React, Rendering and Life Cycle Methods in React, Working with forms in React, integrating third party libraries, Routing in React.

TEXT BOOKS

1. Brad Dayley, Brendan Dayley, Caleb Dayley., Node.js, MongoDB and Angular Web Development, 2nd Edition, Addison-Wesley, 2019.
2. Mark Tielens Thomas, React in Action, 1st Edition, Manning Publications.

REFERENCE BOOKS

1. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, Apress, 2019.
2. Chris Northwood, The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer', 1st edition, Apress, 2018.
3. Kirupa Chinnathambi, Learning React: A Hands-On Guide to Building Web Applications Using React and Redux, 2nd edition, Addison-Wesley Professional, 2018.

WEB REFERENCES

1. https://pepa.holla.cz/wp-content/uploads/2016/08/Full-Stack-JavaScript.pdf
2. https://www.knowledgehut.com/blog/web-development/full-stack-developer-books

E -TEXT BOOKS

1. https://www.sap-press.com/full-stack-development-with-sap_5733/
2. https://demo.smarttrainerlms.com/uploads/0003/trainings/course/45/modules/fullstack-react-book-r30_1510302324482009603.pdf

MOOCS COURSES

1. https://www.mooc-list.com/tags/full-stack
2. https://www.coursera.org/courses?query=full%20stack%20web%20development
3. https://www.udemy.com/topic/full-stack-web-development/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

INTERNET OF THINGS

(PROFESSIONAL ELECTIVE III)

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG632PE	B. Tech	3	0	0	3	40	60	100

PREREQUISITES:

1. Computer organization
2. Computer Networks

COURSE OBJECTIVES

1. To introduce the terminology, technology and its applications
2. To introduce the concept of M2M (machine to machine) with necessary protocols
3. To introduce the Python Scripting Language which is used in many IoT devices
4. To introduce the Raspberry PI platform, that is widely used in IoT applications
5. To introduce the implementation of web-based services on IoT devices.

COURSE OUTCOMES

1. Interpret the impact and challenges posed by IoT networks leading to new architectural models.
2. Compare and contrast the deployment of smart objects and the technologies to connect them to network.
3. Appraise the role of IoT protocols for efficient network communication.
4. Identify the applications of IoT in Industry.

UNIT-I	INTRODUCTION	CLASS:12

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels and Deployment Templates

Domain Specific IoTs – Home automation, Environment, Agriculture, Health and Lifestyle

UNIT-II	IOT SYSTEM MANAGEMENT	CLASS:12

IoT and M2M – M2M, Difference between IoT and M2M, SDN and NFV for IoT,
IoT System Management with NETCOZF, YANG- Need for IoT system Management, Simple Network management protocol, Network operator requirements, NETCONF, YANG, IoT Systems Management with NETCONF-YANG

UNIT-III	IOT SYSTEMS	CLASS:12

IoT Systems – Logical design using Python-Introduction to Python – Python Data types & Data structures, Control flow, Functions, Modules, Packaging, File handling, Data/Time operations, Classes, Exception, Python packages of Interest for IoT

UNIT-IV	IOT PHYSICAL DEVICES	CLASS:12

IoT Physical Devices and Endpoints - Raspberry Pi, Linux on Raspberry Pi, Raspberry Pi Interfaces, Programming Raspberry PI with Python, Other IoT devices.

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs, WAMP-AutoBahn for IoT, Xively Cloud for IoT, Python web application

framework –Django, Designing a REST ful web API

UNIT-V	CASE STUDIES	CLASS:12

Case studies- Home Automation, Environment-weather monitoring-weather reporting- air pollution monitoring, Agriculture.

TEXT BOOKS

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547.

REFERENCE BOOKS

1. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759.

WEB REFERENCES

1. https://books.google.co.in/books/about/Internet_of_Things.html?id=JPKGBAAAQBAJ&prints
2. http://202.62.95.70:8080/jspui/bitstream/123456789/12322/1/Internet%20of%20Things%20By

E -TEXT BOOKS

1. Internet of things security: principles and practices, quango Tang, fan du.

MOOCS COURSES

1. https://www.youtube.com/watch?v=LlhmzVL5bm8
2. https://www.youtube.com/watch?v=6mBO2vqLv38

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

SCRIPTING LANGUAGES

(PROFESSIONAL ELECTIVE III)

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG633PE	B. Tech	3	0	0	3	40	60	100

PREREQUISITES:

1. A course on "Computer Programming and Data Structures".
2. A course on "Object Oriented Programming Concepts".

COURSE OBJECTIVES

1. This course introduces the script programming paradigm
2. Introduces scripting languages such as Perl, Ruby and TCL.
3. Learning TCL

COURSE OUTCOMES

1. Comprehend the differences between typical scripting languages and typical system and application programming languages.
2. Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an
3. Appropriate language for solving a given problem.
4. Acquire programming skills in scripting language.

UNIT-I	INTRODUCTION	CLASS:14

Introduction: Ruby, Rails, The structure and Execution of Ruby Programs, Package Management with RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Webservers, SOAP and web services

Ruby Tk – Simple Tk Application, widgets, Binding events, Canvas, scrolling

UNIT-II	EXTENDING RUBY	CLASS:12

Extending Ruby: Ruby Objects in C, the Jukebox extension, Memory allocation, Ruby Type System, Embedding Ruby to Other Languages, Embedding a Ruby Interpreter

UNIT-III	INTRODUCTION TO PERL AND SCRIPTING SCRIPTS AND PROGRAMS	CLASS:12

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT-IV	ADVANCED PERL	CLASS:12

Advanced perl: Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues

UNIT-V	TCL & TK	CLASS:12

TCL: TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and up level commands, Namespaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

Tk: Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Perl-Tk.

TEXT BOOKS

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Ruby Programming language by David Flanagan and Yukihiro Matsumoto O'Reilly
3. Programming Ruby The Pramatic Progammers guide by Dabve Thomas Second edition.

REFERENCE BOOKS

1. 1. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J.Lee and B. Ware (Addison Wesley) Pearson Education.
2. Perl by Example, E. Quigley, Pearson Education.
3. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
4. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
5. Perl Power, J. P. Flynt, Cengage Learning.

WEB REFERENCES

1. https://ghcrajan.files.wordpress.com/2013/07/cs518-unit-iii.pdf
2. https://mu.ac.in/wp-content/uploads/2021/06/USIT203-Web-programmig.pdf

E -TEXT BOOKS

1. https://www.nocostlibrary.com/2021/07/the-world-of-scripting-languages-no.html
2. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2

MOOCS COURSES

1. https://onlinecourses-archive.nptel.ac.in/
2. https://swayam.gov.in/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

MOBILE APPLICATION DEVELOPMENT

(PROFESSIONAL ELECTIVE III)

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG634PE	B. Tech	3	0	0	3	40	60	100

PREREQUISITES:

1. Acquaintance with JAVA programming
2. A Course on DBMS".

COURSE OBJECTIVES

1. To demonstrate their understanding of the fundamentals of Android operating systems
2. To improves their skills of using Android software development tools
3. To demonstrate their ability to develop software with reasonable complexity on mobile platform
4. To demonstrate their ability to deploy software to mobile devices
5. To demonstrate their ability to debug programs running on mobile devices.

COURSE OUTCOMES

1. Understand the working of Android OS Practically.
2. Develop Android user interfaces
3. Develop, deploy and maintain the Android Applications.

UNIT-I	INTRODUCTION TO ANDROID OPERATING SYSTEM	CLASS:12

Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Android Studio, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes

Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes

UNIT-II	ANDROID USER INTERFACE	CLASS:12

Android User Interface: Measurements – Device and pixel density independent measuring unit - s Layouts – Linear, Relative, Grid and Table Layouts User Interface (UI) Components –Editable and non-editable Text Views, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers Event Handling – Handling clicks or changes of various UI components Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

UNIT-III	INTENTS AND BROADCASTS	CLASS:12

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS

Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity

Notifications – Creating and Displaying notifications, Displaying Toasts

UNIT-IV	PERSISTENT STORAGE	CLASS:12

Persistent Storage: Files – Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared references, saving and retrieving data using Shared Preference

UNIT-V	DATABASE	CLASS:12

Database – Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and etindelg data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update)

TEXT BOOKS

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012

REFERENCE BOOKS

1. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning,2013
2. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

WEB REFERENCES

1. https://www.javatpoint.com/android-tutorial
2. https://www.tutorialspoint.com/mobile_development_tutorials.html

E -TEXT BOOKS

1. https://egyankosh.ac.in/bitstream/123456789/70872/1/Unit-1.pdf
2. https://www.theseus.fi/bitstream/handle/10024/67806/yevheniy_Final_version.pdf
3. https://www.egyankosh.ac.in/bitstream/123456789/70871/1/Block-1.pdf

MOOCS COURSES

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

SOFTWARE TESTING METHODOLOGIES

(PROFESSIONAL ELECTIVE III)

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG635PE	B. Tech	3	0	0	3	40	60	100

PREREQUISITES:

1. Software Engineering

COURSE OBJECTIVES

1. To provide knowledge of the concepts in software testing such as testing process, criteria, strategies, and methodologies.
2. To develop skills in software test automation and management using the latest tools.

COURSE OUTCOMES

1. Understand purpose of testing and path testing
2. Understand strategies in data flow testing and domain testing
3. Develop logic-based test strategies
4. Understand graph matrices and its applications
5. Implement test cases using any testing automation tool.

UNIT-I	INTRODUCTION		CLASS:12

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT-II	TRANSACTION FLOW TESTING	CLASS:12

Transaction Flow Testing: transaction flows, transaction flow testing techniques.
Data Flow testing: Basics of data flow testing, strategies in data flow testing, application of data flow testing.
Domain Testing: domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT-III	PATH PRODUCTS AND REGULAR EXPRESSIONS	CLASS:12

Paths, Path products and Regular expressions: path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing: overview, decision tables, path expressions, kv charts, specifications.

UNIT-IV	STATE GRAPHS AND TRANSITION TESTING	CLASS:12

State, State Graphs and Transition testing: state graphs, good & bad state graphs, state testing, Testability tips.

UNIT-V	GRAPH MATRICES AND APPLICATION	CLASS:12

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like J meter/selenium/soap UI/Catalon).

TEXT BOOKS

1. Software Testing techniques - Baris Beizer, Dream tech, second edition.
2. Software Testing Tools – Dr. K. V. K. K. Prasad, Dream tech.

REFERENCE BOOKS

1. Dr. P. Santosh Kumar Patra, Dr. K. Srinivas, Mr. T. Selva muthu kumar, , Software Testing Methodologies, Seven Hills International Publishers, First Edition 2022
2. The craft of software testing - Brian Marick, Pearson Education.
3. Software Testing Techniques – SPD(Oreille)
4. Software Testing in the Real World – Edward Kit, Pearson.
5. Effective methods of Software Testing, Perry, John Wiley.
6. Art of Software Testing – Meyers, John Wiley.

WEB REFERENCES

1. https://www.smartzworld.com/notes/software-testing-methodologies-pdf-notes-stm-pdf-notes/
2. https://www.academia.edu/27915965/SOFTWARE_TESTING_METHODOLOGIES

E -TEXT BOOKS

1. https://examupdates.in/software-testing-methodologies/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DATA STRUCTURES (OPEN ELECTIVE I)

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG611OE	B. Tech	3	0	0	3	40	60	100

PREREQUISITES:

1. A course on "Programming for Problem Solving

COURSE OBJECTIVES

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

COURSE OUTCOMES

1. Ability to select the data structures that efficiently model the information in a problem.
2. Ability to assess efficiency trade-offs among different data structure implementations or combinations.
3. Implement and know the application of algorithms for sorting and pattern matching.
4. Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.

UNIT-I	INTRODUCTION TO DATA STRUCTURES	CLASS:12

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 & HASH TABLE REPRESENTATION	CLASS:12

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

UNIT-III	SEARCH TREES	CLASS:12

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 & SORTINGS	CLASS:12

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	CLASS:12

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/Pearson Education.

REFERENCE BOOKS

1. Dr. P. Santhosh Kumar Patra, Dr. R. Nagaraju, Mr. C. Yosepu, Mr.A.Mruthyunjayam and Mr. P. Ganesh Kumar, „ Data Structures using C", S International Publishers, First Edition, 2021.
2. Data Structures: A Pseudocode Approach with C, 2 nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning.

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2. https://www.javatpoint.com/data-structure-tutorial

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1. https://www.cs.bham.ac.uk/~jxb/DSA/dsa.pdf
2. https://www.ncertbooks.guru/data-structures/

MOOCS COURSES

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2. https://www.coursera.org/specializations/data-structures-algorithms

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DATABASE MANAGEMENT SYSTEMS (OPEN ELECTIVE I)

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG612OE	B. Tech	3	0	0	3	40	60	100

PREREQUISITES:

1. A course on "Data Structures".

COURSE OBJECTIVES

1. To understand the basic concepts and the applications of database systems.
2. To master the basics of SQL and construct queries using SQL.
3. 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 & INTRODUCTION TO DATABASE DESIGN	CLASS:12

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	CLASS:12

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	CLASS:12

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	CLASS:12

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	CLASS:12

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

TEXT BOOKS

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

REFERENCE BOOKS

1. Dr. P. Santhosh Kumar Patra, Dr. N. Satheesh and Dr. R. Nagaraju ,"Database Management Systems", Spectrum Techno Press, First Edition, 2022
2. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
3. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education
4. Introduction to Database Systems, C. J. Date, Pearson Education
5. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
6. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
7. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

WEB REFERENCES

1. https://www.javatpoint.com/dbms-tutorial
2. https://www.tutorialspoint.com/dbms/index.htmL
3. https://www.ddegjust.ac.in/studymaterial/mca-3/ms-11.pdf

E -TEXT BOOKS

1. Database Management System by Monelli Ayyavaraiah, Arepalli Gopi
2. Database Management System by Panneerselvam, R

MOOCS COURSES

1. https://www.mooc-list.com/tags/database-management
2. https://nptel.ac.in/courses/106/105/106105175/
3. https://www.edx.org/learn/databases

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ENGINEERING DESIGN LAB

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG604PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

1. Learn how to frame the design challenge properly.
2. Learn how to ideate, prototype and Iterate solutions.
3. Learn from the overall design process
4. Learn how to design successful products

COURSE OUTCOMES

1. Students will be able to implement Design Thinking tools and use the same to find the solution.
2. Students will be able to design and develop a Prototype
3. Students will be able to pitch their ide

List of Experiments

Design Thinking using Empathy Map

1. Problem Statement (Clearly mention the problem your group would like to solve)
   a) Mission Statement (Why is it important to solve this problem? Who will be the beneficiaries? What is the market opportunity?
   b) Value Proposition (Clearly state the redefined problem with specific issues the team would like to solve)
2. a) Assumptions (What are the current/existing considerations/limitations regarding the problem your team would like to address?)
   a. Stakeholders (List all the stakeholder groups that can influence or can be influence by a change. Which stakeholder group(s) will be benefitted? Which stakeholder group(s) has your team interacted with? – Identify which user group you would like to target the solution – Mainstream, Extreme or Latent users)
3. Empathy Tool Used (What/How/Why, Empathy Map, AEIOU method, Beginner's mind set, Story/Share capture, etc.)
4. Data Collection (Research, Questionnaires, Interviews, Surveys, Stakeholder groups, Statistics, etc.)
5. Insights (Document all points from data collection stage to form insights about the problem)
6. Ideation Method Used (FreeMind, Brainstorming, SCAMPER)

Human Factor Design using Android Studio

7. Implement the Mobile Screen Recording Apps for Human Factor Design

TEXT BOOKS

1. Ulrich, Karl, and Steven Eppinger. Product Design and Development. 3rd ed. New York, NY: McGraw-Hill, 2004. ISBN: 9780072471465
1. George E. Dieter, Linda C. Schmidt, Engineering Design, Fourth Edition, McGraw-Hill.

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1. Andrew Samuel, John Weir, Introduction to Engineering Design, Butterworth-Heinemann.

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E -TEXT BOOKS

1. https://tutorialpoint.com/products/

MOOCS COURSES

1. https://nptel.ac.in/courses/106105087/pdf/m01L01
2. https://onlinecourses.nptel.ac.in/noc21_cs13/preview

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

FULL STACK DEVELOPMENT LAB

(PROFESSIONAL ELECTIVE III)

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG636PE	B. Tech	0	0	2	1	40	60	100

Pre-Requisites

1. Object Oriented Programming
2. Web Technologies

COURSE OBJECTIVES

1. Introduce fast, efficient, interactive and scalable web applications using run time environment provided by the full stack components.

COURSE OUTCOMES

1. Design flexible and responsive Web applications using Node JS, React, Express and Angular.
2. Perform CRUD operations with MongoDB on huge amount of data.
3. Develop real time applications using react components.
4. Use various full stack modules to handle http requests and responses

List of Experiments

Write a Program to Implement the following using Python.

1. Create an application to setup node JS environment and display “Hello World”.
2. Create a Node JS application for user login system.
3. Write a Node JS program to perform read, write and other operations on a file.
4. Write a Node JS program to read form data from query string and generate response using NodeJS
5. Create a food delivery website where users can order food from a particular restaurant listed in the website for handling http requests and responses using NodeJS.
6. Implement a program with basic commands on databases and collections using MongoDB.
7. Implement CRUD operations on the given dataset using MongoDB.
8. Perform Count, Limit, Sort, and Skip operations on the given collections using MongoDB.
9. Develop an angular JS form to apply CSS and Events.
10. Develop a Job Registration form and validate it using angular JS.
11. Write an angular JS application to access JSON file data of an employee from a server using $http service.
12. Develop a web application to manage student information using Express and Angular JS.
13. Write a program to create a simple calculator Application using React JS.
14. Write a program to create a voting application using React JS

15. Develop a leave management system for an organization where users can apply different types of leaves such as casual leave and medical leave. They also can view the available number of days using react application.

16. Build a music store application using react components and provide routing among the web pages.

17. Create a react application for an online store which consist of registration, login, product information pages and implement routing to navigate through these pages.

TEXT BOOKS

1. Brad Dayley, Brendan Dayley, Caleb Dayley., Node.js, MongoDB and Angular Web Development, 2nd Edition, Addison-Wesley,2019.
2. Mark Tielens Thomas., React in Action, 1st Edition, Manning Publications.

REFERENCE BOOKS

1. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, Apress,2019.
2. Chris Northwood, The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer', 1st edition, Apress, 2018.
3. Brad Green& Seshadri. Angular JS. 1st Edition. O'Reilly Media, 2013.
4. Kirupa Chinnathambi, Learning React: A Hands-On Guide to Building Web Applications Using React and Redux, 2nd edition, Addison-Wesley Professional, 2018.

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2. https://demo.smarttrainerlms.com/uploads/0003/trainings/course/45/modules/fullstack-react-book-r30_1510302324482009603.pdf

E -TEXT BOOKS

1. https://pepa.holla.cz/wp-content/uploads/2016/08/Full-Stack-JavaScript.pdf
2. https://www.knowledgehut.com/blog/web-development/full-stack-developer-books

MOOCS COURSES

1. https://www.coursera.org/courses?query=full%20stack%20web%20development
2. https://www.udemy.com/topic/full-stack-web-development/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

INTERNET OF THINGS LAB

(PROFESSIONAL ELECTIVE III)

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG637PE	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

1. To introduce the raspberry PI platform, that is widely used in IoT applications
2. To introduce the implementation of distance sensor on IoT devices

COURSE OUTCOMES

1. Ability to introduce the concept of M2M (machine to machine) with necessary protocols and get awareness in implementation of distance sensor
2. Get the skill to program using python scripting language which is used in many IoT devices

List of Experiments

1. Using Raspberry pi

a. Calculate the distance using a distance sensor.

b. Interface an LED and switch with Raspberry pi.

c. Interface an LDR with Raspberrry Pi.

2. Using Arduino

a. Calculate the distance using a distance sensor.

b. Interface an LED and switch with Aurdino.

c. Interface an LDR with Aurdino

d. Calculate temperature using a temperature sensor.

3. Using Node MCU

a. Calculate the distance using a distance sensor.

b. Interface an LED and switch with Raspberry pi.

c. Interface an LDR with Node MCU

d. Calculate temperature using a temperature sensor.

4. Installing OS on Raspberry Pi

a) Installation using PiImager

b) Installation using image file

Downloading an Image

Writing the image to an SD card

using Linux

using Windows

Booting up Follow the instructions given in the URL

https://www.raspberrypi.com/documentation/computers/getting-started.html

5. Accessing GPIO pins using Python

a) Installing GPIO Zero library.

update your repositories list:

install the package for Python 3:

b) Blinking an LED connected to one of the GPIO pin

c) Adjusting the brightness of an LED Adjust the brightness of an LED (0 to 100, where 100 means maximum brightness) using the in-built PWM wavelength.

6. Create a DJANGO project and an app.

7. Create a DJANGO view for weather station REST API

8. Create DJANGO template

9. Configure MYSQL with DJANGO framework

TEXT BOOKS

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547.
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759.

REFERENCE BOOKS

1. Bernd Scholz-Reiter, Florian Michahelles, “Architecting the Internet of Things”, ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer, 2016
2. N. Ida, Sensors, Actuators and Their Interfaces, Scitech Publishers, 2014.

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1. https://books.google.co.in/books/about/Internet_of_Things.html?id=JPKGBAAAQBAJ&prints
2. http://202.62.95.70:8080/jspui/bitstream/123456789/12322/1/Internet%20of%20Things%20By

E -TEXT BOOKS

1. Internet of things security: principles and practices, quango Tang, fan du.

MOOCS COURSES

1. https://www.youtube.com/watch?v=LlhmzVL5bm8
2. https://www.youtube.com/watch?v=6mBO2vqLv38

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

SCRIPTING LANGUAGES LAB

(PROFESSIONAL ELECTIVE III)

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG638PE	B. Tech	0	0	2	1	40	60	100

PREREQUISITES

1. Any High level programming language

COURSE OBJECTIVES

1. To Understand the concepts of scripting languages for developing web based projects
2. To understand the applications the of Ruby, TCL, Perl scripting languages

COURSE OUTCOMES

1. Ability to understand the differences between Scripting languages and programming languages
2. Gain some fluency programming in Ruby, Perl, TCL

List of Experiments

1. Write a Ruby script to create a new string which is n copies of a given string where n is a non-negative integer

2. Write a Ruby script which accept the radius of a circle from the user and compute the parameter and area.

3. Write a Ruby script which accept the users first and last name and print them in reverse order with a space between them

4. Write a Ruby script to accept a filename from the user print the extension of that

5. Write a Ruby script to find the greatest of three numbers

6. Write a Ruby script to print odd numbers from 10 to 1

7. Write a Ruby script to check two integers and return true if one of them is 20 otherwise return their sum

8. Write a Ruby script to check two temperatures and return true if one is less than 0 and the other is greater than 100

9. Write a Ruby script to print the elements of a given array

10. Write a Ruby program to retrieve the total marks where subject name and marks of a student stored in a hash

11. Write a TCL script to find the factorial of a number

12. Write a TCL script that multiplies the numbers from 1 to 10

13. Write a TCL script for sorting a list using a comparison function

14. Write a TCL script to (i) create a list (ii) append elements to the list (iii) Traverse the list (iv)Concatenate the list

15. Write a TCL script to comparing the file modified times.

16. Write a TCL script to Copy a file and translate to native format.

17. a) Write a Perl script to find the largest number among three numbers.
    b) Write a Perl script to print the multiplication tables from 1-10 using subroutines.
18. Write a Perl program to implement the following list of manipulating functions
    a) Shift
    b) Unshift
    c) Push
19. a) Write a Perl script to substitute a word, with another word in a string.
    b) Write a Perl script to validate IP address and email address.
20. Write a Perl script to print the file in reverse order using command line arguments

TEXT BOOKS

1. The World of Scripting Languages, David Barron,Wiley Publications.
2. Ruby Programming language by David Flanagan and Yukihiro Matsumoto O'Reilly
3. "Programming Ruby" The Pramatic Progammers guide by Dabve Thomas Second edition

REFERENCE BOOKS

1. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J.Lee and B. Ware (Addison Wesley) Pearson Education.
2. Perl by Example, E. Quigley, Pearson Education.
3. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.
4. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
5. Perl Power, J. P. Flynt, Cengage Learning.

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1. https://ghcrajan.files.wordpress.com/2013/07/cs518-unit-iii.pdf
2. https://mu.ac.in/wp-content/uploads/2021/06/USIT203-Web-programmig.pdf

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1. https://www.nocostlibrary.com/2021/07/the-world-of-scripting-languages-no.html
2. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2

MOOCS COURSES

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

MOBILE APPLICATION DEVELOPMENT LAB

(PROFESSIONAL ELECTIVE III)

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG639PE	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

1. To learn how to develop Applications in an android environment.
2. To learn how to develop user interface applications.
3. To learn how to develop URL related applications.

COURSE OUTCOMES

1. Understand the working of Android OS Practically.
2. Develop user interfaces.
3. Develop, deploy and maintain the Android Applications.

List of Experiments

1. (a) Create an Android application that shows Hello + name of the user and run it on an emulator.

(b) Create an application that takes the name from a text box and shows hello message along with the name entered in the text box, when the user clicks the OK button.

2. Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Datepicker), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button. Use (a) Linear Layout (b) Relative Layout and (c) Grid Layout or Table Layout.

3. Develop an application that shows names as a list and on selecting a name it should show the details of the candidate on the next screen with a “Back” button. If the screen is rotated to landscape mode (width greater than height), then the screen should show list on left fragment and details on the right fragment instead of the second screen with the back button. Use Fragment transactions and Rotation event listeners.

4. Develop an application that uses a menu with 3 options for dialing a number, opening a website and to send an SMS. On selecting an option, the appropriate action should be invoked using intents.

5. Develop an application that inserts some notifications into Notification area and whenever a notification is inserted, it should show a toast with details of the notification.

6. Create an application that uses a text file to store usernames and passwords (tab separated fields and one record per line). When the user submits a login name and password through a screen, the details should be verified with the text file data and if they match, show a dialog saying that login is successful. Otherwise, show the dialog with a Login Failed message.

7. Create a user registration application that stores the user details in a database table.

8. Create a database and a user table where the details of login names and passwords are stored. Insert some names and passwords initially. Now the login details entered by the user should be verified with the database and an appropriate dialog should be shown to the user.

9. Create an admin application for the user table, which shows all records as a list and the

admin can select any record for edit or modify. The results should be reflected in the table.

10. Develop an application that shows all contacts of the phone along with details like name, phone number, mobile number etc.

11. Create an application that saves user information like name, age, gender etc. in shared preference and retrieves them when the program restarts.

12. Create an alarm that rings every Sunday at 8:00 AM. Modify it to use a time picker to set alarm time.

TEXT BOOKS

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012.

2. Android Application Development for Java Programmers, James C Sheusi, Cengage, 2013.

REFERENCE BOOKS

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013.

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1. https://www.javatpoint.com/android-tutorial
2. https://www.tutorialspoint.com/mobile_development_tutorials.html

E -TEXT BOOKS

1. https://egyankosh.ac.in/bitstream/123456789/70872/1/Unit-1.pdf
2. https://www.theseus.fi/bitstream/handle/10024/67806/yevheniy_Final_version.pdf

MOOCS COURSES

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

SOFTWARE TESTING METHODOLOGIES LAB

(PROFESSIONAL ELECTIVE III)

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG640PE	B. Tech	0	0	2	1	40	60	100

Prerequisites

1. A basic knowledge of programming.

COURSE OBJECTIVES

1. To provide knowledge of software testing methods.
2. To develop skills in automation of software testing and software test automation management using the latest tools.

COURSE OUTCOMES

1. Design and develop the best test strategies in accordance with the development model.
2. Design and develop GUI, Bitmap and database checkpoints
3. Develop database checkpoints for different checks
4. Perform batch testing with and without parameter passing

List of Experiments

1. Recording in context sensitive mode and analog mode
2. GUI checkpoint for single property
3. GUI checkpoint for single object/window
4. GUI checkpoint for multiple objects
5. a. Bitmap checkpoint for object/window
   b. Bitmap checkpoint for screen area
6. Database checkpoint for Default check
7. Database checkpoint for custom check
8. Database checkpoint for runtime record check
9. a. Data driven test for dynamic test data submission
   b. Data driven test through flat files
   c. Data driven test through front grids
   d. Data driven test through excel test
10. a. Batch testing without parameter passing
    b. Batch testing with parameter passing
11. Data driven batch
12. Silent mode test execution without any interruption
13. Test case for calculator in windows application

TEXT BOOKS

1. Software Testing techniques, Baris Beizer, 2nd Edition, Dreamtech.
2. Software Testing Tools, Dr. K.V.K.K.Prasad, Dreamtech.

REFERENCE BOOKS

1. The craft of software testing, Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing in the Real World, Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing, Meyers, John Wiley.

WEB REFERENCES

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1. https://examupdates.in/software-testing-methodologies/

MOOCS COURSES

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

GOOGLE ANIMATION/ HADOOP FLASH/ OPEN TOONZ LAB

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG605PC	B. Tech	0	0	4	2	40	60	100

COURSE OBJECTIVES

Create basic animations using Google Animation features

COURSE OUTCOMES

1. Navigate through Google Animation software and understand its interface.
2. Produce simple animated sequences, demonstrating fundamental skills in character movement and scene transitions

List of Experiments

Implement the following scenarios using Google Animation studio.

1. **Expressive Locomotion:** This exercise could involve exploring new ways for characters to move and express themselves beyond traditional animation techniques. Imagine a character's emotions reflected in the fluidity or stiffness of their movements, or their personality shining through their gait and posture.

2**. Procedural Storytelling**: This could involve using algorithms and artificial intelligence to generate story elements or even entire narratives. Imagine a system that can create branching storylines based on viewer choices or dynamically adapt the pacing of a scene based on emotional cues.

3. **Immersive Audio Design**: This might involve pushing the boundaries of sound design to create truly immersive experiences for viewers. Imagine feeling the rumble of a spaceship taking off in your chest or the brush of wind against your skin as a character races through a field.

4. **Tactile Animation**: This could involve exploring ways to make animation feel more tangible and physical. Imagine being able to reach out and touch a character on the screen, or feeling the texture of their fur or clothing.

5. **Hybrid Live-Action/Animation**: This might involve seamlessly blending live-action footage with animation, creating a world where the real and the fantastical coexist. Imagine actors interacting with animated characters as if they were in the same room, or real-world objects morphing into animated creations.

6. **AI-powered Character Rigging**: This could involve using artificial intelligence to automate the process of rigging characters for animation. Imagine a system that can learn from previous animations and automatically create the necessary controls for new characters, saving animators time and effort.

7**. Real-time Animation in Games**: This might involve pushing the boundaries of real-time animation to create more immersive and interactive gaming experiences. Imagine characters that react to your actions in real-time, or environments that dynamically change as you explore them.

8**. Emotionally-driven Animation**: This could involve using technology to capture and interpret human emotions, then translate them into animation. Imagine characters whose facial expressions and body language flawlessly reflect their inner feelings, creating a deeper connection with the audience.

9. **Procedural Animation for Crowds**: This might involve using algorithms to create and animate large

crowds of people, rather than animating each individual character by hand. Imagine bustling city streets filled with realistic-looking pedestrians, or massive concert audiences swaying to the music

10**. Physics-based Animation**: This could involve using physics simulations to create more realistic and dynamic animation. Imagine objects interacting with their environment in real-time, or characters whose movements are governed by the laws of physics.

11. **Data Visualization Animation**: This might involve using animation to bring complex data sets to life in a visually compelling way. Imagine scientific concepts or statistical trends transformed into mesmerizing animated sequences that educate and entertain.

12. **Collaborative Animation Tools**: This could involve developing new tools that allow multiple animators to work on a project together in real-time, breaking down geographical and logistical barriers. Imagine a team of animators scattered around the world, seamlessly collaborating to create a single animated masterpiece.

TEXT BOOKS

1. Rao Heidmets, The Animation Textbook, CRC Press

REFERENCE BOOKS

. https://opentoonz.github.io/e/

WEB REFERENCES

1. https://www.immagic.com/eLibrary/ARCHIVES/EBOOKS/I111025E.pdf

E -TEXT BOOKS

1. https://opentoonz.readthedocs.io/en/latest/https://www.immagic.com/eLibrary/ARCHIVES/EBOOKS/I111025E.pdf

MOOCS COURSES

1. https://www.mooc-list.com/tags/apache-spark
2. https://www.coursera.org/courses?query=apache%20spark

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ENVIRONMENTAL SCIENCE

III B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
ES607MC	B. Tech	3	0	0	3	100	-	100

COURSE OBJECTIVES

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

COURSE OUTCOMES

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

UNIT-I	ECOSYSTEMS	CLASS:12

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

UNIT-II	NATURAL RESOURCES	CLASS:12

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

UNIT-III	BIODIVERSITY AND BIOTIC RESOURCES	CLASS:12

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

UNIT-IV	ENVIRONMENTAL POLLUTION	CLASS:12

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Sources and types of pollution, drinking water quality standards. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. Global Environmental Issues

and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT-V	ENVIRONMENTAL POLICY AND SUSTAINABLE DEVELOPEMENT	CLASS:12

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

TEXT BOOKS

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

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

REFERENCE BOOKS

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.

WEB REFERENCES

1. https://www.britannica.com/science/ecosystem
2. https://ocw.mit.edu/resources/#EnvironmentandSustainability

E -TEXT BOOKS

1. P N Palanisamy Environmental Science ISBN:9788131773253, eISBN:97899332509771 Edition: Second edition
2. Environmental Studies. Author, Dr. J. P. Sharma. Publisher, Laxmi Publications, 2009 ISBN, 8131806413, 9788131806418.

MOOCS COURSES

1. https://nptel.ac.in/courses/122103039/38
2. https://nptel.ac.in/courses/106105151/12

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DESIGN DRAWING AND VISUALIZATION

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG701PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. Learn the design and drawing principles of 2D and 3D surfaces
2. Develop visualization skills using software tools

COURSE OUTCOMES

1. Observe and visually represent all the elements in their environment with a focus on human forms, objects and nature and the way they interact.
2. Inculcate skills and develop the ability to explain the importance of precision in design through drawings using instruments/tools and concept of geometrical forms and configurations of forms through basic geometrical patterns on 2D surfaces.
3. Develop the ability to discuss orthographic projections of forms through Technical Drawings and Isometric Views of forms through Analytical Drawings and use these as a tool for visual understanding and visual representation.
4. Analyse visual structure of 3D forms on 2D surfaces with an understanding of spatial concepts
5. Analyse complex images and in turn develop the ability to visualise concepts, create menta imageries and articulate them visually..

UNIT-I	INTRODUCTION TO DESIGN DRAWING	CLASS:12

Introduction to Materials, Tools & Methods:
Importance of different grades of pencils & exploring different ways of holding the pencil to develop control of drawing implements. Developing free finger, wrist, hand & arm movement and initiate muscle-memory through making of markings. Introduction to Observation – Scrutinize, Examine, Study, Inspect, Perceive, Sense, Feel, Notice, Identify, Understand. Training the eye to observe accurately to educate the visual sense. Introduction to Perception – View, Opinion, Insight, Discernment. Introduction to Perspective – Eye level, Vanishing Point..

UNIT-II	DRAWING OF CUBES and PERSPECTIVES	CLASS:12

Introduction to Vanishing Points, View Point, Eye Level, Horizon, Parallel & Converging Lines, One Point Perspective, Two Point Perspective, Three Point Perspective, Perspective in the Environment, Interior Spaces and Objects

UNIT-III	OBJECT DRAWING	CLASS:12

OBJECT DRAWING
Introduction to other geometric forms like cylinder, cuboids etc., Introduction to Object drawing. How to observe – shape, proportions, effect of light on the objects etc.

UNIT-IV	GEOMETRY & STRUCTURE (Analogue):	CLASS:12

GEOMETRY & STRUCTURE (Analogue):
Construction of Basic Polygons, Proportioning Systems: Golden Proportion.
GEOMETRY & STRUCTURE (Digital): Interrelation of Polygons
PROJECTION DRAWINGS: Orthographic Projection of Planes and Solids

UNIT-V	VISUALISATION DRAWING	CLASS:12

VISUALISATION DRAWING: Introduction to Mental Imagery
DRAWING COMPOSITIONS FROM MEMORY: Compositions inclusive of human forms, object, perspective etc.

TEXT BOOKS

1. Erik Olofsson, Klara Sjolen, Design Sketching, KEEOS Design Books.
2. K . Morling, Geometric and Engineering Drawing, Third Edition, Graduate of the Institution of Mechanical Engineers, SI Units, Elsevier, 2010.
http://ebooks.bharathuniv.ac.in/gdlc1/gdlc4/Engineering%20Drawing/Geometric%20and%20Engineering%20Drawing.pdf
3. Norling, Ernest, Perspective Made Easy - Ebook download as PDF File (.pdf) or read book online.
http://www.storytellerartist.com/documents/Perspective_Made_Easy.pd

REFERENCE BOOKS

1. Flint, Tom, Anatomy for the Artist: The Dynamic of the Human Form, London, Arcturus Publishing.
2. . Koos Eissen, Roselien Steur, Sketching: The Basics, BIS Publishers
3. Edwards, Betty, Drawing on the Artist Within: An Inspirational and Practical Guide to Increasing Your Creative Powers, Simon & Schuster Inc., New York
4. Edwards, Betty; New Drawing on the Right Side of the Brain, Publisher: Tarcher; 2002.
5. 5. Edwards, Betty, New Drawing on the Right Side of the Brain - Ebook download as PDF File (.pdf) or read book online. https://aimeeknight.files.wordpress.com/2016/01/edwards-the-newdrawing-on-the-right-side-of-the-brain-viny.pdf
6. Edwards, Betty, Color: A Course in Mastering the Art of Mixing Colors, Publisher: Tarcher / Penguin, New York.
7. Edwards, Betty, Color - A Course in Mastering the Art of Mixing Colors - Ebook download as PDF File (.pdf) or read book online. https://www.scribd.com/document/55190529/Betty-Edwards-Color

WEB REFERENCES

1. https://www.geeksforgeeks.org/designdrawings/

E -TEXT BOOKS

1. https://helpx.adobe.com/pdf/photoshop_reference.pdf

MOOCS COURSES

1. htttps :mooclist/photoshop

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COMPILER DESIGN

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS702PC	B. Tech	3	0	0	3	40	60	100

PREREQUISITES

1. A course on "Formal Languages and Automata Theory".
2. A course on "Computer Organization and architecture".
3. A course on "Data Structures".

COURSE OBJECTIVES

1. Introduce the major concepts of language translation and compiler design and impart the knowledge of practical skills necessary for constructing a compiler.
2. Topics include phases of compiler, parsing, syntax directed translation, type checking use of symbol tables, code optimization techniques, intermediate code generation, code generation and data flow analysis.

COURSE OUTCOMES

1. Demonstrate the ability to design a compiler given a set of language features.
2. Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis.
3. Acquire skills in using lex tool & yacc tool for developing a scanner and parser.
4. Design and implement LL and LR parsers
5. Design algorithms to do code optimization in order to improve the performance of a program in terms of space and time complexity.
6. Design algorithms to generate machine code.

UNIT-I	INTRODUCTION	CLASS:12

Introduction: The structure of a compiler, the science of building a compiler, programming language basics
Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite Automata, From Regular Expressions to Automata, Design of a Lexical-Analyzer Generator, Optimization of DFA-Based Pattern Matchers.

UNIT-II	Syntax Analysis	CLASS:12

Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom-Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars and Parser Generators.

UNIT-III	Syntax-Directed Translation	CLASS;12

Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, Implementing L-Attributed SDD's.
Intermediate-Code Generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Type Checking, Control Flow, Switch-Statements, Intermediate Code for Procedures.

UNIT-IV	Run-Time Environments	CLASS:12

Run-Time Environments: Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management, Introduction to Garbage Collection, Introduction to Trace-Based Collection.

Code Generation: Issues in the Design of a Code Generator, The Target Language, addresses in the Target

Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator, Peephole Optimization, Register Allocation and Assignment, Dynamic Programming Code-Generation

UNIT-V	MACHINE INDEPENDENT OPTIMIZATION	CLASS:12

Machine-Independent Optimization: The Principal Sources of Optimization, Introduction to Data-Flow Analysis, Foundations of Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs.

TEXT BOOKS

1. Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman.

REFERENCE BOOKS

1. Lex & Yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Compiler Construction, Louden, Thomson.

WEB REFERENCES

1. https://www.geeksforgeeks.org/introduction-of-compiler-design/
2. https://www.javatpoint.com/compiler-tutorial

E -TEXT BOOKS

1. Introduction to Compilers and Language Design
2. Compilers Principles, Techniques, and Tools, Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman; Pearson Education
3. Introduction to Automata Theory, Languages, and Computation, Johne E. Hopcroft, Rajeev Motwani, Jeffrey D. Ulman, Pearson Education
4. Advanced Compiler Design and Implementation, Steven Muchnick, Morgan Kaufman Publication

MOOCS COURSES

1. Compiler Design - Course (nptel.ac.in)
2. Compiler Design: Principles, Techniques and Tools | Udemy
3. Compiler Design | Udemy

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

GRAPH THEORY (PROFESSIONAL ELECTIVE – IV)

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG741PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. Understanding graphs, trees, connected paths, applications of trees and graphs.

COURSE OUTCOMES

1. Know some important classes of graph theoretic problems;
2. Prove central theorems about trees, matching, connectivity, coloring and planar graphs;
3. Describe and apply some basic algorithms for graphs;
4. Use graph theory as a modeling tool.

UNIT-I	INTRODUCTION	CLASS:12

Introduction-Discovery of graphs, Definitions, Subgraphs, Isomorphic graphs, Matrix representations of graphs, Degree of a vertex, Directed walks, paths and cycles, Connectivity in digraphs, Eulerian and Hamilton digraphs, Eulerian digraphs, Hamilton digraphs, Special graphs, Complements, Larger graphs from smaller graphs, Union, Sum, Cartesian Product, Composition, Graphic sequences, Graph theoretic model of the LAN problem, Havel-Hakimi criterion, Realization of a graphic sequence.

UNIT-II	CONNECTED GRAPHS AND SHORTEST PATHS	CLASS:12

Connected graphs and shortest paths - Walks, trails, paths, cycles, Connected graphs, Distance, Cut-vertices and cut-edges, Blocks, Connectivity, Weighted graphs and shortest paths, Weighted graphs, Dijkstra's shortest path algorithm, Floyd-War shall shortest path algorithm.

UNIT-III	TREES	CLASS:12

Trees- Definitions and characterizations, Number of trees, Cayley‟s formula, Kircho↵-matrix-tree theorem, Minimum spanning trees, Kruskal‟s algorithm, Prim‟s algorithm, Special classes of graphs, Bipartite Graphs, Line Graphs, Chordal Graphs, Eulerian Graphs, Fleury‟s algorithm, Chinese Postman problem, Hamilton Graphs, Introduction, Necessary conditions and sufficient conditions.

UNIT-IV	INDEPENDENT SETS COVERINGS AND MATCHINGS	CLASS:12

Independent sets coverings and matchings– Introduction, Independent sets and coverings: basic equations, Matchings in bipartite graphs, Hall‟s Theorem, K¨onig‟s Theorem, Perfect matchings in graphs, Greedy and approximation algorithms.

UNIT-V	VERTEX COLORINGS	CLASS:12

Vertex Colorings- Basic definitions, Cliques and chromatic number, Mycielski‟s theorem, Greedy coloring algorithm, Coloring of chordal graphs, Brooks theorem, Edge Colorings, Introduction and Basics, Gupta-Vizing theorem, Class-1 and Class-2 graphs, Edge-coloring of bipartite graphs, Class-2 graphs, Hajos union and Class-2 graphs, A scheduling problem and equitable edge-coloring.

TEXT BOOKS

1. J. A. Bondy and U. S. R. Murty. Graph Theory, volume 244 of Graduate Texts in Mathematics. Springer, 1st edition, 2008.
2. J. A. Bondy and U. S. R. Murty. Graph Theory with Applications.

REFERENCE BOOKS

1. Lecture Videos: http://nptel.ac.in/courses/111106050/13
2. Introduction to Graph Theory, Douglas B. West, Pearson.

WEB REFERENCES

1. https://www.geeksforgeeks.org/mathematics-graph-theory-basics-set-1/
2. https://www.tutorialspoint.com/graph_theory/graph_theory_introduction.htm

E -TEXT BOOKS

1. A-Textbook-of-Graph-Theory-R.-Balakrishnan-K.-Ranganathan.pdf (meskc.ac.in)
2. https://www.maths.ed.ac.uk/~v1ranick/papers/wilsongraph.pdf
3. Details for: A textbook of graph theory / › Mysore University Library System catalog (informaticsglobal.com)

MOOCS COURSES

1. Algorithms on Graphs (Coursera) | MOOC List (mooc-list.com)
2. Introduction to Graph Theory (Coursera) | MOOC List (mooc-list.com)
3. Graph Theory - Course (swayam2.ac.in)

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

VIRTUAL REALITY (PROFESSIONAL ELECTIVE – IV)

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG742PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. This course will help students learn the basic principles of virtual reality applications and get them to know how games differ from desktop apps. It will help students build various types of VR experiences and use Unity to develop VR applications.

COURSE OUTCOMES

1. Explain fundamentals of virtual reality systems.
2 Summarize the hardware and software of the VR.
3 Analyze the applications of VR..

UNIT-I	Definition of VR	CLASS;12

Definition of VR, modern experiences, historical perspective. Hardware, sensors, displays, software, virtual world generator, game engines, human senses, perceptual psychology, psychophysics. Geometric modeling, transforming rigid bodies, yaw, pitch, roll, axis-angle representation, quaternions, 3D rotation inverses and conversions, homogeneous transforms, transforms to displays, look-at and eye transforms, canonical view and perspective transforms, viewport transforms

UNIT-II	Light propagation	CLASS:12

Light propagation, lenses and images, diopters, spherical aberrations, optical distortion; more lens aberrations; spectral properties; the eye as an optical system; cameras; visual displays. Parts of the human eye, photoreceptors and densities, scotopic and photopic vision, display resolution requiments, eye movements, neural vision structures, sufficient display resolution, other implications of physiology on VR. Depth perception, motion perception, vection, stroboscopic apparent motion, color perception, combining information from multiple cues and senses, implications of perception on VR

UNIT-III	Graphical rendering	CLASS:12

Graphical rendering, ray tracing, shading, BRDFs, rasterization, barycentric coordinates, VR rendering problems, anti-aliasing, distortion shading, image warping (time warp), panoramic rendering. Velocities, acceleration, vestibular system, virtual world physics, simulation, collision detection, avatar motion, vection

UNIT-IV	Tracking systems	CLASS:12

Tracking systems, estimating rotation, IMU integration, drift errors, tilt and yaw correction, estimating position, camera-feature detection model, perspective n-point problem, sensor fusion, lighthouse approach, attached bodies, eye tracking, inverse kinematics, map building, SLAM. Remapping, locomotion, manipulation, social interaction, specialized interaction mechanisms.

UNIT-V	Sound propagation,	CLASS:12

Sound propagation, ear physiology, auditory perception, auditory localization; Fourier analysis; acoustic modeling, HRTFs, rendering, auralization. Perceptual training, recommendations for developers, best practices, VR sickness, experimental methods that involve human subjects Touch, haptics, taste, smell, robotic interfaces, telepresence, brain-machine interfaces.

TEXT BOOKS

1. Virtual Reality, Steven M. LaValle. Cambridge University Press 2016

REFERENCE BOOKS

1. Handbook of Virtual Environments: Design, Implementation, and Applications Kelly S. Hale Kay M. Stanney CRC Press 2nd Edition, 2015
2. . Allan Fowler-AR Game Development‖, 1st Edition, A press Publications, 2018, ISBN 978-1484236178.

WEB REFERENCES

1. http://vr.cs.uiuc.edu/book.htm

E -TEXT BOOKS

1. https://msl.cs.uiuc.edu/vr/vrbook.pdf

MOOCS COURSES

1. https://www.my-mooc.com/en/categorie/virtualrealtiy

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

SOFT COMPUTING (PROFESSIONAL ELECTIVE – IV)

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG743PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. Familiarize with soft computing concepts
2. Introduce and use the idea of fuzzy logic and use of heuristics based on human experience
3. Familiarize the Neuro-Fuzzy modeling using Classification and Clustering techniques
4. Learn the concepts of Genetic algorithm and its applications
5. Acquire the knowledge of Rough Sets.

COURSE OUTCOMES

1. Identify the difference between Conventional Artificial Intelligence to Computational Intelligence.
2. Understand fuzzy logic and reasoning to handle and solve engineering problems
3. Apply the Classification techniques on various applications.
4. Perform various operations of genetic algorithms and Rough Sets.

UNIT-I	INTRODUCTION TO SOFT COMPUTING	CLASS:12

Introduction to Soft Computing: Evolutionary Computing, "Soft" computing versus "Hard" computing, Soft Computing Methods, Recent Trends in Soft Computing, Characteristics of Soft computing, Applications of Soft Computing Techniques.

UNIT-II	FUZZY SYSTEMS	CLASS:12

Fuzzy Systems: Fuzzy Sets, Fuzzy Relations, Fuzzy Logic, Fuzzy Rule-Based Systems

UNIT-III	FUZZY DECISION MAKING	CLASS:12

Fuzzy Decision Making, Particle Swarm Optimization

UNIT-IV	GENETIC ALGORITHMS	CLASS:12

Genetic Algorithms: Basic Concepts, Basic Operators for Genetic Algorithms, Crossover and Mutation Properties, Genetic Algorithm Cycle, Fitness Function, Applications of Genetic Algorithm.

UNIT-V	ROUGH SETS	CLASS:12

Rough Sets: Rough Sets, Rule Induction, and Discernibility Matrix, Integration of Soft Computing Techniques.

TEXT BOOKS

1. Soft Computing – Advances and Applications - Jan 2015 by B.K. Tripathy and J. Anuradha – Cengage Learning

REFERENCE BOOKS

1. S. N. Sivanandam & S. N. Deepa, "Principles of Soft Computing", 2nd edition, Wiley India, 2008.
2. David E. Goldberg, "Genetic Algorithms-In Search, optimization and Machine learning", Pearson Education.
3. J. S. R. Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", Pearson Education, 2004.
4. G.J. Klir & B. Yuan, "Fuzzy Sets & Fuzzy Logic", PHI, 1995.
5. Melanie Mitchell, "An Introduction to Genetic Algorithm", PHI, 1998.
6. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", McGraw- Hill International editions, 1995

WEB REFERENCES

1. https://www.javatpoint.com/what-is-soft-computing

E -TEXT BOOKS

1. https://www.vssut.ac.in/lecture_notes/lecture1423723637.pdf
2. https://pkklib.iitk.ac.in/index.php/resources/e-books/e-text-books/42005:artificial-intelligence-and-soft-computing
3. https://freecomputerbooks.com/Introduction-to-Soft-Computing.html

MOOCS COURSES

1. https://onlinecourses.nptel.ac.in/noc22_cs54/preview
2. https://www.iare.ac.in/?q=pages/moocs-courses-it
3. https://sunilwanjarisvpcet.wordpress.com/soft-computing/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

CLOUD COMPUTING (PROFESSIONAL ELECTIVE – IV)

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG744PE	B. Tech	3	0	0	3	40	60	100

PRE-REQUISITES:

1. A course on "Computer Networks".
2. A course on "Operating System".

COURSE OBJECTIVES

1. This course provides an insight into cloud computing
2. Topics covered include- Cloud Computing Architecture, Deployment Models, Service Models, Technological Drivers for Cloud Computing, Networking for Cloud Computing and Security in Cloud Computing

COURSE OUTCOMES

1. Understand different computing paradigms and potential of the paradigms and specifically cloud computing
2. Understand cloud service types, cloud deployment models and technologies supporting and driving the cloud
3. Acquire the knowledge of programming models for cloud and development of software application that runs the cloud and various services available from major cloud providers
4. Understand the security concerns and issues in cloud computing
5. Acquire the knowledge of advances in cloud computing.

UNIT-I	INTRODUCTION	CLASS:12

Computing Paradigms, Cloud Computing Fundamentals, Cloud Computing Architecture and Management

UNIT-II	CLOUD DEPLOYMENT & SERVICES MODELS	CLASS:14

Cloud Deployment Models, Cloud Service Models, Technological Drivers for Cloud Computing: SOA and Cloud, Multicore Technology, Web 2.0 and Web 3.0, Pervasive Computing, Operating System, Application Environment

UNIT-III	VIRTUALIZATION & PROGRAMMING MODELS	CLASS:12

Virtualization, Programming Models for Cloud Computing: MapReduce, Cloud Haskell, Software Development in Cloud

UNIT-IV	NETWORKING FOR CLOUD COMPUTING	CLASS:10

Networking for Cloud Computing: Introduction, Overview of Data Center Environment, Networking Issues in Data Centers, Transport Layer Issues in DCNs, Cloud Service Providers

UNIT-V	SECURITY	CLASS:10

Security in Cloud Computing, and Advanced Concepts in Cloud Computing

TEXT BOOKS

1. Chandrasekaran, K. Essentials of cloud computing. CRC Press, 2014

REFERENCE BOOKS

1. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley, 2011
2. Enterprise Cloud Computing - Technology, Architecture, Applications, Gautam Shroff, Cambridge University Press, 2010
3. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010

WEB REFERENCES

1. https://www.zdnet.com/article/what-is-cloud-computing-everything-you-need-to-know-about-the-cloud/
2. https://www.techtarget.com/searchcloudcomputing/definition/cloud-computing

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1. https://www.techtarget.com/searchcloudcomputing/definition/cloud-computing
2. https://mu.ac.in/wp-content/uploads/2021/01/Cloud-Computing.pdf
3. https://www.lpude.in/SLMs/Master%20of%20Computer%20Applications/Sem_2/DECAP470_CLOUD_COMPUTING.pdf

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1. https://www.mooc-list.com/tags/cloud-computing
2. https://www.my-mooc.com/en/mooc/introduction-cloud-computing-microsoft-cloud200x/
3. https://www.mooclab.club/threads/10-top-moocs-in-cloud-and-distributed-computing.9006/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

AD-HOC & SENSOR NETWORKS (PROFESSIONAL ELECTIVE – IV)

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG745PE	B. Tech	3	0	0	3	40	60	100

PRE-REQUISITES

1. Computer Networks
2. Distributed Systems
3. Mobile Computing

COURSE OBJECTIVES

1. To understand the challenges of routing in ad-hoc and sensor networks
2. To understand various broadcast, mutlicast and geocasting protocols in ad hoc and sensor networks
3. To understand basics of Wireless sensors, and Lower Layer Issues and Upper Layer Issues of WSN

COURSE OUTCOMES

1. Understand the concepts of sensor networks and applications
2. Understand and compare the MAC and routing protocols for adhoc networks
3. Understand the transport protocols of sensor networks

UNIT-I	INTRODUCTION	CLASS:12

Introduction to Ad Hoc Networks
Characteristics of MANETs, Applications of MANETs and Challenges of MANETs.
Routing in MANETs
Criteria for classification, Taxonomy of MANET routing algorithms, Topology-based routing algorithms- Proactive: DSDV, WRP; Reactive: DSR, AODV, TORA; Hybrid: ZRP; Position- based routing algorithms- Location Services-DREAM, Quorum-based, GLS; Forwarding Strategies, Greedy Packet, Restrict Directional Flooding-DREAM, LAR; Other routing algorithms-QoS Routing, CEDAR.

UNIT-II	DATA TRANSMISSION	CLASS:12

Broadcast Storm Problem, Rebroadcasting Schemes-Simple-flooding, Probability-based Methods, Area based Methods, Neighbor Knowledge-based: SBA, Multipoint Relaying, AHBP. Multicasting: Tree-based: AMRIS, MAODV; Mesh-based: ODMRP, CAMP; Hybrid: AM Route, MCEDAR.

UNIT-III	GEOCASTING	CLASS:12

Data-transmission Oriented-LBM; Route Creation Oriented-Geo TORA, MGR.
TCP over Ad Hoc TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT-IV	BASICS OF WIRELESS SENSORS AND LOWER LAYER ISSUES	CLASS:12

Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer, Routing Layer.

UNIT-V	UPPER LAYER ISSUES OF WSN	CLASS:12

Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

TEXT BOOKS

1. Ad Hoc and Sensor Networks – Theory and Applications, Carlos Corderio Dharma P. Aggarwal, World Scientific Publications, March 2006, ISBN – 981-256-681-3
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman)

REFERENCE BOOKS

1. C. Siva Ram Murthy, B.S. Manoj Ad Hoc Wireless Networks: Architectures and Protocols.
2. Taieb Znati Kazem Sohraby, Daniel Minoli, Wireless Sensor Networks: Technology, Protocols and Applications, Wiley.

WEB REFERENCES

1. https://www.geeksforgeeks.org/differences-between-wireless-adhoc-network-and-wireless-sensor-network/

E -TEXT BOOKS

1. https://referenceglobe.com/CollegeLibrary/library_books/20180301073312adhoc2-ilovepdf-compressed.pdf
2. https://www.worldscientific.com/worldscibooks/10.1142/6044#t=aboutBook
3. https://benthamscience.com/public/chapter/1107

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1. https://archive.nptel.ac.in/courses/106/105/106105160/
2. https://library.iitd.ac.in/node/79180
3. https://courseinfo.canterbury.ac.nz/GetCourseDetails.aspx?course=COSC418&occurrence=13S2(C)&year=2013

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COMPUTER GAME DESIGNING & PROGRAMMING

(PROFESSIONAL ELECTIVE – V)

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG751PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. To learn ideas and techniques to develop games
2. To Understand computer game development

COURSE OUTCOMES

1. Understand the game design, Game systems, and its prototyping.
2. Knowledge on the Gaming architecture
3. Knowledge on Graphics and animation
4. Understand Game Industry and IP

UNIT-I	Games: History and Society	CLASS:12

Games: History and Society
The First Video Games, Games for the Masses, The Console Kings, Audience and Demographics, Societal Reaction to Games, Cultural Issues, Society within Games
Game Design:
The Game Designer, A Model of Games, Game, Player and Experience, Play Mechanics, Interface, Game Systems, Design Work, Prototyping and Play testing Cycles, Play testing

UNIT-II	Programming Languages and Fundamentals	CLASS:12

Programming Languages and Fundamentals
C++ and Game Development, Java, Scripting Languages, Data Structures, Object-Oriented Design in Games, Component Systems, Design Patterns
Game Architecture, Memory and Debugging:
Bird's-Eye View of a Game, Initialization/Shutdown Steps, Main Game Loop, Game, Entities, Memory Management, File I/O, Game Resources, Serialization, The Five-Step Debugging Process, Expert Debugging Tips, Tough Debugging, Scenarios and Patterns, Understanding the Underlying System, Adding Infrastructure to Assist in Debugging, Prevention of Bugs.

UNIT-III	Graphics and Animation	CLASS:12

Graphics and Animation
Introduction to 3D Modeling, Box Modeling with Polygons, NURBS, Subdivision Surfaces, 3D Sculpting, Reverse Engineering, BSP Modeling, Modeling Methodology, Texture Mapping, Mapping UV Coordinates, Animation, Motion Capture, Motion Extraction, Mesh Deformation, Inverse Kinematics, Collision Detection, Real-Time Animation Playback, Character Animation, Facial Animation, Simulation Animation

UNIT-IV	Artificial Intelligence for Games	CLASS:12

Artificial Intelligence for Games
AI for Games, Game Agents, Finite-State Machines, Common AI Techniques, Search Space, Path finding, Audio and Network, Programming Basic Audio, Programming Music Systems, Programming Advanced Audio

UNIT-V	Game Industry and IP	CLASS:12

Game Industry and IP
Game Developers, Publishers, Platform Holders, Deal Dynamics, Payment Negotiation, Advertising, Media, Publicity Opportunities, Marketing, IP Protection, The IP Content of Video Games, Patents, Copyrights, Trademarks, Transfers of IP Rights, Video Game Content Regulation.

TEXT BOOKS

1. Steve Rabin, Introduction to Game Development, 2nd ed. Course Technology 2010, 978-1-58450-679-9.

REFERENCE BOOKS

1. Kenneth C. Finney, 3D Game Programming: All in One, 3rd Ed Course Technology 2013, 978-1-4354- 5744-7.

WEB REFERENCES

https://www.coursera.org/learn/computergamedesignandprogramming

E -TEXT BOOKS

1. https://www.cs.cmu.edu/~15850/notes/cmu850-f20.pdf

MOOCS COURSES

1. https://www.my-mooc.com/en/categorie/computergamedesignamdprogamming

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

AGILE METHODOLOGY (PROFESSIONAL ELECTIVE – V)

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG752PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. Knowledge on concepts of agile development, releasing, planning and developing

COURSE OUTCOMES

1. Identify basic concepts of agile methodology and Extreme programming
2. Analyze real customer involvement in collaboration
3. Discuss risk management and iteration planning
4. Understanding incremental requirements, refactoring, incremental design and architecture

UNIT-I	INTRODUCTION	CLASS:12

Introduction Extreme Programming (XP) - Agile Development

Why Agile?, Understanding Success, Beyond Deadlines, Importance of Organizational Success, Introduction to Agility, Agile methods-Scrum and XP, Manifesto for Agile Software Development, Principles of Agile Process. Understanding XP (Extreme Programming) - XP life cycle, XP team, XP Concepts, Adopting XP - Knowing whether XP is suitable, Implementing XP, assessing Agility, Practicing XP - Thinking, Pair Programming, Energized work, Informative Workspace, Root cause Analysis, Retrospectives.

UNIT-II	COLLABORATING	CLASS:12

Collaborating

Trust, Sit together, Real customer involvement, Ubiquitous language, Stand-Up meetings, coding standards, Iteration demo, Reporting.

UNIT-III	RELEASING	CLASS:12

Releasing: Bugfree Release, Version Control, Ten-Minute Build, continuous integration, Collective ownership and Documentation.

UNIT-IV	PLANNING	CLASS:12

Planning: Version, Release Planning, The Planning Game, Risk Management, Iteration Planning, Slack, Stories, and Estimating

UNIT-V	DEVELOPING	CLASS:12

Developing: Incremental requirements, Customer tests, Test driven development, Refactoring, Incremental design and architecture, spike solutions, Performance optimization, Exploratory testing.

TEXT BOOKS

1. The art of Agile Development, James Shore and Shane Warden, 11th Indian Reprint, O'Reilly, 2018.

REFERENCE BOOKS

1. Learning Agile, Andrew Stellman and Jennifer Greene, O'Reilly, 4th Indian Reprint, 2018
2. Practices of an Agile Developer, Venkat Subramaniam and Andy Hunt, SPD, 5th Indian Reprint, 2015
3. Agile Project Management - Jim Highsmith, Pearson Low price Edition 2004

WEB REFERENCES

1. https://www.wrike.com/project-management-guide/faq/what-is-agile-methodology-in-project-management/
2. https://asana.com/resources/agile-methodology

E -TEXT BOOKS

1. https://asana.com/resources/agile-methodology
2. https://stackify.com/agile-methodology/
3. https://www.agilealliance.org/agile101/12-principles-behind-the-agile-manifesto/

MOOCS COURSES

1. https://www.my-mooc.com/en/mooc/agile-software-development-ethx-asd-1x/
2. https://www.mooc-list.com/tags/agile
3. https://www.my-mooc.com/en/mooc/applied-scrum-for-project-management/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ROBOTIC PROCESS AUTOMATION (PROFESSIONAL ELECTIVE – V)

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG753PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. Introduce robotic process automation, techniques of automation using UIPath RPA tool.

COURSE OUTCOMES

1. Understand the concepts of Robotic Process Automation.
2. Apply the flow chart mechanism in various calculations.
3. Applying UI Path tool for debugging process
4. Design system managing techniques.
5. Create application for process automation using UI Path tool.

UNIT-I	ROBOTIC PROCESS AUTOMATION	CLASS:12

Robotic Process Automation: Introduction, Scope and techniques of automation, Robotic process automation, Components of RPA, RPA platforms, About UiPath
UIPath Stack Uipath Studio, Uipath Robot, Types of Robots, UiPath Orchestrator
UIPath Studio Projects, User interface
The User Interface: Task recorder, Advanced UI interactions: Input methods, Output methods

UNIT-II	SEQUENCE, FLOWCHART & CONTROL FLOW	CLASS:12

Sequence, Flowchart, and Control Flow: Sequencing the workflow, Activities, Control Flow, various types of loops and decision making
Data Manipulation: Variables and scope, Collections, Arguments – Purpose and use, Data table usage with examples, File operation with step-by-step example, CSV/Excel to data table and vice versa

UNIT-III	CONTROL & PLUGINS AND EXTENSIONS	CLASS:12

Taking Control of the Controls: Finding and attaching windows, Finding the control, Techniques for waiting for a control, Act on controls – mouse and keyboard activities, Handling events, revisit recorder, When to use OCR, Types of OCR available, How to use OCR
Plugins and Extensions: Terminal Plugin, SAP Automation, Citrix automation and Credential management

UNIT-IV	HANDLING, DEBUGGING & LOGGING	CLASS:12

Handling User Events and Assistant Bots: Assistant bots, Monitoring system event triggers, Monitoring image and element triggers, Launching an assistant bot on a keyboard event
Exception Handling, Debugging, and Logging: Exception handling, Common exceptions and ways to handle them, Logging and taking screenshots, Debugging techniques, Collecting crash dumps, Error reporting

UNIT-V	MANAGING AND MAINTAINING	CLASS:12

Managing and Maintaining the Code: Project organization, nesting workflows, Reusability of workflows, Commenting techniques, State Machine, When to use Flowcharts, State Machines, or Sequences, Using config file
Deploying and Maintaining the Bot: Publishing using publish utility, using Orchestration Server to control bots, deploy bots, License Management, Publishing and Managing updates

TEXT BOOKS

1. Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool - UiPath: Create Software robots. with the leading RPA tool – UiPath Kindle Edition

REFERENCE BOOKS

1. Robotic Process Automation A Complete Guide - 2020 Edition Kindle Edition.

WEB REFERENCES

1. https://www.ibm.com/topics/rpa

E -TEXT BOOKS

1. https://www.uipath.com/rpa/robotic-process-automation
2. https://www.techtarget.com/searchcio/definition/RPA
3. https://atria.edu/assets/pdf/ise/Notes/RPA_Notes.pdf

MOOCS COURSES

1. https://www.mooc-list.com/tags/rpa
2. https://www.coursera.org/specializations/roboticprocessautomation
3. https://www.classcentral.com/course/roboticprocessautomation-89523

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

SIMULATION AND MODELING (PROFESSIONAL ELECTIVE – V)

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG754PE	B. Tech	3	0	0	3	40	60	100

PREREQUISITES

1. Probability and statistics, MFCS, Programming.

COURSE OBJECTIVES

1. Define the basics of simulation modeling and replicating the practical situations in organizations
2. Generate random numbers and random variates using different techniques.
3. Develop a simulation model using heuristic methods.
4. Analysis of Simulation models using input analyzer, and output analyzer
5. Explain Verification and Validation of simulation model

COURSE OUTCOMES

1. Describe the role of important elements of discrete event simulation and modeling paradigm.
2. Conceptualize real world situations related to systems development decisions, originating from source requirements and goals.
3. Develop skills to apply simulation software to construct and execute goal-driven system models.
4. Interpret the model and apply the results to resolve critical issues in a real-world environment

UNIT-I	Overview of Modelling and Simulation:	CLASS:12

Overview of Modeling and Simulation: Motivating Examples, Mathematical Foundations for Mathematical Modeling, Elements of Probability and Statistics, Review of Block diagrams, Flow Charts, Algorithms, Principles of Mathematical modeling.

UNIT-II	Deterministic Models-I	CLASS:12

Deterministic Models – I: Conceptual inputs: Principles of Mathematical Modeling. Compartmental Models, Single population models and Interacting population models. Applications/case studies of Compartmental Models, Single population models and Interacting population models.

UNIT-III	Deterministic Models-II	CLASS:12

Deterministic Models – II: Conceptual Inputs: Static and Dynamical systems (simple), System studies, System simulation. Applications of Static and Dynamical systems: Cobweb Models, Distributed Lag Models

UNIT-IV	Pseudo Random Numbers	CLASS:12

Pseudo Random Numbers: Conceptual Inputs: Random number generation and tests for randomness, Generation of Random deviates of discrete and continuous variables, Applications of Monte Carlo Integration.

UNIT-V	Stochastic Modelling	CLASS:12

Stochastic Modeling: Conceptual Inputs: Queuing systems, Inventory systems. System simulation of PERT, Queuing, Inventory. Discrete System Simulation**.**

TEXT BOOKS

1. J.N Kapur (1988) “Mathematical Modeling” New Age International(P) Limited Publications
2. Narsing Deo (1996) “System Simulation with Digital Computer” Prentice-Hall of India Private Limited, New Delhi
3. Jerry Banks, John S Carson II, Barry L Nelson and David M Nicol (2010) Dorling Kindersley (india) Pvt. Ltd.

REFERENCE BOOKS

1. Geoffrey Gordon (2005) “System Simulation” Prentice-Hill of India Private Limited New Delhi.
2. Donald W. Boyd (2001) “System Analysis and Modeling” Harcout India Private Limited.
3. Sankar Sangupta (2013) “System Simulation and Modeling” Dorling Kindersley (India) Pvt. Ltd.
4. Clive L. Dym (2004) “Principles of Mathematical Modeling” Elsevier, New Delhi, India

WEB REFERENCES

01) https://tutorialpoint.com

E -TEXT BOOKS

1. https://industri.fatek.unpatti.ac.id/wp-content/uploads/2019/03/108-Simulation-Modeling-and-Analysis-Averill-M.-Law-Edisi-5-2014.pdf

MOOCS COURSES

1. https://www.mooc4dev.org/systemmodellingandsimulation

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

VISUAL DESIGN AND COMMUNICATIONS

(PROFESSIONAL ELECTIVE – V)

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG755PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. Apply appropriate communication skills across settings, purposes, and audiences.
2. Demonstrate knowledge of communication theory and application.

COURSE OUTCOMES

1. Demonstrate Designing for Experience
2. Understand perceptual and cultural experience in Visual Design and Communications
3. Analyze principles for orienting readers to the interpretation of information
4. Illustrate the nature of Interaction and Interpretation, Legibility/ Readability, Denotation and Connotation.

UNIT-I	Building Blocks of Design	CLASS:12

Building Blocks of Design
Organizing Graphic Space, Selecting And Creating Images, Working With Type

UNIT-II	Power Principles-I	CLASS:12

Power Principles-I
Use Color with Purpose, Establish A Visual Hierarchy, Unify The Design

UNIT-III	Power Principles- II	CLASS:12

Power Principles- II
Create Contrast, Group for Meaning.

UNIT-IV	Practicing Design-I	CLASS:12

Practicing Design-I
Show Them Where To Look, Add Some Excitement.

UNIT-V	Practicing Design-II	CLASS:12

Practicing Design-II
Enhance Meaning, Tell Stories With Visuals, Make Numbers Interesting

TEXT BOOKS

1. Connie Malamed, Visual Design Solutions, Principles and Creative Inspiration for Learning Professionals, Wiley

REFERENCE BOOKS

1. Communication between cultures - Larry A. Samovar, Richard E. Porter, Edwin R. McDaniel & Carolyn Sexton Roy, Monica Eckman, USA, 2012.
2. Introduction to Communication studies - John Fiske & Henry Jenkins 3rd edition, Routledge, Oxon 2011.
3. An Introduction to communication studies - Sheila Steinberg, Juta & Co., Cape Town, 2007.
4. One World Many Voices: Our Cultures - Marilyn Marquis & Sarah Nielsen, Wingspan Press, California, 2010.

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1. https://www.geeksforgeeks.org/visualdesignandcooomuncation

E -TEXT BOOKS

1. https://www.projectsmind.com/wp-content/uploads/2023/04/Software-Project-Management-1.pdf
2. https://www.scribd.com/doc/186841938/software-process-and-project-management
3. https://www.phindia.com/Books/BookDetail/9788120347021/software-project-management-kelkar

MOOCS COURSES

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

OPERATING SYSTEMS (Open Elective –II)

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week	Credits			Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG721OE	B. Tech	3	0	0	3	40	60	100

Prerequisites:

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

COURSE OBJECTIVES

1. Introduce operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
2. Introduce the issues to be considered in the design and development of operating system
3. Introduce basic Unix commands, system call interface for process management, inter process 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	INTRODUCTION	CLASS:12

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 & DEADLOCKS	CLASS:12

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 & INTERPROCESS COMMUNICATION MECHANISMS	CLASS:12

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	CLASS:12

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	CLASS:12

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

TEXT BOOKS

1. Operating Systems, Dr. P. Santosh Kumar Patra, Spectrum University Press, First Edition 2023.
2. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
3. 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,
1. 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.

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1. https://www.cse.iitb.ac.in/~mythili/os/

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1. Abraham Silberschatz-Operating System Concepts (9th,2012_12).pdf (uqu.edu.sa)
2. Operating System Concepts, 8th Edition (mbit.edu.in)
3. operating_systems_three_easy_pieces.pdf (wordpress.com)

MOOCS COURSES

1. Best Operating System Courses & Certificates Online [2024] | Coursera
2. Operating System - Course (nptel.ac.in)
3. MOOC.org | Massive Open Online Courses | An edX Site

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

SOFTWARE ENGINEERING (Open Elective –II)

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG722OE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

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

COURSE OUTCOMES

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

UNIT-I	INTRODUCTION	CLASS:12

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

UNIT-II	SOFTWARE REQUIREMENTS & ENGINEERING PROCESS	CLASS:12

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.
Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

UNIT-III	DESIGN ENGINEERING	CLASS;12

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

UNIT-IV	TESTING STRATEGIES	CLASS;12

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

UNIT-V	RISK & QUALITY MANAGEMENT	CLASS:12

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXT BOOKS

1. Dr. P. Santosh Kumar Patra, Mrs. P. Devasudha, Dr. P. Sai Prasad, Mrs. T. Bhargavi, Software Engineering, Spectrum University Press, First Edition 2023.
2. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw Hill International Edition.
3. Software Engineering- Sommerville, 7th edition, Pearson Education.

REFERENCE BOOKS

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

WEB REFERENCES

1. Software Engineering References (tue.nl)

E -TEXT BOOKS

1. eBooks - Computer Science, Software Engineering and Information Technology - Library Guides at University of Melbourne (libguides.com)
2. Book: Software Engineering - textbook by Ivan Marsic (rutgers.edu)
3. Software Engineering: A Practitioner's Approach (mlsu.ac.in)

MOOCS COURSES

1. Best Software Engineering Courses & Certificates Online [2024] | Coursera
2. TUMx: Software Engineering Essentials | edX
3. MOOC: Global Software Development | TU Delft Online

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

DESIGN DRAWING AND VISUALIZATION LAB

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG703PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

1. Learn the design and drawing principles of 2D and 3D surfaces
2. Develop visualization skills using software tools.

COURSE OUTCOMES

1. Observe and visually represent all the elements in their environment with a focus on human forms, objects and nature and the way they interact.
2. Inculcate skills and develop the ability to explain the importance of precision in design through drawings using instruments/tools and concept of geometrical forms and configurations of forms through basic geometrical patterns on 2D surfaces.
3. Develop the ability to discuss orthographic projections of forms through Technical Drawings and Isometric Views of forms through Analytical Drawings and use these as a tool for visual understanding and visual representation.
4. Analyse visual structure of 3D forms on 2D surfaces with an understanding of spatial concepts
5. Analyse complex images and in turn develop the ability to visualise concepts, create mental imageries and articulate them visually.

LIST OF EXPERIMENTS

1. PROCESS OF LEARNING TO DRAW & SKETCH
   I. Exploring different grades of pencils & different ways of holding the pencil to develop control of drawing implements.
   II. Freehand doodling & sketching to encourage free finger, wrist, hand & arm movement and initiate muscle-memory through making of markings
2. SKETCHING SIMPLE BASIC 3D CUBES TO UNDERSTAND DIFFERENT PERSPECTIVES
   I. Demonstrating the understanding of Vanishing Points, View Point, Eye Level, Horizon Parallel & Converging Lines.
   II. Drawing Cubes in One Point Perspective.
   III. Drawing Cubes in Two Point Perspective.
   IV. Drawing Cubes in Three Point Perspective.
   V. Applying the principles of perspective in sketches of man-made objects and environmental spaces (Buildings, Interior Spaces, etc).
3. SKETCHING MAN MADE OBJECTS
   I. Sketching geometric forms like Cylinder, Cuboids etc.
   II. Introduction to Object Drawing
4. GEOMETRICAL CONSTRUCTION (Analogue)
   I. Construction of straight lines, parallel lines, perpendicular lines & inclined lines.
   II. Construction of circles and tangent lines.
   III. Construction of triangles, squares and polygons
5. GEOMETRICAL CONSTRUCTION (Digital)
   I. Creating Tessellations
6. DRAWING FROM IMAGINATION

7 . SKETCHING FROM OBSERVATION &MEMORY

I. Sketching from Observation: Visual study of human interaction in a mini environment on campus.

II. Sketching from Memory: Sketching the same mini environment from memory.

8. SKETCHING FROM OBSERVATION & MEMORY

I. Drawing Compositions from Observation: Visual study of human interaction in a mini environment outside the campus.

II. Sketching from Memory: Sketching the same mini environment from memory

TEXT BOOKS

1. Erik Olofsson, Klara Sjolen, Design Sketching, KEEOS Design Books.
2. K. Morling, Geometric and Engineering Drawing, Third Edition, Graduate of the Institution of Mechanical Engineers, SI Units, Elsevier, 2010.
3. http://ebooks.bharathuniv.ac.in/gdlc1/gdlc4/Engineering%20Drawing/Geometric%20and%20Engineering%20Drawing.pdf
4. Norling, Ernest, Perspective Made Easy - Ebook download as PDF File (.pdf) or read book online.
5. http://www.storytellerartist.com/documents/Perspective_Made_Easy.pdf

REFERENCE BOOKS

1. Flint, Tom, Anatomy for the Artist: The Dynamic of the Human Form, London, Arcturus Publishing.
2. Koos Eissen, Roselien Steur, Sketching: The Basics, BIS Publishers
3. Edwards, Betty, Drawing on the Artist Within: An Inspirational and Practical Guide to Increasing Your Creative Powers, Simon & Schuster Inc., New York
4. Edwards, Betty; New Drawing on the Right Side of the Brain, Publisher: Tarcher; 2002.
5. Edwards, Betty, New Drawing on the Right Side of the Brain - Ebook download as PDF File (.pdf) or read book online. https://aimeeknight.files.wordpress.com/2016/01/edwards-the-newdrawing-on-the-right-side-of-the-brain-viny.pdf
6. Edwards, Betty, Color: A Course in Mastering the Art of Mixing Colors, Publisher: Tarcher / Penguin, New York.
7. Edwards, Betty, Color - A Course in Mastering the Art of Mixing Colors - Ebook download as PDF File (.pdf) or read book online.
8. https://www.scribd.com/document/55190529/Betty-Edwards-Color

WEB REFERENCES

1. https://www.geeksforgeeks.org//

E -TEXT BOOKS

1. ebook.com/photoshop

MOOCS COURSES

1. photoshop (FutureLearn) | MOOC List (mooc-list.com)

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COMPILER DESIGN LAB

IV B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CS704PC	B. Tech	0	0	2	1	40	60	100

PREREQUISITES

1. A Course on "Object Oriented Programming through Java".

CO-REQUISITES

1. A course on "Web Technologies"

COURSE OBJECTIVES

1. To understand the various phases in the design of a compiler.
2. To understand the design of top-down and bottom-up parsers.
3. To understand syntax directed translation schemes.
4. To introduce lex and yacc tools.

COURSE OUTCOMES

1. Design, develop, and implement a compiler for any language.
2. Use lex and yacc tools for developing a scanner and a parser.
3. Design and implement LL and LR parsers.

LIST OF EXPERIMENTS

1. Implementation of symbol table.
2. Develop a lexical analyzer to recognize a few patterns inc (ex. Identifiers, constants, comments, operators etc.)
3. Implementation of lexical analyzer using lex tool.
4. Generate yacc specification for a few syntactic categories.
   a) Program to recognize a valid arithmetic expression that uses operator +,-, * and /.
   b) Program to recognize a valid variable which starts with a letter followed by any number of letter or digits.
   c) Implementation of calculator using lex and yacc.
5. Convert the bnf rules into yacc form and write code to generate abstract syntax tree.
6. Implement type checking
7. Implement any one storage allocation strategies (heap, stack, static)
8. Write a lex program to count the number of words and number of lines in a given file or program.
9. Write a 'C' program to implement lexical analyzer using c program.
10. Write recursive descent parser for the grammar E->E+T E->T T->T*F T->F F->(E)/id.
11. Write recursive descent parser for the grammar S->(L) S->a L->L,S L->S
12. Write a C program to calculate first function for the grammar
    E->E+T E->T T->T*F T->F F->(E)/id
13. Write a YACC program to implement a top down parser for the given grammar.
14. Write a YACC program to evaluate algebraic expression.

TEXT BOOKS

1. Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman.

REFERENCE BOOKS

1. Lex & Yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Compiler Construction, Louden, Thomson.

WEB REFERENCES

1. https://www.geeksforgeeks.org/introduction-of-compiler-design/

E -TEXT BOOKS

1. Introduction to Compilers and Language Design
2. Compilers Principles, Techniques, and Tools, Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman; Pearson Education
3. Introduction to Automata Theory, Languages, and Computation, Johne E. Hopcroft, Rajeev Motwani, Jeffrey D. Ulman, Pearson Education
4. Advanced Compiler Design and Implementation, Steven Muchnick, Morgan Kaufman Publication

MOOCS COURSES

1. Compiler Design - Course (nptel.ac.in)
2. Compiler Design: Principles, Techniques and Tools | Udemy
3. Compiler Design | Udemy

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ORGANIZATIONAL BEHAVIOUR

IV B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
SM801MS	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. This course demonstrates individual, group behavior aspects: The dynamics of organizational climate, structure and its impact on Organizations.

COURSE OUTCOMES

1. Students understand their personality, perception and attitudes for overall development and further learn the importance of group behaviour in the organizations.

UNIT-I	ORGANIZATIONAL BEHAVIOUR	CLASS;12

Organizational Behavior: Definition, need and importance of organizational behaviour – Nature and scope – Frame work – Organizational behaviour models.

UNIT-II	INDIVIDUAL BEHAVIOUR	CLASS:14

Individual Behavior: Personality – types – Factors influencing personality – Theories – Learning – Types of learners – The learning process – Learning theories – Organizational behavior modification, Misbehavior – Types – Management Intervention. Emotions - Emotional Labour – Emotional Intelligence – Theories. Attitudes – Characteristics – Components – Formation – Measurement- Values. Perceptions – Importance – Factors influencing perception – Interpersonal perception- Impression Management. Motivation – importance – Types – Effects on work behavior.

UNIT-III	GROUP BEHAVIOUR	CLASS:10

Group Behavior: Organization structure – Formation – Groups in organizations – Influence – Group dynamics – Emergence of informal leaders and working norms – Group decision making techniques – Tea building - Interpersonal relations – Communication – Control.

UNIT-IV	LEADERSHIP AND POWER	CLASS:12

Leadership and Power: Meaning – Importance – Leadership styles – Theories of leadership – Leaders Vs Managers – Sources of power – Power centers – Power and Politics.

UNIT-V	DYNAMICS OF ORGANIZATIONAL BEHAVIOUR	CLASS:12

Dynamics of Organizational Behavior: Organizational culture and climate – Factors affecting organizational climate – Importance. Job satisfaction – Determinants – Measurements – Influence on behavior. Organizational change – Importance – Stability Vs Change – Proactive Vs Reaction change – the change process – Resistance to change – Managing change. Stress – Work Stressors – Prevention and Management of stress – Balancing work and Life. Organizational development – Characteristics – objectives –. Organizational effectiveness

TEXT BOOKS

1. Stephen P. Robins, Organizational Behavior, PHI Learning / Pearson Education, 11th edition, 2008.
2. Fred Luthans, Organizational Behavior, McGraw Hill, 11th Edition, 2001.

REFERENCE BOOKS

1. Schermerhorn, Hunt and Osborn, Organizational behavior, John Wiley, 9th Edition, 2008.
2. Udai Pareek, Understanding Organizational Behavior, 2nd Edition, Oxford Higher Education, 2004.

WEB REFERENCES

01) https://www.geeksforgeeks.org/organisational-behaviour-concept-nature-and-role/

02) https://www.coursera.org/articles/organizational-behavior

E -TEXT BOOKS

1. https://open.umn.edu/opentextbooks/textbooks/30
2. https://old.mu.ac.in/wp-content/uploads/2014/04/Management-PAPER-II-Organizational-Behavior-final-book.pdf
3. https://assets.openstax.org/oscms-prodcms/media/documents/OrganizationalBehavior-OP_TtwWIeQ.pdf

MOOCS COURSES

1. https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_ug/229
2. https://www.mooc-list.com/tags/organizational-behavior
3. https://www.coursera.org/learn/organisational-behaviour-know-your-people

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COMPUTER VISION AND ROBOTICS (PROFESSIONAL ELECTIVE – VI)

IV B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG861PE	B. Tech	3	0	0	3	40	60	100

PREREQUISITE

1. Linear Algebra and Probability..

COURSE OBJECTIVES

1. To understand the Fundamental Concepts Related To sources, shadows and shading
2. To understand the The Geometry of Multiple Views

3. COURSE OUTCOMES

1 Implement fundamental image processing techniques required for computer vision
2 Implement boundary tracking techniques
3 Apply chain codes and other region descriptors, Hough Transform for line, circle, and ellipse detections.
4 Apply 3D vision techniques and Implement motion related techniques.
5 Develop applications using computer vision techniques

UNIT-I	CAMERAS: Pinhole Cameras	CLASS:12

CAMERAS: Pinhole Cameras
Radiometry – Measuring Light: Light in Space, Light Surfaces, Important Special Cases
Sources, Shadows, And Shading: Qualitative Radiometry, Sources and Their Effects, Local Shading
Models, Application: Photometric Stereo, Interreflections: Global Shading Models
Color: The Physics of Color, Human Color Perception, Representing Color, A Model for Image Color, Surface Color from Image Color.

UNIT-II	Linear Filters

Linear Filters: Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing, Filters as Templates
Edge Detection: Noise, Estimating Derivatives, Detecting Edges
Texture: Representing Texture, Analysis (and Synthesis) Using Oriented Pyramids, Application: Synthesis by Sampling Local Models, Shape from Texture

UNIT-III	The Geometry of Multiple Views: Two Views

The Geometry of Multiple Views: Two Views
Stereopsis: Reconstruction, Human Stereposis, Binocular Fusion, Using More Cameras
Segmentation by Clustering: Segmentation, Human Vision: Grouping and Getstalt, Applications: Shot Boundary Detection and Background Subtraction, Image Segmentation by Clustering Pixels, Segmentation by Graph-Theoretic Clustering.

UNIT-IV	Segmentation by Fitting a Model

Segmentation by Fitting a Model: The Hough Transform, Fitting Lines, Fitting Curves, Fitting as a Probabilistic Inference Problem, Robustness
Geometric Camera Models: Elements of Analytical Euclidean Geometry, Camera Parameters and the Perspective Projection, Affine Cameras and Affine Projection Equations
Geometric Camera Calibration: Least-Squares Parameter Estimation, A Linear Approach to Camera

Calibration, Taking Radial Distortion into Account, Analytical Photogrammetry, An Application: Mobile Robot Localization

UNIT-V	Introduction to Robotics

Introduction to Robotics: Social Implications of Robotics, Brief history of Robotics, Attributes of hierarchical paradigm, Closed world assumption and frame problem, Representative Architectures, Attributes of Reactive Paradigm, Subsumption Architecture, Potential fields and Perception.
Common sensing techniques for Reactive Robots: Logical sensors, Behavioural Sensor Fusion, Pro- prioceptive sensors, Proximity Sensors, Topological Planning and Metric Path Planning

TEXT BOOKS

1. David A. Forsyth and Jean Ponce: Computer Vision – A Modern Approach, PHI Learning (Indian Edition), 2009.
2. Robin Murphy, Introduction to AI Robotics, MIT Press

REFERENCE BOOKS

1. Dr P. Santosh Kumar Patra, Dr Govinda Rajulu. Computer Vision MS Spectrum publication
2. E. R. Davies: Computer and Machine Vision – Theory, Algorithms and Practicalities, Elsevier(Academic Press), 4th edition, 2013.
3. The Robotics premier, Maja J Matari, MIT Press.
4. Richard Szeliski “Computer Vision: Algorithms and Applications” Springer-Verlag London Limited 2011

WEB REFERENCES

1. https://www.javatpoint.com/Computervision

E -TEXT BOOKS

1. https://medium.com/@ferlatti.aldo/estimation-of-text-complexity-c113d111e29f

MOOCS COURSES

1. https://onlinecourses.nptel.ac.in/noc24_cs05/preview
2. https://onlinecourses.nptel.ac.in/noc22_cs126/preview

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

COMPUTER AIDED GEOMETRIC DESIGN (PROFESSIONAL ELECTIVE – VI)

IV B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG862PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. Use of computer software in design of geometry.

COURSE OUTCOMES

1. Learn basic algorithms for drawings
2. Learn algorithms for solid geometry rendering
3. Understand curvature design methods
4. Learn various geometric commands.

UNIT-I	CAD/CAM Software:	CLASS:12

CAD/CAM Software:
Introduction, Operating system, Graphic Software, Application Software, Programming Languages, Evaluation Criteria of CAD/CAM Software, Graphics Standards
Interactive Computer Graphics-1:
Introduction, Raster Scan Graphics, Line Drawing Algorithms, Mid-Point Circle Algorithm, Scan Conversion, Rasterizing Polygons, Anti-Aliasing,

UNIT-II	Interactive Computer Graphics-1:	CLASS:12

Interactive Computer Graphics-1:
Coordinate Systems, Windowing, View Generation, Clipping, Transformations of Geometry, Mathematics of Projections, Hidden Surface Removal, Shading, Rendering, Database Structure for Graphics Modelling.

UNIT-III	Basics of Geometric Modelling	CLASS:12

Basics of Geometric Modelling:
Introduction, Requirements of Geometric Modelling, Geometric Models, Geometric Construction Methods, Modelling Facilities Desire Wireframe Modelling:
Introduction, Classification of Wireframe Entities, Curve Representation Methods, Parametric Representation of Analytics Curves, Curvature Continuity, Lagrange Interpolation, Parametric Representation of Synthetic Curves, Curve Manipulations.

UNIT-IV	Surface Modelling	CLASS:12

Surface Modelling:
Introduction, Planes, Vector planes, Surface Entities, Surface Representation Methods, Parametric Surfaces, Parametric Representation of Analytic Surfaces, Parametric Representation of Synthetic Surfaces, Tensor Product Surfaces, De Casteljau's Algorithm for Bezier Surfaces, B-Spline Surface, De Boor's Algorithm for B-Spline Surfaces, Blending Surface, Surface Manipulations

UNIT-V	SOLID MODEELING	CLASS:12

Solid Modelling:
Introduction, Application of Solid Models, Modelling Considerations of Solids, Wireframe Models, Geometry and Topology, Solid Modelling Scheme, Boundary Representation, Winged-edge Data Structure for Boundary Representation, The Euler-Poincare Formula, , Constructive Solid Geometry, Sweeping, Solid Manipulations Computer-aided Drafting:

Introduction, Drafting Set-up, Drawing Structure, Basic Geometric Commands, Layers, Display Control Commands, Editing a Drawing, dimensioning, Geometric Tolerances.

TEXT BOOKS

1. CAD/CAM Concepts and Applications by Chennakesava R. Alavala, PHI Learning Private

REFERENCE BOOKS

1. 1. CAD CAM: Computer aided Design and Manufacturing, Mikell P Groover, Facmile Edition.
2. 2. Principles of CAD/CAM/CAE by Kunwoo lee

WEB REFERENCES

1. https://www.geeksforgeeks.org/what-is-a-d computer aided geometric design /

E -TEXT BOOKS

1. https://www.computergamedesignnet/index.php/books/ds3/

MOOCS COURSES

1. https://online-learning.tudelft.nl/courses/CAGD/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

MACHINE LEARNING (PROFESSIONAL ELECTIVE – VI)

IV B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG863PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. To introduce students to the basic concepts and techniques of Machine Learning.
2. To have a thorough understanding of the Supervised and Unsupervised learning techniques.
3. To study the various probability-based learning techniques.

COURSE OUTCOMES

1. Distinguish between, supervised, unsupervised and semi-supervised learning.
2. Understand algorithms for building classifiers applied on datasets of non-linearly separable classes.
3. Understand the principles of evolutionary computing algorithms.
4. Design an ensembler to increase the classification accuracy.

UNIT-I	INTRODUCTION	CLASS:12

Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants: – Perceptron – Linear Separability – Linear Regression.

UNIT-II	MULTI-LAYER PERCEPTRON & BACK-PROPAGATION	CLASS:12

Multi-layer Perceptron– Going Forwards – Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice – Examples of using the MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines

UNIT-III	CLASSIFICATION AND REGRESSION	CLASS:12

Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means
Algorithms

UNIT-IV	DIMENSIONALITY REDUCTION TECHNIQUES	CLASS:12

Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization
Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms

UNIT-V	REINFORCEMENT LEARNING	CLASS:12

Reinforcement Learning – Overview – Getting Lost Example
Markov Chain Monte Carlo Methods – Sampling – Proposal Distribution – Markov Chain Monte Carlo– Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – Tracking Methods

TEXT BOOKS

1. Stephen Marsland, ―Machine Learning – An Algorithmic Perspective, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.

REFERENCE BOOKS

1. Dr. P. Santosh Kumar Patra, Dr. R. Santhosh Kumar, Mrs. E. Soumya, Machine Learning, Seven Hills International Publishers, First Edition 2022.
2. Tom M Mitchell, ―Machine Learning, First Edition, McGraw Hill Education, 2013.
3. Peter Flach, ―Machine Learning: The Art and Science of Algorithms that Make Sense of Data‖, First Edition, Cambridge University Press, 2012.
4. Jason Bell, ―Machine learning – Hands on for Developers and Technical Professionals‖, First Edition, Wiley, 2014
5. Ethem Alpaydin, ―Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series), Third Edition, MIT Press, 2014

WEB REFERENCES

1. https://www.ibm.com/in-en/cloud/learn/machine-learning

E -TEXT BOOKS

1. https://machinelearningmastery.com/products/
2. https://www.kdnuggets.com/2020/03/24-best-free-books-understand-machine-learning.html
3. https://www.analyticsinsight.net/10-popular-must-read-free-ebooks-on-machine-learning/

MOOCS COURSES

1. https://nptel.ac.in/courses/106105087/pdf/m01L01
2. https://onlinecourses.nptel.ac.in/noc21_cs13/preview
3. https://www.tutorialspoint.com/machine_engineering/index.htm

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

HUMAN COMPUTER INTERACTION (PROFESSIONAL ELECTIVE – VI)

IV B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG864PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. To gain an overview of Human-Computer Interaction (HCI)
2. Understanding the alternatives to traditional "keyboard and mouse" computing.
3. Getting familiarity with the vocabulary associated with sensory and cognitive systems
4. Be able to apply models from cognitive psychology to predicting user performance
5. Working in small groups on a product design with invaluable team-work experience.

COURSE OUTCOMES

1. Apply HCI and principles to interaction design.
2. Design certain tools for blind or PH people
3. Understand the social implications of technology and ethical responsibilities as engineers.
4. Understand the importance of a design and evaluation methodology

UNIT-I	INTRODUCTION	CLASS:12

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design, A brief history of Screen design.
The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT-II	DESIGN PROCESS & SCREEN DESIGNING	CLASS:12

Design process – Human interaction with computers, importance of human characteristics, human consideration, Human interaction speeds, understanding business junctions.
Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT-III	WINDOWS	CLASS:12

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT-IV	HCI IN THE SOFTWARE PROCESS	CLASS;12

HCI in the software process- The software life cycle, Usability engineering, Iterative design and prototyping, Design Focus: Prototyping in practice, Design rationale, Design rules, Principles to support usability Standards, Golden rules and heuristics, HCI patterns, Evaluation techniques, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method, Universal design, Universal design principles Multimodal interaction

UNIT-V	COGNITIVE MODELS GOAL AND TASK HIERARCHIES DESIGN FOCUS	CLASS:12

Cognitive models Goal and task hierarchies Design Focus: GOMS saves money, Linguistic models, The challenge of display-based systems, Physical and device models, Cognitive architectures, Ubiquitous computing and augmented realities, Ubiquitous computing applications research, Design Focus: Ambient Wood – augmenting the physical, Virtual and augmented reality, Design Focus: Shared experience Design Focus: Applications of augmented reality Information and data visualization

TEXT BOOKS

1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dream Tech.
2. Human – Computer Interaction. Alan Dix, Janet Fincay, Gregory's, Abowd, Russell Bealg, Pearson Education.

REFERENCE BOOKS

1. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
3. User Interface Design, Soren Lauesen, Pearson Education.
4. Human –Computer Interaction, D. R. Olsen, Cengage Learning.
5. Human –Computer Interaction, Smith - Atakan, Cengage Learning.

WEB REFERENCES

1. https://www.simplilearn.com/what-is-human-computer-interaction-article
2. https://www.spiceworks.com/tech/artificial-intelligence/articles/what-is-hci/

E -TEXT BOOKS

1. https://paragnachaliya.in/wp-content/uploads/2017/08/HCI_Alan_Dix.pdf
2. https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/human-computer-interaction-brief-intro
3. https://pkklib.iitk.ac.in/index.php/resources/e-books/e-text-books/53111:human-computer-interaction-interaction-techniques-and-environments

MOOCS COURSES

1. https://www.mooc-list.com/tags/human-computer-interaction
2. https://www.coursera.org/courses?query=human%20computer%20interaction
3. https://www.edx.org/certificates/professional-certificate/gtx-human-computer-interaction

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

VFX ANIMATION (PROFESSIONAL ELECTIVE – VI)

IV B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG865PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. Knowledge on concepts of Visual Effects before Computers, Digital Effects, The VFX Team, Basic VFX Technologies and Equipment, The VFX Bible and Database, Models and Miniatures.

COURSE OUTCOMES

1. Understand Visual Effects before Computers and digital effects
2. Analyze the VFX team and basic VFX Technologies and equipment
3. Illustrate breakdowns scheduling and budgeting production support
4. Describe On-Set Operations, On-Set References

UNIT-I	Visual Effects before Computers	CLASS:12

Visual Effects before Computers
Stop-Motion Animation, Puppets and Animatronics, Matte Paintings, Miniatures, In-Camera Miniatures, Hanging Miniatures with Live Action, Miniatures with Composited Elements, Front and Rear Projection, Forced Perspective with Live Action, Blue- or Green Screen Composites, Motion Control, In-Camera Practical Effects, Special (Mechanical) Effects and Visual Effects
Digital Effects:
The 15-minute Version, Two-Dimensional (2D) vs. Three-Dimensional (3D) CGI, 2D CGI, 3D CGI, Creating a Digital Image, Building Digital Models, Texturing, Painting, and Lighting, CG Characters, Animation, Rendering, Compositing, Miniatures vs. Digital Models

UNIT-II	The VFX Team	CLASS:12

The VFX Team
The Visual Effects Supervisor, The Visual Effects Producer, First In—Last Out, VFX Producer, VFX Producer's Abilities and Personal Qualities, VFX Producers and Guild Membership, The VFX Producer and Marketing, Visual Effects Production Coordinator, Visual Effects Data Coordinator, Visual Effects PA, Runner, and Similar Support Positions, Freelance Visual Effects Crew, First Assistant Director (AD), Visual Effects DP, Blue or Green Screen DP, Motion Control Technician, Miniature Pyro technicians, Other Special VFX Crew
Basic VFX Technologies and Equipment
Blue and Green Screens, Lighting for Blue- or Green screen Photography, Motion Control, When to Use Motion Control, Encoda Cam, Vista Vision Cameras, High-Speed Photography, Digital Video Assist with Compositing Capability, Motion Capture, Space Cam, We scam, Flying-Cam, Cyber scanning and Structured Light Scanning, Set Surveys, Lighting References and HDRI (High Dynamic Range Imaging), LIDAR (Light Detection and Ranging), Renting Equipment

UNIT-III	Breakdowns	CLASS:12

Breakdowns
Production Breakdowns, The First Go-Around: Generating a VFX Breakdown, Getting Started, Marking Up the Script, Numbering Visual Effects Shots, Constructing a Digital Cost Breakdown Spreadsheet, Estimating Digital Shot Costs, A Sampling of Ancillary Digital Costs, Facility Visual Effects Supervision and Management, Preliminary Bids: Getting a Handle on the Digital Shot Costs, Budget

Guidelines for Digital Work, Casting and Evaluating Potential Vendors, Practical Steps in Checking Out a Vendor, The Importance of Artists, Bidding Guidelines: Comparing Apples to Apples, Following Up, Budgeting Miniatures

UNIT-IV	Scheduling and Budgeting Production Support	CLASS :12

The Production Support Breakdown Sheet, Using Movie Magic Scheduling, VFX Breakdown Sheets, Preparing the VFX Breakdown, Stand-Alone VFX Elements, Scheduling the Shooting of Your Effects, Collaborating with the 1st Unit, Communication—Key to Smooth Sailing, Scheduling 1st Unit Shooting, Working with a Strip Board, Separating 1st Unit and VFX Unit Shooting, Designating Different Types of VFX Plates, Modifying the Strip Board Design, Keeping Up with Changes, Scheduling the VFX Unit, Refi ning the Schedule, Reports and More Reports, Modified Day-out-of-Days Report, Modified One-Liner

The VFX Bible and Database

Introduction to VFX Bible, Examples of Reports from a FileMaker Pro Database, Database Maintenance, Visual Aids, Storyboards, Animatics, Previs, A Case Study—Previs for The Guardian, Generating a Previs

UNIT-V	On-Set Operations	CLASS:12

On-Set Operations

Production Meetings, The Visual Effects Review, More Meetings, Tech Scouts, Extended Location Scouts, Key to Success: Keep the ADs Informed, Influencing the 1st Unit Shooting Schedule, Motion Control: A Special Situation on Set, Production Calendars, Production Reports, When the Schedule Changes, Physical Support/1st Unit Support, Working on Sets, Laying the Groundwork, Support from Camera Assistants, Grips, Electrical, Paint and Construction, Digital Video Assist, Transportation

On-Set References

Reference Photos; Art Department References, Element Data Sheets, Reference and Clean Background Plates, Performance References, Video References, Lighting Reference Tools, Tracking Markers, Tests

TEXT BOOKS

1. Charles Finance, Susan Zwerman, The Visual Effects Producer, Understanding the Art and Business of VFX, focal press

REFERENCE BOOKS

1. 1. Wallace Jackson, VFX Fundamentals Visual Special Effects Using Fusion 8.0 2016 Edition, Apress
2. 2. Pakhira, Malay K, Computer Graphics, Multimedia and Animation, 2nd edition, Prentice Hall India Learning Private Limited

WEB REFERENCES

1. https://www.geeksforgeeks.org//

E -TEXT BOOKS

1. https://annamalaiuniversity.ac.in/studport/download/engg/it/resources/Cyber%20Forensics.pdf

MOOCS COURSES

1. https://www.mooc-list.com/tags/ VFX ANIMATION

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

ALGORITHMS DESIGN AND ANALYSIS

(OPEN ELECTIVE – III)

III B. TECH- I SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG831OE	B. Tech	3	0	0	3	40	60	100

PREREQUISITES:

1. A Course on Programming for Problem Solving and Data Structures

COURSE OBJECTIVES

Students will be able to:

1. Understand the Introduction of notations for analysis of the performance of algorithms and the data structure ofdisjoint sets.
2. Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic programming, greedy, branch and bound methods) and mention problems for which each technique is appropriate
3. Describes how to evaluate and compare different algorithms using worst-, average-and bestcase analysis.
4. Explains the difference between tractable and intractable problems, and introduces the problems that are P, NP and NP complete.

COURSE OUTCOMES

Students will be able to:

1. Analyze the performance of algorithms
2. Choose appropriate data structures and algorithm design methods for a specified application.
3. Understand the choice of data structures and the algorithm design methods.

UNIT-I	INTRODUCTION	CLASS:12

Introduction: Algorithm, Performance Analysis-Space complexity, Time complexity, Asymptotic Notations- Big oh notation, Omega notation, Theta notation and Little oh notation.

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT-II	DISJOINT SETS & BACKTRACKING	CLASS:12

Disjoint Sets: Disjoint set operations, union and find algorithms, Priority Queue- Heaps, Heapsort **Backtracking:** General method, applications, n-queen's problem, sum of subsets problem, graph Coloring, Hamiltonian cycles.

UNIT-III	DYNAMIC PROGRAMMING	CLASS:12

Dynamic Programming: General method, applications- Optimal binary search tree, 0/1 knapsack problem, All pairs shortest path problem, Traveling salesperson problem, Reliability design.

UNIT-IV	GREEDY METHOD, BASIC TRAVERSAL AND SEARCH TECHNIQUES	CLASS:12

Greedy method: General method, applications-Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs, Connected components, Biconnected components.

UNIT-V	BRANCH & BOUND, NP-HARD & NP-COMPLETE PROBLEMS	CLASS:12

Branch and Bound: General method, applications - Traveling salesperson problem, 0/1 knapsack problem - LC Branch and Bound solution, FIFO Branch and Bound solution.

NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP-Hard and NP-Complete classes, Cook's theorem.

TEXT BOOKS

1. Fundamentals of Computer Algorithms, Ellis Horowitz, SatrajSahni and Rajasekharan, University press, 1998.

REFERENCE BOOKS

1. Dr. P. Santosh Kumar Patra, Dr. K. Srinivas, Mrs. K. Radha, Dr. T. Poongothai, Algorithm Design and Analysis, M/S Sun Techno Publications, First Edition, 2022
2. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
3. Introduction to Algorithms, second edition, T. H. Cormen, C.E. Leiserson, R. L. Rivest, and C. Stein, PHI Pvt. Ltd./ Pearson Education.
4. Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R. Tamassia, John Wiley and sons.

WEB REFERENCES

1. https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
2. https://www.javatpoint.com/daa-tutorial
3. https://www.guru99.com/design-analysis-algorithms-tutorial.html

E -TEXT BOOKS

1. Download Design and Analysis of Algorithms eBook PDF Online By V K Pallaw 2022 (kopykitab.com)
2. Introduction to Design Analysis of Algorithms - In Simple Way - Free Computer, Programming, Mathematics, Technical Books, Lecture Notes and Tutorials (freecomputerbooks.com)
3. Design Analysis of Algorithm Book. Download free pdf or Buy Books (ebooknetworking.net)

MOOCS COURSES

1. https://onlinecourses.nptel.ac.in/noc19_cs47/preview
2. https://www.my-mooc.com/en/mooc/algorithm-design-and-analysis/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

INTRODUCTION TO COMPUTER NETWORKS (OPEN ELECTIVE – III)

IV B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
CSG832OE	B. Tech	3	0	0	3	40	60	100

PREREQUISITES

1. A course on "Programming for problem solving"
2. A course on "Data Structures"

COURSE OBJECTIVES

1. Equip the students with the concepts and fundamentals of computer networks.
2. Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers.

COURSE OUTCOMES

1. Gain the knowledge of the basic computer network technology.
2. Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
3. Understand subnetting and routing mechanisms.
4. Familiarity with the essential application protocols of computer networks

UNIT-I	INTRODUCTION	CLASS:12

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.
Data link layer: Design issues, framing, Error detection and correction.

UNIT-II	PROTOCOLS	CLASS:14

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, Data link layer switching.

UNIT-III	NETWORK LAYER	CLASS:12

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

UNIT-IV	TRANSPORT LAYER	CLASS:12

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

UNIT-V	APPLICATION LAYER	CLASS:10

Application Layer: Domain name system, Electronic Mail; the World WEB, HTTP, Streaming audioand video.

TEXT BOOKS

1. Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 6th Edition. PearsonEducation

REFERENCE BOOKS

1. An Engineering Approach to Computer Networks-S. Keshav, 2nd Edition, Pearson Education
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

WEB REFERENCES

1. https://freecomputerbooks.com/networkComputerBooks.html

E -TEXT BOOKS

1. https://open.umn.edu/opentextbooks/textbooks/353
2. https://intronetworks.cs.luc.edu/
3. https://ebooks.inflibnet.ac.in/itp10/

MOOCS COURSES

1. https://online.stanford.edu/courses/cs144-introduction-computer-networking
2. https://www.classcentral.com/course/stanford-openedx-introduction-to-computer-networking-1578
3. https://www.mooc-list.com/course/introduction-computer-networking-stanford-online