St. Martin's Engineering College

UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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**

St. Martin's Engineering College

UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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	**13**	**4**	**12**	**20**	**360**	**540**	**900**
10	*CH209MC	Environmental Science	3	0	0	0	40	60	100

St. Martin's Engineering College

UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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	IT303PC	Computer Organization and Microprocessor	3	0	0	3	40	60	100
5	EC313PC	Introduction to IoT	2	0	0	2	40	60	100
6	EC312PC	Digital Electronics Lab	0	0	2	1	40	60	100
7	CS307PC	Data Structures Lab	0	0	3	1.5	40	60	100
8	EC314PC	Internet of Things Lab	0	0	3	1.5	40	60	100
9	CS310PC	Data visualization-R Programming/ Power BI Lab	0	0	2	1	40	60	100
		Total	**14**	**1**	**10**	**20**	**360**	**540**	**900**
Mandatory Course (Non - Credit)									
10	*GS309MC	Gender Sensitization Lab	0	0	2	0	100	-	100

St. Martin's Engineering College

UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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	IT403PC	Java Programming	2	0	0	2	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	IT408PC	Java Programming Lab	0	0	2	1	40	60	100
9	CS410PC	Real-time Research Project/ Societal Related Project	0	0	4	2	50	-	50
10	CS411PC	Node JS/ React JS/ Django Lab	0	0	2	1	40	60	100
		Total	**14**	**0**	**12**	**20**	**410**	**540**	**950**
Mandatory Course (Non – Credit)									
11	*CI409MC	Constitution of India	3	0	0	0	100	-	100

***MC – Satisfactory/Unsatisfactory**

St. Martin's Engineering College

UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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	IT501PC	Software Engineering	3	0	0	3	40	60	100
2	IT502PC	Data Communications and Computer Networks	3	1	0	4	40	60	100
3	IT503PC	Machine Learning	3	0	0	3	40	60	100
4		Professional Elective - I	3	0	0	3	40	60	100
5		Professional Elective - II	3	0	0	3	40	60	100
6	IT504PC	Software Engineering & Computer Networks Lab	0	0	2	1	40	60	100
7	IT505PC	Machine Learning 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 Lab	0	0	2	1	40	60	100
		Total	**15**	**1**	**8**	**20**	**360**	**540**	**900**
Mandatory Course (Non – Credit)									
11	*IP510MC	Intellectual Property Rights	3	0	0	0	100	-	100

St. Martin's Engineering College

UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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	IT601PC	Automata Theory and Compiler Design	3	0	0	3	40	60	100
2	IT602PC	Algorithm Design and Analysis	3	0	0	3	40	60	100
3	IT603PC	Embedded Systems	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	IT604PC	Compiler Design Lab	0	0	2	1	40	60	100
7	IT605PC	Embedded Systems Lab	0	0	2	1	40	60	100
8		Professional Elective – III Lab	0	0	2	1	40	60	100
9	IT606PC	Industrial Oriented Mini Project / Internship / Skill Development Course (Big data-Spark)	0	0	4	2	-	100	100
		Total	**15**	**0**	**10**	**20**	**320**	**580**	**900**
Mandatory Course (Non – Credit)									
10	*ES607MC	Environmental Science	3	0	0	0	100	-	100

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

St. Martin's Engineering College

UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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	IT701PC	Information Security	3	0	0	3	40	60	100
2	IT702PC	Cloud Computing	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	IT703PC	Information Security Lab	0	0	2	1	40	60	100
7	IT704PC	Cloud Computing Lab	0	0	2	1	40	60	100
8	IT705PC	Project Stage - I	0	0	6	3	-	-	-
		Total	**15**	**0**	**10**	**20**	**280**	**420**	**700**

St. Martin's Engineering College

UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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	IT802PC	Project Stage – II including Seminar	0	0	22	11	40	60	100
5		**Total**	**9**	**0**	**22**	**20**	**160**	**240**	**400**

*MC – Satisfactory/Unsatisfactory

#Skill Course - 1 credit with 2 Practical Hours

Professional Elective – I

IT511PE	Biometrics
IT512PE	Advanced Computer Architecture
IT513PE	Data Analytics
IT514PE	Image Processing
IT515PE	Principles of Programming Languages

Professional Elective - II

IT521PE	Computer Graphics
IT522PE	Quantum Computing
IT523PE	Advanced Operating Systems
IT524PE	Distributed Databases
IT525PE	Pattern Recognition

Professional Elective - III

IT631PE	Full Stack Development
IT632PE	Data Mining
IT633PE	Scripting Languages
IT634PE	Mobile Application Development
IT635PE	Software Testing Methodologies

Professional Elective – III Lab

IT636PE	Full Stack Development Lab
IT637PE	Data Mining Lab
IT638PE	Scripting Languages Lab
IT639PE	Mobile Application Development Lab
IT640PE	Software Testing Methodologies Lab

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

Professional Elective - IV

IT741PE	Human Computer Interaction
IT742PE	High Performance Computing
IT743PE	Artificial Intelligence
IT744PE	Information Retrieval Systems
IT745PE	Ad-hoc & Sensor Networks

Professional Elective - V

IT751PE	Intrusion Detection Systems
IT752PE	Real Time Systems
IT753PE	Blockchain Technology
IT754PE	Deep Learning
IT755PE	Software Process & Project Management

Professional Elective - VI

IT861PE	Natural Language Processing
IT862PE	Distributed Systems
IT863PE	Augmented Reality & Virtual Reality
IT864PE	Web Security
IT865PE	Cyber Forensics

Open Elective -1:
1. IT611OE: Java Programming
2. IT612OE: Object Oriented Programming using C++

Open Elective -2:
1. IT721OE: Full Stack development
2. IT722OE: Scripting Languages

Open Elective -3:
1. IT831OE: Big Data Technologies
2. IT832OE: DevOps

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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 battery and 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 - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point,pour point, flash point and fire point.

TEXT BOOKS

1. Engineering Chemistry 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 Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)
3. Engineering Chemistry by A. Aditya Prasad, S. Hemambika and N. V. V. Panduranga Rao, Spectrum Medico Plus Pharma Publishers., Hyderabad, 1st edition (2020)
4. 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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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.
1. E.Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
2. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
3. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
4. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
5. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
6. 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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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 Graphics and Design, WILEY, Edition 2020
3. Engineering Drawing, M. B. Shah, B.C. Rane / Pearson.
4. Engineering Drawing, N. S. Parthasarathy and Vela Murali, Oxford
5. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers
6. **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. ghttp://freevideolectures.com/Course/3420/Engineering-Drawin
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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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	40	60	100

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/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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 Learn

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

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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

BASIC ELECTRICAL ENGINEERING LABORATORY

I B. TECH- I SEMESTER (R 22)

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

St. Martin's Engineering College
UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SMEC B. TECH R22 AUTONOMOUS

I YEAR -II-SEMESTER SYLLABUS

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

I B. TECH - II SEMESTER (R 22)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
MA201BS	**B. Tech**	**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, Mr. K Upender Reddy& Mr. G Chandra Mohan, A First Course in Linear Algebra and Calculus for Engineers, M/s StudentsHelpline Publishing House Pvt. Ltd, First Edition-2020.
2. 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.
3. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint,2002.

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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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 fabricationstechniques.
5. Study the characteristics of lasers and optical fibres.

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. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons,11th Edition, 2018.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
4. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhya - Nano Materials, New Age International, 1stEdition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion andStorage Aliaksandr S. Bandarenka, CRC Press Taylor & Francis Group
7. 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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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

To learn

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. 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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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 with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Writing: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- 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. Effective Academic Writing by Liss and Davis (OUP)
2. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Chaudhuri, Santanu Sinha. (2018). Learn English: A Fun Book of Functional Language,Grammar and Vocabulary. (2nd ed.,). Sage Publications India Pvt. Ltd.
5. (2019). Technical Communication. Wiley India Pvt. Ltd.
6. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students.Mc Graw-Hill Education India Pvt. Ltd.
7. 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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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

St. Martin's Engineering College

UGC Autonomous

Dhulapally, Secunderabad-500 100

NBA & NAAC A+ Accredited

www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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

To Learn

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 geometricalshapes and operations on them as its functions.
3. Use the structure of exception handling all general purpose exceptions.

Week-6:

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

   b. Add an attribute named color to your Rectangle objects and modify draw_rectangle so that 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 forcorrectness.

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, blankspaces, 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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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 of English by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize the impact of dialects.
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 LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions

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

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

SPEAKING SKILLS:

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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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 block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

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

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 proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

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

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their 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) office or 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 powerpoint 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/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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: C**limate 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. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHLLearning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHILearning 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. A. Aditya Prasad, S.Hemambika, A.Rambabu, “Environmental Science”, Spectrum Educational Books., Hyderabad,1st edition(2021)
1. 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

St. Martin's Engineering College
UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SMEC B. TECH R22 AUTONOMOUS

II YEAR – I -SEMESTER SYLLABUS

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

DIGITAL ELECTRONICS

II B. TECH- I SEMESTER (R 22)								
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

To Learn

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: 12**

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:12**

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:12
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: 12**
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: 12**
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.DigitalDesign-MorrisMano,PHI,4thEdition,2006
2.Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R.Peterson,3rdEd,JohnWiley&SonsInc.
3.Fundamentals of Logic Design CharlesH.Roth,CengageLearning,5th,Edition,2004.

REFERENCE BOOKS

1.SwitchingandFiniteAutomataTheory ZviKohavi&NirajK.Jha,3rdEdition,Cambridge,2010.
2.DigitalPrinciples, 3/e, RogerL.Tokheim,Schaum'soutlineseries, 1994.
3.ModernDigitalelectronicsRPJain4thEdition,McGrawHill
4.SwitchingTheoryandLogicDesign–AAnandKumar,PHI,2013.

WEB REFERENCES

1. http://blog.digitalelectronics.co.in/
2. www.nesoacademy.org/electronics-engineering/digital-electronics/digital
3. https://www.slideshare.net/JournalsPubwwwjourna/international-journal-of-digital-electronics-vol-2-issue-2
4. https://lecturenotes.in/subject/203/switching-theory-and-logic-design-stld
5. http://www.infocobuild.com/education/audio-video-courses/electronics/DigitalCircuitsSystems
6. https://nptel.ac.in/courses/117105080/

E -TEXT BOOKS

1. https://pages.uoregon.edu/rayfrey/DigitalNotes.pdf
2. https://easyengineering.net/fundamentals-of-digital-circuits-by-anand-kumar/

MOOCS COURSE

1. https://swayam.gov.in/courses/1392-digital-circuits-and-systems
2. https://swayam.gov.in/courses/4410-synthesis-of-digital-systems
3. https://www.smartzworld.com/notes/digital-logic-design-dld/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

DATA STRUCTURES

II B. TECH - I SEMESTER (R 22)

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

Prerequisites: Programming for Problem Solving

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

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
3. Implementations orcombinations.
4. Implement and know the application of algorithms for sorting and pattern matching.
5. Design programs using a variety of data structures, including hash tables, binary and generaltree structures, search trees, tries, heaps, graphs, and AVL-trees.

UNIT-I	INTRODUCTION TO DATA STRUCTURES	Classes: 10

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	Classes: 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	Classes: 14

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	Classes: 08

Graph Implementation Methods. Graph Traversal Methods.

Sorting: Quick Sort, Heap Sort, External Sorting- Model for external sorting, Merge Sort.

UNIT-V	PATTERN MATCHING	Classes: 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.Santosh Kumar Patra,Dr.R.Nagaraju,Mr.C.Yosepu, Mr.A.Mruthuyunjayam,Mr.P.Ganesh Kumar "Data Structure 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.

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 COURSE

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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER ORIENTED STATISTICAL METHODS

II B. TECH- I SEMESTER (R 22)

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

Pre-requisites: Mathematics courses of first year of study.

COURSEOBJECTIVES

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.

COURSEOUTCOMES

After learning the contents of this paper the student must be 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:10

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:10

Expectation and discrete distributions Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem. Discrete Probability Distributions: Binomial Distribution, Poisson distribution.

UNIT-III	CONTINUOUS AND SAMPLING DISTRIBUTIONS	Classes:10

Continuous and Sampling Distributions 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:10

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, 9th Edition, 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.
   S. D. Sharma, Operations Research, Kedarnath and Remnant Publishers, Meerut, Delhi

WEB REFERENCES

1 https://www.mathworld.wolfram.com/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

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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER ORGANIZATION AND MICROPROCESSOR

II B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT303PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES:

To learn
1. To understand basic components of computers.
2. To understand the architecture of the 8086 processor.
3. To understand the instruction sets, instruction formats and various addressing modes of 8086.
4. To understand the representation of data at the machine level and how computations are Performed at machine level.
5. To understand the memory organization and I/O organization.
6. To understand the parallelism both in terms of single and multiple processors.

COURSE OUTCOMES:

1. Able to understand the basic components and the design of CPU, ALU and Control Unit.
2. Ability to understand memory hierarchy and its impact on computer cost/performance.
3. Ability to understand the advantage of instruction level parallelism and pipelining for high Performance Processor design.
4. Ability to understand the instruction set, instruction formats and addressing modes of 8086.
5. Ability to write assembly language programs to solve problems.

UNIT-I	DIGITAL COMPUTERS	Classes:7

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.
Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.

UNIT-II	CENTRAL PROCESSING UNIT	Classes:9

The 8086 Processor Architecture, Register organization, Physical memory organization, General Bus Operation, I/O Addressing Capability, Special Processor Activities, Minimum and Maximum mode system and timings.

UNIT-III	ASSEMBLY LANGUAGE PROGRAMMING	Classes:10

Assembly Language Programming with 8086- Machine level programs, Machine coding the programs, Programming with an assembler, Assembly Language example programs. Stack structure of 8086, Interrupts and Interrupt service routines, Interrupt cycle of 8086, Interrupt programming, Passing parameters to procedures, Macros, Timings and Delays.

UNIT-IV	COMPUTER ARITHMETIC	Classes:10
Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating - point Arithmetic operations. Input-Output Organization: Peripheral Devices, Input- Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP), Intel 8089 IOP.		
UNIT-V	**MEMORY ORGANIZATION**	**Classes:9**
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory. **Pipeline and Vector Processing:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.		

TEXTBOOKS:

1. Computer System Architecture, M. Morris Mano, Third Edition, Pearson. (UNITS – I, IV, V)
2. Advanced Microprocessors and Peripherals, K M Bhurchandi, A. K Ray ,3rd edition, McGraw Hill India Education Private Ltd. (UNITS - II, III).

REFERENCE BOOKS:

1. 1.Dr.P.Santosh Kumar Patra, Mrs.G.Udaya sri, Dr.R.Nagaraj,Dr.R.Santhosh Kumar, Mr.M. Venkanna“Computer Organization and Micro Prodessor”, Srikrishna Publicatoins. First Edition,(2022).
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002
3. Computer Organization and Architecture, William Stallings, 9th Edition, Pearson.
4. David A. Patterson, John L. Hennessy: Computer Organization and Design – The Hardware / Software Interface ARM Edition, 4th Edition, Elsevier, 2009.

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 –TEXTBOOKS:

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

MOOCS COURSE:

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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

INTRODUCTION TO IOT

II B. TECH - I SEMESTER (R 22)								
Course Code	**Programme**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIE**	**SEE**	**Total**
EC313PC	**B. Tech**	**2**	**0**	**0**	**2**	**40**	**60**	**100**

COURSE OBJECTIVES

To learn

1. The objectives of the course are to:
2. Understand the concepts of Internet of Things and able to build IoT applications
3. Learn the programming and use of Arduino and Raspberry Pi boards.
4. Known about data handling and analytics in SDN.

COURSE OUTCOMES

1. Upon completing this course, the student will be able to:
2. Known basic protocols in sensor networks.
3. Program and configure Arduino boards for various designs.
4. Python programming and interfacing for Raspberry Pi.
5. Explore IoT applications in different domains.

UNIT-I	INTRODUCTION TO INTERNET OF THINGS	Classes: 10

Introduction to Internet of Things, Characteristics of IoT, Physical design of IoT, Functional blocks of IoT, Sensing, Actuation, Basics of Networking, Communication Protocols, Sensor Networks.

UNIT-II	MACHINE-TO-MACHINE COMMUNICATIONS	Classes: 12

Machine-to-Machine Communications, Difference between IoT and M2M, Interoperability in IoT, Introduction to Arduino Programming, Integration of Sensors and Actuators with Arduino.

UNIT- III	INTRODUCTION TO PYTHON PROGRAMMING	Classes:12
Introduction to Python programming, Introduction to Raspberry Pi, Interfacing Raspberry Pi with basic peripherals, Implementation of IoT with Raspberry Pi, Case studies.		
UNIT-IV	**IMPLEMENTATION OF IOT WITH RASPBERRY PI**	**Classes: 12**
Implementation of IoT with Raspberry Pi, Introduction to Software defined Network (SDN), SDN for IoT, Data Handling and Analytics.		
UNIT-V	**CLOUD COMPUTING**	**Classes: 12**
Cloud Computing, Sensor-Cloud, Smart Cities and Smart Homes, Connected Vehicles, Smart Grid, Industrial IoT. Case Study: Agriculture, Healthcare, Activity Monitoring		

TEXT BOOKS

1.Internet of Things: Fundamentals by A V L N SUJITH (Author), T.S.SANDEEP (Author), G SUNIL KUMAR (Author)

2.The Internet of Things" by SAMUEL GREENGARD

3. Internet of Things with Raspberry Pi and Arduino by Rajesh Singh, Anita Gehlot, Lovi Raj Gupta, Bhupendra Singh, Mahendra Swain

REFERENCE BOOKS

1. Internet of Things A HANDS – ON APPROACH –. ARSHDEEP BAHGA, VIJAY MADISETTI.

2. Internet of Things with Raspberry Pi and Arduino (Singh Rajesh)

3. Beginning Sensor networks with Arduino and Raspberry Pi – Charles Bell, Apress

4. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks Theory and Practice"

WEB REFERENCES

1. https://www.pdfdrive.com/beginning-sensor-networks-with-arduino-and-raspberry-pi-e27719879.html
2. https://www.scribd.com/document/513453064/Internet-of-Things-a-Hands-On-Approach-by-Arshdeep-Bahga-Vijay-Madisetti

E -TEXT BOOKS

1. https://www.taylorfrancis.com/books/mono/10.1201/9781351188319/hands-course-sensors-using-arduino-raspberry-pi-volker-ziemann
2. https://www.amazon.in/Raspberry-Pi-Arduino-Users-Applications-ebook/dp/B07DVXX1NQ
3. https://www.pdfdrive.com/python-programming-python-programming-for-beginners-python-programming-for-intermediates-e180663309.html

MOOCS COURSE

1.https://archive.nptel.ac.in/courses/106/105/106105166/

2.http://www.digimat.in/nptel/courses/video/106105166/L28.html

3.https://prutor.ai/product/learn-iot-through-arduino-and-raspberry-pi/

4.https://www.youtube.com/watch?v=c235EsGFcZs

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

DIGITAL ELECTRONICS LAB

II B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EC312PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To learn

1. To understand common forms of number representation in logic circuits.
2. To understand the minimization of expression using Karnaugh Map method.
3. To understand the concepts of combinational logic circuits.
4. To understand the concepts of sequential logic circuits.
5. To understand the concepts of memories.

COURSE OUTCOMES

1. Upon Completing This Course, the students will be able to:
2. Acquire the knowledge on numerical information in different forms and Boolean Algebra Theorems.
3. Define Postulates of Boolean algebra and to minimize combinational functions, and design the combinational circuits.
4. Design and Analyze Sequential Circuits for various cyclic functions.
5. Characterize logic families analyze them for the purpose of AC and DC parameters

LIST OF EXPERIMENTS

1. Realization of Logic circuit to generate r's Complement using Logic Gates.
2. Realization of given Boolean function using universal gates and minimizing the same.Compare the gate count before and after minimization.
3. Design and realize Full Adder circuit using gates/universal gates. Implement Full Subtractorusing full adder.
4. Designing a 2 – bit Comparator using AND, OR and NOT gates. Realize 4 – bit Comparatorusing 2 – bit Comparators.
5. Realize 2:1 MUX using the given gates and Design 8:1 using 2:1 MUX.
6. Implement the given Boolean function using the given MUX (ex: code converters).
7. Realize a 2x4 Decoder using logic gates and implement 3x8 Decoder using 2x4 Decoder.
8. Implement the given Boolean function using given Decoders. Convert Demultiplexer to Decoder and vice versa.
9. Verification of truth tables of flip flops using different clocks (level triggering, positive andnegative edge triggering) also converts the given flip flop from one type to another.

10. Designing of Universal n-bit shift register using flip flops and Multiplexers. Draw the timingdiagram of the Shift Register.
11. Design a Synchronous binary counter using D-flipflop /given flip flop.
12. Design Asynchronous counter for the given sequence using given flip flops.
13. Designing of MOD 8 Counter using JK flip flops.

Major Equipment required for Laboratories:

1. 5 V Fixed Regulated Power Supply/ 0-5V or more Regulated Power Supply.
2. 20 MHz Oscilloscope with Dual Channel.
3. Bread board and components/ Trainer Kit.
4. Multimeter.

TEXT BOOKS

1. R. P.Jain, "Modern Digita lElectronics", McGrawHill Education, 2009.
   M.M. Mano, "Digital logic and Computerdesign", PearsonEducationIndia,2016.

REFERENCE BOOKS

1. A.Kumar, "Fundamentals of Digital Circuits", PrenticeHallIndia,2016.
   Switching Theory and Logic Design – Anand Kumar, 3rd Edition, PHI, 2013.3.Modern Digital electronics RP Jain 4thEdition,McGrawHill

WEB REFERENCES

1. http://blog.digitalelectronics.co.in/
2. www.nesoacademy.org/electronics-engineering/digital-electronics/digital
3. https://www.slideshare.net/JournalsPubwwwjourna/international-journal-of-digital-electronics-vol-2-issue-2
4. https://lecturenotes.in/subject/203/switching-theory-and-logic-design-stld
5. http://www.infocobuild.com/education/audio-video-courses/electronics/DigitalCircuitsSystems
   https://nptel.ac.in/courses/117105080/

E -TEXT BOOKS

1. https://pages.uoregon.edu/rayfrey/DigitalNotes.pdf
2. https://easyengineering.net/fundamentals-of-digital-circuits-by-anand-kumar/

MOOCS COURSE

1. https://swayam.gov.in/courses/1392-digital-circuits-and-systems
   https://swayam.gov.in/courses/4410-synthesis-of-digital-systems

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

DATA STRUCTURES LAB

II B. TECH- I SEMESTER (R 22)

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

Prerequisites: A Course on "Programming for problem solving".

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

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.:

   Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list.:

   Creation ii) Insertion iii) Deletion iv) Traversal
3. Write a program that uses functions to perform the following operations on circular linked list.:

   Creation ii) Insertion iii) Deletion iv) Traversal
4. Write a program that implement stack (its operations) using

   Arrays ii) Pointers
5. Write a program that implement Queue (its operations) using

   Arrays ii) Pointers
6. Write a program that implements the following sorting methods to sort a given list of integers in ascending order

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

   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 COURSE

1. https://www.mooc-list.com/tags/data-structures
2. https://www.coursera.org/specializations/data-structures-algorithms

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

INTERNET OF THINGS LAB

II B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
EC314PC	B. Tech	0	0	3	1.5	40	60	100

COURSE OBJECTIVES

To Learn

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. Basic LED functionality.
2. Using Arduino
   a. Calculate the distance using a distance sensor.
   b. Basic LED functionality.
   c. Calculate temperature using a temperature sensor.
3. Using Node MCU
   a. Calculate the distance using a distance sensor.
   b. Basic LED functionality.
   c. 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/gett

ing-started.html

5. Accessing GPI Opinusing Python

a) Installing GPIO Zero library.

First, update your repositories list:

sudo apt update

Then install the package for Python 3:

sudo apt install python3-gpiozero

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. Collecting Sensor Data

a) DHT Sensor interface

- Connect the terminals of DHT GPIO pins of Raspberry Pi.
- Import the DHT library using import Adafruit_DHT
- Read sensor data and display it on screen.

TEXT BOOKS

1.Internet of Things: Fundamentals by A V L N SUJITH (Author), T.S.SANDEEP (Author), G SUNIL KUMAR (Author)

2.The Internet of Things" by SAMUEL GREENGARD

3. Internet of Things with Raspberry Pi and Arduino by Rajesh Singh, Anita Gehlot, Lovi Raj Gupta, Bhupendra Singh, Mahendra Swain

REFERENCE BOOKS

1. Internet of Things A HANDS – ON APPROACH –. ARSHDEEP BAHGA, VIJAY MADISETTI.

2. Internet of Things with Raspberry Pi and Arduino (Singh Rajesh)

3. Beginning Sensor networks with Arduino and Raspberry Pi – Charles Bell, Apress

4. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks Theory and Practice"

WEB REFERENCES

1. https://www.pdfdrive.com/beginning-sensor-networks-with-arduino-and-raspberry-pi-e27719879.html
2. https://www.scribd.com/document/513453064/Internet-of-Things-a-Hands-On-Approach-by-Arshdeep-Bahga-Vijay-Madisetti
3.https://www.amazon.in/Sensors-Their-Applications-XII-ebook/dp/B07CSZ3XCT

MOOCS COURSES

1.https://archive.nptel.ac.in/courses/106/105/106105166/

2.http://www.digimat.in/nptel/courses/video/106105166/L28.html

3.https://prutor.ai/product/learn-iot-through-arduino-and-raspberry-pi/

4.https://alison.com/course/arduino-and-programming-in-internet-of-things

5.https://onlinecourses.nptel.ac.in/noc19_cs65/preview

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

DATA VISUALIZATION - R PROGRAMMING/ POWER BI

II B. TECH- I SEMESTER (R 22)

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

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

LIST OF EXPERIMENTS

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 calculationsand fields.

4. Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Toolsand 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 differentdisplays, 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.

REFERENCES 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.

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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

GENDER SENSITIZATION LAB

II B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
*GS309MC	B. Tech	0	0	2	0	40	60	100

COURSE DESCRIPTION

To Learn

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.

Objectives of the Course

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.

Learning Outcomes

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. 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.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of labor and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks of life.
7. 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: 10

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: 8

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:10

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: 8

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 Out Is 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: 8

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.

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

St. Martin's Engineering College
UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SMEC B. TECH R22 AUTONOMOUS

II YEAR – II -SEMESTER SYLLABUS

St. Martin's Engineering College

UGC Autonomous
NBA& NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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: 11

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: 12

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

UNIT-III	ALGEBRAIC STRUCTURES	Classes: 10

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

UNIT-IV	ELEMENTARY COMBINATORICS	Classes: 11

Basics of Counting, Combinations and Permutations, Enumeration ofCombinationsandPermutations,EnumeratingCombinationsandPermutationswithRepetitions,EnumeratingPermutationwithConstrainedRepetitions,BinomialCoefficient,TheBinomialandMultinomialTheorems,The Principle ofExclusion.

UNIT-V	GRAPH THEORY	Classes: 12

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.Dr.P.Santosh Kumar Patra, Dr.D.Ranadheer Reddy , Mr.K.Upender Reddy, , Dr.S.Someshwar "Discrete Mathematics", Spectrum Publicatoins. First Edition,(2022)

2.Elements of Discrete Mathematics" by C L Liu Discrete Mathematics" by Norman L Biggs

3. Discrete Mathematics for Computer Science" by Kenneth Bogart and Robert L Drysdale

4. Discrete Mathematics with Applications" by Thomas Koshy

5. 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 MathematicsChandrasekaran, N., Umaparvathi, M. Mar
2. Discrete Mathematics And Graph TheoryBiswal, Purna Chandra
3. Advanced Discrete MathematicsRajput, 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

St. Martin's Engineering College

UGC Autonomous

Dhulapally, Secunderabad-500 100

NBA & NAAC A+ Accredited

www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

II B. TECH – II SEMESTER (R22)								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	T	P	C	CIE	SEE	Total
BE404MS	**B. Tech**	3	0	0	3	40	60	100

COURSE OBJECTIVES

1. To learn the basic Business types, impact of the Economy on Business and firms specifically to analyze the Business from the Financial Perspective.
2. To Plan production and cost concepts for maximizing profit.
3. To Construct financial statement in accordance with generally accepted accounting principles.
4. To Analyze the Financial performance of business through Ratios.
5. To Estimate investment proposals through Capital Budgeting Methods.

COURSE OUTCOMES

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

1. Understand Business with the use of economic theories and business structure.
2. Learn Production and cost concepts for maximizing profit.
3. Construct financial statement in accordance with generally accepted accounting principles.
4. Analyze the Financial performance of business through Ratios.
5. Estimate investment proposals through Capital Budgeting Methods.

UNIT-I INTRODUCTION TO BUSINESS AND ECONOMICS

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 in 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

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 & Law of Supply.

UNIT-III	PRODUCTION, COST, MARKRT STRUCTUES & PRICING

Production Analysis: Factors of Production, Production Function, Production Function with onevariable 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 ProfitAnalysis.

UNIT-IV	FINANCIAL ACCOUNTING

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.

UNIT-V	FINANCIAL ANALYSIS THROUGH RATIOS

Financial Analysis through Ratios: Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios,Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems).
Introduction to Fund Flow and Cash Flow Analysis (simple problems).

TEXT BOOKS

1. K. Sudha, K. Sathish, A. Sarveswarareddy, Business Economics and Financial Analysis-M/S Spectrum Publications, First Edition 2021.
2. D.D. Chaturvedi, S.L. Gupta, Business Economics - Theory and Applications, InternationalBook House Pvt. Ltd. 2013.
3. Dhanesh K Khatri, Financial Accounting, Tata McGraw Hill, 2011.
4. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGrawHill Education Pvt. Ltd. 2012.

REFERENCE BOOKS

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2. S.N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, VikasPublications, 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 COURSE

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

St. Martin's Engineering College

UGC Autonomous
NBA& NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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

To learn

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, interprocess communication and I/O in Unix

COURSE OUTCOMES

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

UNIT-I	Operating System	Classes: 12

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: 14

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: 11

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**	**Classes: 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**	**Classes: 13**
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. Dr.P.Santosh Kumar Patra, Mr.A.Mruthyunjayam , Dr.M.Narayanan, Dr.T.Poongothai,Mrs.E.Soumya “Operating Systems”, Spectrum Publicatoins. First Edition,(2022).
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 Principlesby Silberschatz, Galvin, Gagne
2. Operating Systems: Internals and Design Principles, 7eby 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

St. Martin's Engineering College

UGC Autonomous
NBA& NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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		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		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		Classes: 12

SQL:QUERIES,CONSTRAINTS,TRIGGERS:formofbasicSQLquery,UNION,INTERSECT,andEXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL,triggersand active databases.
SchemaRefinement: Problemscausedbyredundancy,decompositions,problemsrelatedtodecomposition, reasoning about functional dependencies, First, Second, Third

normal forms, BCNF,losslessjoindecomposition,multivalueddependencies,Fourthnormalform,Fifthnormalform.

UNIT-IV		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		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. Dr.P.Santosh Kumar Patra, Dr.Satheesh, ,Dr.R.Nagaraju, “Database Management System”, Spectrum Publicatoins. First Edition,(2022).
2. Fundamentals of Database Systems, ElmasriNavrate, Pearson Education
3. Introduction to Database Systems, C. J. Date, Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

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/python3/
2. https://www.youtube.com/watch?v=Dl_dz1FOvcY&list=PLHT9VxUGxZRshJ-edzjLZ72HfSta8s5f
3. https://www.udemy.com/machine-learning-using-r-and-python/
4. https://www.udemy.com/r-programming-language/
5. https://www.simpliv.com/itcertification/data-analytics-using-r-programming
6. https://books.goalkicker.com/PythonBook/

MOOCS COURSES

1. https://www.coursera.org/learn/python-programming
2. https://www.edx.org/professional-certificate/python-data-science

3. https://www.edx.org/course/cs50s-web-programming-with-python-and-javascript
4. https://www.programiz.com/python-programming/regex
5. https://www.tutorialspoint.com/python3/
6. https://www.geeksforgeeks.org/cgi-programming-python/
7. https://realpython.com/python-beginner-tips/
8. https://www.python.org/

St. Martin's Engineering College

UGC Autonomous
NBA& NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

JAVA PROGRAMMING

II B. TECH- II SEMESTER (R22)

Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT403PC	B. Tech	2	0	0	2	40	60	100

COURSE OBJECTIVES

To learn

1. To introduce object-oriented programming principles and apply them in solving problems.
2. To introduce the implementation of packages and interfaces.
3. To introduce the concepts of exception handling and multithreading.
4. To introduce the design of Graphical User Interface using swing controls.

COURSE OUTCOMES

1. Able to solve real world problems using OOP techniques.
2. Able to solve problems using java collection framework and I/O classes.
3. Able to develop multithreaded applications with synchronization.
4. Able to design GUI based applications.

UNIT-I	FOUNDATIONS OF JAVA:	Classes: 13

Foundations of Java: History of Java, Java Features, Variables, Data Types, Operators, Expressions, Control Statements. Elements of Java - Class, Object, Methods, Constructors and Access Modifiers, Generics, Inner classes, String class and Annotations. OOP Principles: Encapsulation – concept, setter and getter method usage, this keyword. Inheritance - concept, Inheritance Types, super keyword. Polymorphism – concept, Method Overriding usage and Type Casting. Abstraction – concept, abstract keyword and Interface.

UNIT-II	EXCEPTION HANDLING:	Classes: 12

Exception Handling: Exception and Error, Exception Types, Exception Handler, Exception Handling Clauses – try, catch, finally, throws and the throw statement, Built-in-Exceptions and Custom Exceptions. Files and I/O Streams: The file class, Streams, The Byte Streams, Filtered Byte Streams, The Random Access File class.

UNIT-III	PACKAGES	Classes: 12

Packages- Defining a Package, CLASSPATH, Access Specifiers, importing packages. Few Utility Classes - String Tokenizer, BitSet, Date, Calendar, Random, Formatter, Scanner. Collections: Collections overview, Collection Interfaces, Collections Implementation Classes, Sorting in Collections, Comparable and Comparator Interfaces.

UNIT-IV	MULTITHREADING:	Classes: 12

Multithreading: Process and Thread, Differences between thread-based multitasking and process based multitasking, Java thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication. Java Database Connectivity: Types of Drivers, JDBC architecture, JDBC Classes and Interfaces, Basic steps in Developing JDBC Application, Creating a New Database and Table with JDBC.

UNIT-V	GUI PROGRAMMING WITH SWING	Classes: 13

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers, Layout Manager Classes, Simple Applications using AWT and Swing. Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes.

TEXT BOOKS

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

REFERENCE BOOKS

1. Dr.P.Santosh Kumar Patra, Mr.J.Sudhakar , Mr.M.Manohar, ,Mr.A.Veera Babu "Java Programming", Surneni Publicatoins. First Edition,(2022).
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, University Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
5. Java Programming and Object-oriented Application Development, R. A. Johnson, Cengage Learning.

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. HTTPProgrammingRecipesforJavaBotsbyJeffHeaton-HeatonResearch,Inc.
2. Java Distributed Computing by Jim Farley - O'Reilly Media
3. Java Precisely by PeterSestoft-IT University of Copenhagen
4. JavaforAbsoluteBeginners:LearntoProgramtheFundamentalstheJava9+Way
5. Fundamentals of the Java Programming Language, Java SE6
6. JAVA: Easy Java Programming for Beginners, Your Step-By-Step Guide to
7. Learning Java Programming
8. AndroidAppDevelopmentinAndroidStudio:Java+AndroidEditionforBeginners

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.
6. https://www.futurelearn.com › courses ›begin-programming.

St. Martin's Engineering College

UGC Autonomous
NBA& NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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

To learn

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

COURSE OUTCOMES

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

LIST OF EXPERIMENTS

1. 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.

St. Martin's Engineering College

UGC Autonomous
NBA& NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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. Introduction 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.)

   Introduction 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/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

JAVA PROGRAMMING LAB

II B. TECH- II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT408PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To Learn

1. To understand OOP principles.
2. To understand the Exception Handling mechanism.
3. To understand Java collection framework.
4. To understand multithreaded programming.
5. To understand swing controls in Java.

COURSE OUTCOMES

1. Able to write the programs for solving real world problems using Java OOP principles.
2. Able to write programs using Exceptional Handling approach.
3. Able to write multithreaded applications.
4. Able to write GUI programs using swing controls in Java.

LIST OF EXPERIMENTS

1. Use Eclipse or Net bean platform and acquaint yourself with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
2. Write a Java program to demonstrate the OOP principles. [i.e., Encapsulation, Inheritance, Polymorphism and Abstraction]
3. Write a Java program to handle checked and unchecked exceptions. Also, demonstrate the usage of custom exceptions in real time scenario.
4. Write a Java program on Random Access File class to perform different read and write operations.
5. Write a Java program to demonstrate the working of different collection classes. [Use package structure to store multiple classes].
6. Write a program to synchronize the threads acting on the same object. [Consider the example of any reservations like railway, bus, movie ticket booking, etc.]
7. Write a program to perform CRUD operations on the student table in a database using JDBC.
8. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons

for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

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

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.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.AI Algorithms, Data Structures, and Idioms in Prolog, Lisp, and Java Paperback – 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.

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

https://www.quora.com › What-are-the-best-MOOCs-for-learning-Java

St. Martin's Engineering College

UGC Autonomous

NBA& NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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 Press2021

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

St. Martin's Engineering College

UGC Autonomous
NBA& NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

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

To learn
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: 12

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

UNIT-II		Classes: 12

Philosophy of the Indian Constitution- Preamble Salient Features

UNIT-III		Classes: 12

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		**Classes: 12**

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		**Classes: 12**

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		**Classes: 10**

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. Sarveswara reddy, K. Sathish, K. Sudha, Constitution of India, M/S Spectrum Publications, First Edition 2021.
2. http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/
3. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, 5th edition, Pearson Education.

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 COURSE

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

St. Martin's Engineering College
UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SMEC B. TECH R22 AUTONOMOUS

III YEAR – I SEMESTER SYLLABUS

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SOFTWARE ENGINEERING

III B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT501PC	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 will be 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: 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	Classes: 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	Classes: 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 modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT-IV	TESTING STRATEGIES	Classes: 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 MANAGEMENT AND QUALITY MANAGEMENT	Classes: 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. 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. Software Engineering, Dr. P Santosh Kumar Patra, Mrs. P Devasudha, Dr. P Sai Prasad, Mrs. T Bhargavi, Spectrum University Press.
2. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.
3. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
4. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.
5. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

WEB REFERENCES

1. https://w3.cs.jmu.edu/bernstdh/web/common/references/software-engineering.php
2. https://en.wikipedia.org/wiki/Software_engineering
3. https://www.mtu.edu/cs/undergraduate/software/what/#:~:text=Software%20engineering%20is%20the%20branch,software%20solutions%20for%20end%20users.

E -TEXT BOOKS

1. https://engineering.futureuniversity.com/BOOKS%20FOR%20IT/Software-Engineering-9th-Edition-by-Ian-Sommerville.pdf
2. https://davcollegetitilagarh.org/wp-content/uploads/2020/09/fundamentals-of-software-engineering-fourth-edition-rajib-mall.pdf

MOOCS COURSE

1. https://www.edx.org/course/introduction_to_agile_software_development?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list
2. https://www.edx.org/course/global-software-development?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list /
3. https://www.edx.org/course/unix-tools-data-software-and-production-engineering?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list

St. Martin's Engineering College

UGC Autonomous

Dhulapally, Secunderabad-500 100

NBA & NAAC A+ Accredited

www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

DATA COMMUNICATIONS AND COMPUTER NETWORKS

III B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT502PC	B. Tech	3	1	0	4	40	60	100

COURSE OBJECTIVES

To learn

1. Explore basic concepts of data communication
2. Introduce students to TCP/IP and OSI models along with their merits and demerits.
3. Explore in detail services offered by various layers of OSI Model.
4. Understand link layer protocols, UDP, TCP and application layer protocols.

COURSE OUTCOMES

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

1. Understand and explore the basics of communication and computer networks
2. Understand datalink, network and transport layers concepts of a computer network.
3. Understand the working of application layer protocols.

UNIT-I	DATA COMMUNICATIONS	Classes: 13

Data Communications: Components – Direction of Data flow – Networks – Components and Categories – Types of Connections – Topologies –Protocols and Standards – ISO / OSI model, Example Networks such as ATM, Frame Relay, ISDN.

Physical layer: Transmission modes, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT-II	DATA LINK LAYER	Classes: 12

Data link layer: Introduction, Framing, and Error – Detection and Correction – Parity – LRC – CRC Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols. 111 Medium Access sub layer: ALOHA, CSMA/CD, LAN – Ethernet IEEE 802.3, IEEE 802.5 – IEEE 802.11, Random access, Controlled access, Channelization.

UNIT-III	NETWORK LAYER	Classes: 12

Network layer: Logical Addressing, Internetworking, Tunneling, Address mapping, ICMP, IGMP, Forwarding, Uni-Cast Routing Protocols, Multicast Routing Protocols.

UNIT-IV	TRANSPORT LAYER	Classes: 12

Transport Layer: Process to Process Delivery, UDP and TCP protocols, Data Traffic, Congestion, Congestion Control, QoS, Integrated Services, Differentiated Services, QoS in Switched Networks.

UNIT-V	APPLICATION LAYER	Classes: 11

Application Layer: Domain name space, DNS in Internet, Electronic Mail, SMTP, FTP, WWW, HTTP, SNMP.

TEXT BOOKS

1. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition TMH.

REFERENCE BOOKS

1. Data Communication and Computer Networks, Dr. P Santosh Kumar Patra, Dr. N Satheesh, P Alexander, Dr. B Laxmi Kantha, Spectrum Publications.
2. Computer Networks, Andrew S Tanenbaum, 6th Edition. Pearson Education.
3. Computer Networking: A Top-Down Approach Featuring the Internet. James F. Kurose & Keith W. Ross, 3 rd Edition, Pearson Education
4. Data communications and Computer Networks, P.C Gupta, PHI.
5. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education.

WEB REFERENCES

1. https://opac.atmaluhur.ac.id/uploaded_files/temporary/DigitalCollection/Yzg0ZmVhY2FiY2ZlNTVjZGVmZjI2OGRiMGJlYzE4NGNkOTI3ZmRjZQ==.pdf
2. https://ncert.nic.in/textbook/pdf/lecs111.pdf
3. https://www.oreilly.com/library/view/express-learning-data/9788131761274/

E -TEXT BOOKS

1. http://www.freetechbooks.com/data-communication-and-networks-f31.html
2. https://freecomputerbooks.com/networkComputerBooks.html

MOOCS COURSE

1. https://www.mooc-list.com/course/computer-networks-uninettuno
2. https://www.mooc-list.com/course/computer-communications-and-networks-saylororg
3. https://www.mooc-list.com/course/computer-networks-coursera

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

MACHINE LEARNING

III B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT503PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

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

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	LEARNING	Classes: 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	Classes: 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	LEARNING WITH TREES	Classes: 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	Classes: 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	Classes: 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. Machine Learning, Dr. P Santosh Kumar Patra, Dr. R Santhosh Kumar, E Soumya, Seven Hills International Publishers.
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://doc.lagout.org/science/Artificial%20Intelligence/Machine%20learning/Machine%20Learning%20for%20Hackers_%20Case%20Studies%20and%20Algorithms%20to%20Get%20You%20Started%20%5BConway%20%26%20White%202012-02-25%5D.pdf
2. http://14.139.161.31/OddSem-0822-1122/Hands-On_Machine_Learning_with_Scikit-Learn-Keras-and-TensorFlow-2nd-Edition-Aurelien-Geron.pdf
3. https://docdrop.org/download_annotation_doc/AAAMLP-569to.pdf

E -TEXT BOOKS

1. https://bmansoori.ir/book/Machine%20Learning%20For%20Absolute%20Beginners.pdf
2. https://mml-book.github.io/book/mml-book.pdf

MOOCS COURSE

1. https://www.my-mooc.com/en/mooc/intro-to-machine-learning--ud120/
2. https://www.my-mooc.com/en/mooc/machine-learning-unsupervised-learning--ud741/
3. https://www.my-mooc.com/en/mooc/train-a-supervised-machine-learning-model/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

BIOMETRICS (Professional Elective – I)

III B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT511PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

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

5. Distinguish between, supervised, unsupervised and semi-supervised learning
6. Understand algorithms for building classifiers applied on datasets of non-linearly separable classes
7. Understand the principles of evolutionary computing algorithms
8. Design an ensembler to increase the classification accuracy

UNIT-I	INTRODUCTION	Classes: 12

Introduction, history, type of Biometrics, General Architecture of Biometric Systems, Basic Working of biometric Matching, Biometric System Error and performance Measures, Design of Biometric Systems, Applications of Biometrics, Benefits of Biometrics Versus Traditional Authentication Methods

UNIT-II	FACE, RETINA AND IRIS BIOMETRICS	Classes: 12

Face Biometrics & Retina And Iris Biometrics Introduction, Background of Face Recognition, Design of Face Recognition System, Neural Network for Face Recognition, Face Detection in Video Sequences, Challenges in Face Biometrics, Face Recognition Methods, Advantages and Disadvantages, Performance of Biometrics.

UNIT-III	DESIGN OF RETINA BIOMETRICS	Classes: 12

Design of Retina Biometrics, Iris Segmentation Method, Determination of Iris Region, Experimental Results of Iris Localization, Applications of Iris Biometrics, Advantages and Disadvantages.

UNIT-IV	VEIN AND FINGERPRINT BIOMETRICS	Classes: 12

Vein and Fingerprint Biometrics & Biometric Hand Gesture Recognition For Indian Sign Language. Biometrics Using Vein Pattern of Palm, Fingerprint Biometrics, Fingerprint Recognition System, Minutiae Extraction, Fingerprint Indexing, Experimental Results, Advantages and Disadvantages, Basics of Hand Geometry, Sign Language, Indian Sign Language, SIFT Algorithms- Practical Approach Advantages and Disadvantages.

UNIT-V	PRIVACY ENHANCEMENT	Classes: 12

Privacy Enhancement Using Biometrics & Biometric Cryptography And Multimodal Biometrics: Introduction, Privacy Concerns Associated with Biometric Developments, Identity and Privacy, Privacy Concerns, Biometrics with Privacy Enhancement, Comparison of Various Biometrics in Terms of Privacy, Soft Biometrics - Introduction to Biometric Cryptography.

TEXT BOOKS
1. G R Sinha and Sandeep B. Patil, Biometrics: concepts and applications, Wiley, 2013. 2. Paul Reid, Biometrics for Network Security, Pearson Education.
REFERENCE BOOKS
1. Samir Nanavathi, Micheal Thieme and Raj Nanavathi, Biometrics, Identity verification in a networked world, Wiley, dream Tech. 2. John D. Woodward and Jr. Wiley Dreamtech, Biometrics, The Ultimate Reference.
WEB REFERENCES
1. https://citationsy.com/styles/biometrics 2. https://assets.publishing.service.gov.uk/media/5b21060240f0b634d14c22bf/biometrics_final.pdf 3. https://www.irishimmigration.ie/biometrics/
E -TEXT BOOKS
1. https://gswan.gujarat.gov.in/PDF/Face-Image-Data-Standard-e-Gov-App-India-13-14122017.pdfhttps://mml-book.github.io/book/mml-book.pdf 2. https://www.cgdev.org/sites/default/files/biometric-elections-poor-countries-wasteful-or-worthwhile-investment.pdf
MOOCS COURSE
1. https://www.academia.edu/31861214/A_New_Verification_System_For_Verified_Certificate_MOOCs_ 2. https://ro.scribd.com/document/440644846/Coursera-docx 3. https://books.google.co.in/books?id=fGqtDwAAQBAJ&pg=PA322&lpg=PA322&dq=MOOCS+COURSE+Biometric+pdf&source=bl&ots=Lg4i3KGksa&sig=ACfU3U0q63zUSlhBjCVxOhocd2wvssh4ug&hl=en&sa=X&ved=2ahUKEwjPyJ6Fg-mDAxWmklYBHW5oBbs4HhDoAXoECAQQAw#v=onepage&q=MOOCS%20COURSE%20Biometric%20pdf&f=false

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

ADVANCED COMPUTER ARCHITECTURE (Professional Elective – I)

III B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT512PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. To impart the concepts and principles of parallel and advanced computer architectures.
2. To develop the design techniques of Scalable and multithreaded Architectures
3. To Apply the concepts and techniques of parallel and advanced computer architectures to design modern computer systems To introduce students to the basic concepts and techniques of Machine Learning.

COURSE OUTCOMES

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

1. Computational models and Computer Architectures.
2. Concepts of parallel computer models.
3. Scalable Architectures, Pipelining, Superscalar processors Distinguish between, supervised, unsupervised and semi-supervised learning

UNIT-I	THEORY OF PARALLELISM	Classes: 14

Theory of Parallelism, Parallel computer models, The State of Computing, Multiprocessors and Multicomputers, Multivector and SIMD Computers, PRAM and VLSI models, Architectural development tracks, Program and network properties, Conditions of parallelism, Program partitioning and Scheduling, Program flow Mechanisms, System interconnect Architectures.

UNIT-II	PRINCIPLES OF SCALABLE PERFORMANCE	Classes: 12

Principles of Scalable performance, Performance metrics and measures, Parallel Processing applications, Speed up performance laws, Scalability Analysis and Approaches, Hardware Technologies, Processes and Memory Hierarchy, Advanced Processor Technology, Superscalar and Vector Processors

UNIT-III	SHARED MEMORY ORAGANIZATION	Classes: 11

Shared-Memory Organizations, Sequential and weak consistency models, Pipelining and superscalar techniques, Linear Pipeline Processors, Non-Linear Pipeline Processors, Instruction Pipeline design, Arithmetic pipeline design, superscalar pipeline design. .

UNIT-IV	PARALLEL AND SCALABE ARCHITECTURES	Classes: 12

Parallel and Scalable Architectures, Multiprocessors and Multicomputers, Multiprocessor system interconnects, cache coherence and synchronization mechanism, Three Generations of Multicomputers, Message-passing Mechanisms, Multivetor and SIMD computers.

UNIT-V	VECTOR PROCESSING PRINCIPLES	Classes: 11

Vector Processing Principles, Multivector Multiprocessors, Compound Vector processing, SIMD computer Organizations, The connection machine CM-5.

TEXT BOOKS

1. Advanced Computer Architecture, Kai Hwang, 2nd Edition, Tata McGraw Hill Publishers.

REFERENCE BOOKS

1. Computer Architecture, J.L. Hennessy and D.A. Patterson, 4th Edition, ELSEVIER.

2. Advanced Computer Architectures, S.G.Shiva, Special Indian edition, CRC, Taylor &Francis.
3. Introduction to High Performance Computing for Scientists and Engineers, G. Hager and G. Wellein, CRC Press, Taylor & Francis Group.
4. Advanced Computer Architecture, D. Sima, T. Fountain, P. Kacsuk, Pearson education.
5. Computer Architecture, B. Parhami, Oxford Univ. Press.Tom M Mitchell, ―Machine Learning, First Edition, McGraw Hill Education, 2013.

WEB REFERENCES

1. https://batch.libretexts.org/print/Letter/Finished/workforce-14821/Full.pdf
   https://www.irishimmigration.ie/biometrics/
2. https://doc.lagout.org/science/0_Computer%20Science/Computer%20Architecture/Advanced%20Computer%20Architecture%20and%20Parallel%20Processing.pdf

E -TEXT BOOKS

1. https://www.tdx.cat/bitstream/handle/10803/5976/08REFERENCES.pdf;sequence=8
2. https://www1.goramblers.org/textbooks/filestrackid=koK:6427?Academia=Advanced-Computer-Architecture-And-Parallel-Processing.pdf

MOOCS COURSE

1. https://www.classcentral.com/report/coursera-free-online-courses/
2. https://www.researchgate.net/publication/317070659_MOOC_architecture_model_for_computer_programming_courses
3. https://www.my-mooc.com/en/mooc/train-a-supervised-machine-learning-model/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

DATA ANALYTICS (Professional Elective – I)

III B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT513PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

Upon successful completion of the course, the student 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	Classes: 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	Classes: 12

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

UNIT-III	REGRESSION	Classes: 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	Classes: 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	Classes: 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. Data Analytics, Dr. P Santosh Kumar Patra, Dr. G Govinda Rajulu, Dr. B Rajalingam, N Mahboob Subani, Spectrum Publishing House.
2. Introduction to Data Mining, Tan, Steinbach and Kumar, Addision Wisley, 2006.
3. Data Mining Analysis and Concepts, M. Zaki and W. Meira
4. Mining of Massive Datasets, Jure Leskovec Stanford Univ. Anand Rajaraman Milliway Labs Jeffrey D Ullman Stanford Univ

WEB REFERENCES

1. https://content.kopykitab.com/ebooks/2014/07/3400/sample/sample_3400.pdf
2. https://www.cns.nyu.edu/pub/lcv/wang03-preprint.pdf
3. https://farid.berkeley.edu/downloads/tutorials/fip.pdf

E -TEXT BOOKS

1. https://noirlab.edu/public/media/archives/techdocs/pdf/techdoc027.pdf
2. https://mu.ac.in/wp-content/uploads/2022/05/MCA-IMEGE-PROCESING-1.pdf

MOOCS COURSE

1. https://www.my-mooc.com/en/mooc/digital/
2. https://www.techtarget.com/whatis/definition/massively-open-online-course-MOOC

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

IMAGE PROCESSING (Professional Elective – I)

III B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT514PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

Upon successful completion of the course, the student 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	Classes: 13

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	Classes: 12

Image Enhancement in Spatial Domain Point Processing, Histogram Processing, Spatial Filtering, Enhancement in Frequency Domain, Image Smoothing, Image Sharpening.

UNIT-III	IMAGE STORATION	Classes: 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 AND DETECTION	Classes: 11

Image Segmentation Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region Oriented Segmentation.

UNIT-V	IMAGE COMPRESSION	Classes: 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, 2 nd Ed, 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://cag.gov.in/uploads/guidelines/Guidelines-on-Data-Analytics-book-05de4f7fd52e565-67820093.pdf 2. https://d1.awsstatic.com/architecture-diagrams/ArchitectureDiagrams/modern-data-analytics-using-lake-house-ra.pdf?anld_da6 3. https://www.iospress.com/catalog/journals/intelligent-data-analysis
E -TEXT BOOKS
1. https://bold-web.maths.gla.ac.uk/cpd/assets/pdfs/handbook.pdf 2. https://www.oreilly.com/library/view/data-analytics-with/9781491913734/
MOOCS COURSE
1. https://thesai.org/Downloads/Volume4No5/Paper_16-LASyM_A_Learning_Analytics_System_for_MOOCs.pdf 2. https://www.cell.com/heliyon/pdf/S2405-8440%2820%2932576-7.pdf 3. https://core.ac.uk/download/pdf/132612349.pdf

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

PRINCIPLES OF PROGRAMMING LANGUAGES (Professional Elective – I)

III B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT515PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. Introduce important paradigms of programming languages
2. To provide conceptual understanding of high-level language design and implementation
3. Topics include programming paradigms; syntax and semantics; data types, expressions and statements; subprograms and blocks; abstract data types; concurrency; functional and logic programming languages; and scripting languages.

COURSE OUTCOMES

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

1. Acquire the skills for expressing syntax and semantics in formal notation
2. Identify and apply a suitable programming paradigm for a given computing application
3. Gain knowledge of the features of various programming languages and their comparison

UNIT-I PRELIMINARY CONCEPTS — Classes: 12

Preliminary Concepts: Reasons for Studying Concepts of Programming Languages, Programming Domains, Language Evaluation Criteria, Influences on Language Design, Language Categories, Language Design Trade-Offs, Implementation Methods, Programming Environments Syntax and Semantics: General Problem of Describing Syntax and Semantics, Formal Methods of Describing Syntax, Attribute Grammars, Describing the Meanings of Programs

UNIT-II NAMES, BINDINGS AND SCOPES — Classes: 12

Names, Bindings, and Scopes: Introduction, Names, Variables, Concept of Binding, Scope, Scope and Lifetime, Referencing Environments, Named Constants

Data Types: Introduction, Primitive Data Types, Character String Types, User Defined Ordinal Types, Array, Associative Arrays, Record, Union, Tuple Types, List Types, Pointer and Reference Types, Type Checking, Strong Typing, Type Equivalence Expressions and Statements, Arithmetic Expressions, Overloaded Operators, Type Conversions, Relational and Boolean Expressions, Short Circuit Evaluation, Assignment Statements, Mixed-Mode

Assignment Control Structures – Introduction, Selection Statements, Iterative Statements, Unconditional Branching, Guarded Commands.

UNIT-III SUBPROGRAMS AND BLOCKS — Classes: 12

Subprograms and Blocks: Fundamentals of Sub-Programs, Design Issues for Subprograms, Local Referencing Environments, Parameter Passing Methods, Parameters that Are Subprograms, Calling Subprograms Indirectly, Overloaded Subprograms, Generic Subprograms, Design Issues for Functions, User Defined Overloaded Operators, Closures, Coroutines Implementing Subprograms: General Semantics of Calls and Returns, Implementing Simple Subprograms, Implementing Subprograms with Stack-Dynamic Local Variables, Nested Subprograms, Blocks, Implementing Dynamic Scoping

Abstract Data Types: The Concept of Abstraction, Introductions to Data Abstraction, Design Issues, Language Examples, Parameterized ADT, Encapsulation Constructs, Naming Encapsulations

UNIT-IV	CONCURRENCY	Classes: 12

Concurrency: Introduction, Introduction to Subprogram Level Concurrency, Semaphores, Monitors, Message Passing, Java Threads, Concurrency in Function Languages, Statement Level Concurrency.

Exception Handling and Event Handling: Introduction, Exception Handling in Ada, C++, Java, Introduction to Event Handling, Event Handling with Java and C#.

UNIT-V	FUNCTIONAL PROGRAMMING LANGUAGES	Classes: 12

Functional Programming Languages: Introduction, Mathematical Functions, Fundamentals of Functional Programming Language, LISP, Support for Functional Programming in Primarily Imperative Languages, Comparison of Functional and Imperative Languages

Logic Programming Language: Introduction, an Overview of Logic Programming, Basic Elements of Prolog, Applications of Logic Programming.

Scripting Language: Pragmatics, Key Concepts, Case Study: Python – Values and Types, Variables, Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library.

TEXT BOOKS

1. Concepts of Programming Languages Robert. W. Sebesta 10/E, Pearson Education.
2. Programming Language Design Concepts, D. A. Watt, Wiley Dreamtech, 2007.

REFERENCE BOOKS

1. Principles of Programming Languages, Dr. P Santosh Kumar Patra, M Sandyarani, K Priti, Srikrishna techno books publication.
2. Programming Languages, 2nd Edition, A.B. Tucker, R. E. Noonan, TMH.
3. Programming Languages, K. C. Louden, 2nd Edition, Thomson, 2003.

WEB REFERENCES

1. https://www.coloradomesa.edu/testing/documents/aleks_ppl_student_module_reference_guide_january_2023.pdf
2. https://www.pplweb.com/wp-content/uploads/2023/04/PPL-Corporation-2023-Proxy.pdf
3. https://www.pplweb.com/wp-content/uploads/2023/04/PPL-Corporation-2023-Proxy.pdf

E -TEXT BOOKS

1. https://www.academia.edu/93319875/Principles_of_Programming_Languages/1000
2. https://bookpdf.co.in/principles-programming-languages-pdf/

MOOCS COURSE

1. https://publik.tuwien.ac.at/files/publik_270613.pdf
2. https://www.my-mooc.com/en/categorie/programming-languages
3. https://www.mooc.org/blog/why-is-computer-programming-important

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER GRAPHICS (Professional Elective – II)

III B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT521PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

Upon successful completion of the course, the student 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	Classes: 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	Classes: 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	Classes: 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	Classes: 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	Classes: 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. Computer Graphics, Dr. P Santosh Kumar Patra, Mr. J Venkatarangan, Dr. N Krishnaiah, Mr. G Sathish, Surneni International Book Publishers. 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. 6. Computer Graphics, Steven Harrington, TMH.
WEB REFERENCES
1. https://onlinecourses.nptel.ac.in/noc22_cs111/preview 2. https://www.mooc-list.com/course/interactive-3d-graphics-udacity 3. https://www.mooc-list.com/course/foundations-ar-coursera
E -TEXT BOOKS
1. https://ia902203.us.archive.org/22/items/DonaldHearnM.PaulineBakerComputerGraphicsBookFi.org/%5BDonald_Hearn%2C_M._Pauline_Baker%5D_Computer_Graphics%28BookFi.org%29.pdf 2. https://math.hws.edu/eck/cs424/downloads/graphicsbook-linked.pdf
MOOCS COURSE
1. https://www.mooc-list.com/course/foundations-ar-coursera 2. https://www.mooc-list.com/course/interactive-computer-graphics-coursera 3. https://www.mooc-list.com/course/computer-graphics-edx

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

QUANTUM COMPUTING (Professional Elective – II)

III B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT522PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

Upon successful completion of the course, the student 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	Classes: 11

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	Classes: 13

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	Classes: 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	Classes: 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	Classes: 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.ibm.com/topics/quantum-computing 2. https://en.wikipedia.org/wiki/Quantum_computing 3. https://azure.microsoft.com/en-us/resources/cloud-computing-dictionary/what-is-quantum-computing
E -TEXT BOOKS
1. https://www.fi.muni.cz/usr/gruska/qbook1.pdf 2. https://www.academia.edu/97932719/Fundamentals_of_Quantum_Computing_Theory_and_Practice
MOOCS COURSE
1. https://www.coursera.org/learn/introduction-to-quantum-information 2. https://onlinecourses.nptel.ac.in/noc21_cs103/preview 3. https://www.udemy.com/topic/quantum-computing/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

ADVANCED OPERATING SYSTEMS (Professional Elective – II)

III B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT523PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. To study, learn, and understand the main concepts of advanced operating systems (parallel processing systems, distributed systems, real time systems, network operating systems, and open-source operating systems), Hardware and software features that support these systems.

COURSE OUTCOMES

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

1. Understand the design approaches of advanced operating systems
2. Analyze the design issues of distributed operating systems.
3. Evaluate design issues of multi-processor operating systems.
4. Identify the requirements Distributed File System and Distributed Shared Memory.
5. Formulate the solutions to schedule the real time applications.

UNIT-I	ARCHITECTURES OF DISTRIBUTED SYSTEMS	Classes: 12

Architectures of Distributed Systems: System Architecture Types, Distributed Operating Systems, Issues in Distributed Operating Systems, Communication Primitives. Theoretical Foundations: Inherent Limitations of a Distributed System, Lamport's Logical Clocks, Vector Clocks, Causal Ordering of Messages, Termination Detection.

UNIT-II	DISTRIBUTED MUTUAL EXCLUSION	Classes: 12

Distributed Mutual Exclusion: The Classification of Mutual Exclusion Algorithms, Non-Token – Based Algorithms: Lamport's Algorithm, The Ricart-Agrawala Algorithm, Maekawa's Algorithm, Token-Based Algorithms: Suzuki-Kasami's Broadcast Algorithm, Singhal's Heurisric Algorithm, Raymond's Heuristic Algorithm.

UNIT-III	DISTRIBUTED DEADLOCK DETECTION	Classes: 12

Distributed Deadlock Detection: Preliminaries, Deadlock Handling Strategies in Distributed Systems, Issues in Deadlock Detection and Resolution, Control Organizations for Distributed Deadlock Detection, Centralized- Deadlock – Detection Algorithms, Distributed Deadlock Detection Algorithms, Hierarchical Deadlock Detection Algorithms.

UNIT-IV	MULTIPROCESSOR SYSTEM ARCHITECTURES	Classes: 12

Multiprocessor System Architectures: Introduction, Motivation for multiprocessor Systems, Basic Multiprocessor System Architectures

Multi Processor Operating Systems: Introduction, Structures of Multiprocessor Operating Systems, Operating Design Issues, Threads, Process Synchronization, Processor Scheduling.

Distributed File Systems: Architecture, Mechanisms for Building Distributed File Systems, Design Issues.

UNIT-V	DISTRIBUTED SCHEDULING	Classes: 12

Distributed Scheduling: Issues in Load Distributing, Components of a Load Distributed Algorithm, Stability, Load Distributing Algorithms, Requirements for Load Distributing, Task Migration, Issues in task Migration Distributed Shared Memory: Architecture and Motivation, Algorithms for Implementing DSM, Memory Coherence, Coherence Protocols, Design Issues.

TEXT BOOKS
1. Advanced Concepts in Operating Systems, Mukesh Singhal, Niranjan G. Shivaratri, Tata McGraw-Hill Edition 2001.
REFERENCE BOOKS
1. Distributed Systems: Andrew S. Tanenbaum, Maarten Van Steen, Pearson Prentice Hall, Edition – 2, 2007.
WEB REFERENCES
1. https://online.stanford.edu/courses/cs240-advanced-topics-operating-systems 2. https://www.handbook.unsw.edu.au/undergraduate/courses/2019/comp9242 3. https://www.classcentral.com/course/udacity-advanced-operating-systems-1016
E -TEXT BOOKS
1. https://techworldthink.github.io/MCA/Download/S2/El%20-%20OS/FULL/OS_MD_1.pdf 2. https://www.academia.edu/28818227/Advanced_Operating_Systems_Introduction_and_Overview
MOOCS COURSE
1. https://www.shiksha.com/online-courses/advanced-operating-systems-course-udacl50 2. https://www.my-mooc.com/en/mooc/advanced-operating-systems--ud189/ 3. https://www.coursera.org/specializations/codio-introduction-operating-systems

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

DISTRIBUTED DATABASES (Professional Elective – II)

III B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT524PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

Upon successful completion of the course, the student 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. d Shared Memory.

UNIT-I	INTRODUCTION	Classes: 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	Classes: 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	Classes: 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	Classes: 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	Classes: 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://online.stanford.edu/courses/cs240-advanced-topics-operating-systems
2. https://upcommons.upc.edu/bitstream/handle/2117/389765/PID_00179800-3.pdf?sequence=1&isAllowed=y
3. https://www.academia.edu/37509288/Distributed_database_system_on_web_server_A_Review

E -TEXT BOOKS

1. https://upcommons.upc.edu/bitstream/handle/2117/389765/PID_00179800-3.pdf?sequence=1&isAllowed=y
2. https://www.pdfdrive.com/distributed-system-books.html

MOOCS COURSE

1. https://www.my-mooc.com/en/mooc/distributed-database-systems/
2. https://testbook.com/objective-questions/mcq-on-moocs--5eea6a0a39140f30f369dba7
3. https://iopscience.iop.org/article/10.1088/1742-6596/1836/1/012043/pdf

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

PATTERN RECOGNITION (Professional Elective – II)

III B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT525PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. Introducing fundamental concepts, theories, and algorithms for pattern recognition and machine learning.

COURSE OUTCOMES

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

1. Understand the importance of pattern recognition and its representation
2. Analyza the variants of NN algorithm
3. Understand the necessity of Hidden markov models, decision tree and SVM for classification
4. Understand different types of clustering algorithms

UNIT-I	INTRODUCTION	Classes: 12

Introduction: Pattern Recognition, Data Sets for Pattern Recognition, Different Paradigms for Pattern Recognition. Representation: Data Structures for Pattern Representation, Representation of Clusters, Proximity Measures, Size of Patterns, Abstractions of the Data Set, Feature Extraction, Feature Selection, Evaluation of Classifier, Evaluation of Clustering.

UNIT-II	NEAREST NEIGHBOR BASED CLASSIFIER	Classes: 12

Nearest Neighbor Based Classifier: Nearest Neighbor Algorithm, Variants of the NN Algorithm, use of the Nearest Neighbor Algorithm for Transaction Databases, Efficient Algorithms, Data Reduction, Prototype Selection. Bayes Classifier: Bayes Theorem, Minimum Error Rate Classifier, Estimation of Probabilities, Comparison with the NNC, Naïve Bayes Classifier, Bayesian Belief Network.

UNIT-III	HIDDEN MARKOV M0DELS	Classes: 12

Hidden Markov Models: Markov Models for Classification, Hidden Morkov Models, Classification using HMMs. Decision Trees: Introduction, Decision Tree for Pattern Classification, Construction of Decision Trees, Splitting at the Nodes, Overfitting and Pruning, Examples of Decision Tree Induction.

UNIT-IV	VECTOR MACHINES	Classes: 12

Support Vector Machines: Introduction, Learning the Linear Discriminant Functions, Neural Networks, SVM for Classification. Combination of Classifiers: Introduction, Methods for Constructing Ensembles of Classifiers, Methods for Combining Classifiers.

UNIT-V	CLUSTERING	Classes: 12

Clustering: Importance of clustering, Hierarchical Algorithms, Partitional Clustering, Clustering Large Data Sets. An Application-Hand Written Digit Recognition: Description of the Digit Data, Preprocessing of Data, Classification Algorithms, Selection of Representative Patterns, Results.

TEXT BOOKS

1. Pattern Recognition: An Algorithmic Approach: Murty, M. Narasimha, Devi, V. Susheela, Spinger Pub, 1st Ed.

REFERENCE BOOKS
1. Machine Learning - Mc Graw Hill, Tom M. Mitchell. 2. Fundamentals of Speech Recognition: Lawrence Rabiner and Bing- Hwang Juang. Prentice Hall Pub.
WEB REFERENCES
1. https://cdn.intechopen.com/pdfs/5795/InTech-Theory_of_cognitive_pattern_recognition.pdf 2. https://researchers.mq.edu.au/files/62426503/Publisher%20version%20%28open%20access%29.pdf
E -TEXT BOOKS
1. https://us.sagepub.com/sites/default/files/upm-assets/83356_book_item_83356.pdf 2. https://www.morganstanley.com/im/publication/insights/articles/article_patternrecognition.pdf
MOOCS COURSE
1. https://www.oerknowledgecloud.org/archive/MOOC_Final.pdf 2. https://citl.illinois.edu/docs/default-source/mooc-presentations/massive-open-online-courses-moocs-participant-activity-demographics-satisfaction.pdf?sfvrsn=2 3. https://dergipark.org.tr/en/download/article-file/1673192

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SOFTWARE ENGINEERING & COMPUTER NETWORKS LABORATORY

III B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT504PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To Learn

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

Software Engineering List of Experiments:

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

Sample Projects:

1. Passport automation System
2. Book Bank
3. Online Exam Registration

Computer Networks 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

TEXT BOOKS

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw Hill International Edition
2. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition TMH.

REFERENCE BOOKS

1. Software Engineering, Dr. P Santosh Kumar Patra, Mrs. P Devasudha, Dr. P Sai Prasad, Mrs. T Bhargavi, Spectrum University Press.
2. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.
3. Data Communication and Computer Networks, Dr. P Santosh Kumar Patra, Dr. N Satheesh, P Alexander, Dr. B Laxmi Kantha, Spectrum Publications.
4. Computer Networks, Andrew S Tanenbaum, 6th Edition. Pearson Education.
5. Computer Networking: A Top-Down Approach Featuring the Internet. James F. Kurose & Keith W. Ross, 3 rd Edition, Pearson Education

WEB REFERENCES

1. https://en.wikipedia.org/wiki/Software_engineering
2. https://w3.cs.jmu.edu/bernstdh/web/common/references/software-engineering.php
3. https://opac.atmaluhur.ac.id/uploaded_files/temporary/DigitalCollection/Yzg0ZmVhY2FiY2ZlNTVjZGVmZjI2OGRiMGJlYzE4NGNkOTI3ZmRjZQ==.pdf
4. https://ncert.nic.in/textbook/pdf/lecs111.pdf

E -TEXT BOOKS

1. https://engineering.futureuniversity.com/BOOKS%20FOR%20IT/Software-Engineering-9th-Edition-by-Ian-Sommerville.pdf
2. http://www.freetechbooks.com/data-communication-and-networks-f31.html

MOOCS COURSE

1. https://www.edx.org/course/introduction_to_agile_software_development?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list
2. https://www.edx.org/course/global-software-development?hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list /

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

MACHINE LEARNING LABORATORY

III B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT505PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To Learn

1. The objective of this lab is to get an overview of the various machine learning techniques and can demonstrate them using python.

COURSE OUTCOMES

Upon successful completion of the course, the student is able

1. Understand modern notions in predictive data analysis • Select data, model selection, model complexity and identify the trends
2. Understand a range of machine learning algorithms along with their strengths and weaknesses
3. Build predictive models from data and analyze their performance

LIST OF EXPERIMENTS

1. Write a python program to compute Central Tendency Measures: Mean, Median, Mode Measure of Dispersion: Variance, Standard Deviation
2. Study of Python Basic Libraries such as Statistics, Math, Numpy and Scipy
3. Study of Python Libraries for ML application such as Pandas and Matplotlib
4. Write a Python program to implement Simple Linear Regression
5. Implementation of Multiple Linear Regression for House Price Prediction using sklearn
6. Implementation of Decision tree using sklearn and its parameter tuning
7. Implementation of KNN using sklearn
8. Implementation of Logistic Regression using sklearn
9. Implementation of K-Means Clustering
10. Performance analysis of Classification Algorithms on a specific dataset (Mini Project)

TEXT BOOKS

1. Machine Learning – Tom M. Mitchell, - MGH.

REFERENCE BOOKS

1. Machine Learning, Dr. P Santosh Kumar Patra, Dr. R Santhosh Kumar, E Soumya, Seven Hills International Publishers
2. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis..
3. Tom M Mitchell, ―Machine Learning, First Edition, McGraw Hill Education, 2013.
4. Peter Flach, ―Machine Learning: The Art and Science of Algorithms that Make Sense of Data‖, First Edition, Cambridge University Press, 2012.
5. Jason Bell, ―Machine learning – Hands on for Developers and Technical Professionals‖, First Edition, Wiley, 2014
6. Ethem Alpaydin, ―Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series), Third Edition, MIT Press, 2014

WEB REFERENCES
1. https://doc.lagout.org/science/Artificial%20Intelligence/Machine%20learning/Machine%20Learning%20for%20Hackers_%20Case%20Studies%20and%20Algorithms%20to%20Get%20You%20Started%20%5BConway%20%26%20White%202012-02-25%5D.pdf
2. http://14.139.161.31/OddSem-0822-1122/Hands-On_Machine_Learning_with_Scikit-Learn-Keras-and-TensorFlow-2nd-Edition-Aurelien-Geron.pdf
3. https://docdrop.org/download_annotation_doc/AAAMLP-569to.pdf
E -TEXT BOOKS
1. https://bmansoori.ir/book/Machine%20Learning%20For%20Absolute%20Beginners.pdf
2. https://mml-book.github.io/book/mml-book.pdf
MOOCS COURSE
1. https://www.my-mooc.com/en/mooc/intro-to-machine-learning--ud120/
2. https://www.my-mooc.com/en/mooc/machine-learning-unsupervised-learning--ud741/
3. https://www.my-mooc.com/en/mooc/train-a-supervised-machine-learning-model/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

ADVANCED ENGLISH COMMUNICATION SKILLS LAB

III B. TECH - I SEMESTER (R 22)

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

COURSE OBJECTIVES

To train students

1. To use relevant words through the practice of vocabulary and responding appropriately.
2. To improve Reading Comprehension Skills and Techniques, to read and infer for meanings.
3. To enable to write and improve writing skills to present different types of writing.
4. To enable students to perform presentation skills with the right usage of Body language through seminars, posters, etc.
5. To prepare students for placements by practicing various activates like group discussions, mock interviews, etc.

COURSE OUTCOMES

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

1. Gather ideas and information to organize ideas relevantly and coherently.
2. Participate in group discussions.
3. Face interviews.
4. Write project/research reports/technical reports.
5. Make oral presentations and written presentations.

LIST OF EXPERIMENTS

1. Activities on Listening and Reading Comprehension: Active Listening – Development of Listening Skills Through Audio clips - Benefits of Reading – Methods and Techniques of Reading – Basic Steps to Effective Reading – Common Obstacles – Discourse Markers or Linkers - Subskills of reading - Reading for facts, negative facts and Specific Details- Guessing Meanings from Context, Inferring Meaning - Critical Reading — Reading Comprehension – Exercises for Practice.

2. Activities on Writing Skills: Vocabulary for Competitive Examinations - Planning for Writing – Improving Writing Skills - Structure and presentation of different types of writing – Free Writing and Structured Writing - Letter Writing –Writing a Letter of Application –Resume vs. Curriculum Vitae – Writing a Résumé – Styles of Résumé - e-Correspondence – Emails – Blog Writing - (N)etiquette – Report Writing – Importance of Reports – Types and Formats of Reports– Technical Report Writing– Exercises for Practice.

3. Activities on Presentation Skills - Starting a conversation – responding appropriately and relevantly – using the right language and body language – Role Play in different situations including Seeking Clarification, Making a Request, Asking for and Refusing Permission, Participating in a Small Talk – Oral presentations (individual and group) through JAM sessions- PPTs – Importance of Presentation Skills – Planning, Preparing, Rehearsing and Making a Presentation – Dealing with Glossophobia or Stage Fear – Understanding Nuances of Delivery - Presentations through Posters/Projects/Reports – Checklist for Making a Presentation and Rubrics of Evaluation

4. Activities on Group Discussion (GD): Types of GD and GD as a part of a Selection Procedure -

Dynamics of Group Discussion- Myths of GD - Intervention, Summarizing - Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas – Do's and Don'ts - GD Strategies – Exercises for Practice.

5. Interview Skills: Concept and Process - Interview Preparation Techniques - Types of Interview Questions – Pre-interview Planning, Opening Strategies, Answering Strategies - Interview Through Tele-conference & Video-conference - Mock Interviews.

MINIMUM REQUIREMENT

The Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- One PC with latest configuration for the teacher
- T. V, a digital stereo
- Headphones of High quality

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 Press2009.
4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. English Vocabulary in Use series, Cambridge University Press 2008.

WEB REFERENCES

1. http://www.skillsyouneed.com/ips/interpersonal-communication.html#ixzz3Zo3C60Js
2. http://en.wikipedia.org/wiki/Conversation
3. http://www.wikihow.com/Start-a-Conversation-When-You-Have-Nothing-to-Talk-About 10 Sure-Fire Strategies to Improve Your Vocabulary
4. https://litemind.com/top-3-reasons-to-improve-your-vocabulary/

E -TEXT BOOKS

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

MOOCS COURSE

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

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

UI DESIGN-FLUTTER LAB

III B. TECH - I SEMESTER (R 22)

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

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

Upon successful completion of the course, the student 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://is.muni.cz/th/on45r/bachelors_thesis.pdf 2. https://elib.uni-stuttgart.de/bitstream/11682/11515/1/thesis.pdf
E -TEXT BOOKS
1. https://www.academia.edu/51410191/IRJET_Mobile_Application_Using_Flutter_Know_Your_Ride?uc-sb-sw=92463975 2. https://core.ac.uk/download/pdf/42858431.pdf
MOOCS COURSE
1. http://www.cs.cmu.edu/~bam/uicourse/830spring20/830-19-Flutter%20slides%20copy.pdf 2. https://www.sbup.edu.in/assets/policyDocuments/bca-proposed-course-structure.pdf

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

INTELLECTUAL PROPERTY RIGHTS

III B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IP510MC	B. Tech	3	0	0	0	40	60	100

COURSE OBJECTIVES

1. To acquaint the learners with the basic concepts of Intellectual Property Rights.
2. To develop expertise in the learners in IPR related issues and sensitize the learners with the emerging issues in IPR and the rationale for the protection of IPR.
3. To identify the significance of practice and procedure of Patents.
4. To learn the procedure of obtaining Patents, Copyrights, Trade Marks &Industrial Design.
5. To enable the students to keep their IP rights alive.

COURSE OUTCOMES

Upon successful completion of the course

1. Gain knowledge on Intellectual Property assets and generate economic wealth.
2. Assist individuals and organizations in capacity building and work as a platform for development, promotion, protection, compliance, and enforcement of Intellectual Property & knowledge.
3. Gather knowledge about Intellectual Property Rights which is important for students of engineering in particular as they are tomorrow's technocrats and creator of new technology.
4. Discover how IPR are regarded as a source of national wealth and mark of an economic leadership in context of global market scenario.
5. Study the national & International IP system.

UNIT-I	INTRODUCTION INTELLECTUAL PROPERTY	Classes: 11

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

UNIT-II	TRADE MARKS	Classes: 12

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	Classes: 13

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	Classes: 12

Trade secrets law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

Unfair competition: Misappropriation right of publicity, false advertising.

UNIT-V	NEW DEVELOPMENT OF INTELLECTUAL PROPERTY	Classes: 12

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 Rights, Dr. P Joel Josephson, K Sudha, K Satish, B Kanaka Laxmi, K Yamini Bhargavi, Spectrum Educational Books. 2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tata McGraw Hill Publishing company ltd. Open-Source SDK, 1st edition, Apress. .
WEB REFERENCES:
1. http://libgen.rs/book/index.php?md5=C4A6559ECCAEFC767CE71BD91A1BAD41 2. http://libgen.rs/book/index.php?md5=6463CAD16544B347B19335FB19D6917C
E –TEXTBOOKS:
1. http://libgen.rs/book/index.php?md5=13C4B3A45B1C95B4A388F94729CCCFBC 2. https://maklaw.in/intellectual-property-rights/?gclid=EAIaIQobChMIsprsv_WI7QIVilVgCh29HwPzEAAYASAAEgK5YvD_BwE
MOOCSCOURSE:
1. https://nptel.ac.in/courses/110/105/110105139/ 2. https://nptel.ac.in/courses/109/106/109106137/

St. Martin's Engineering College
UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SMEC B. TECH R22 AUTONOMOUS

III YEAR –II– SEMESTER SYLLABUS

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

AUTOMATA THEORY AND COMPILER DESIGN

III B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT601PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

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

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

UNIT-I INTRODUCTION TO FINITE AUTOMATA — Classes: 12

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

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

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

UNIT-II REGULAR EXPRESSIONS — Classes: 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.

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

UNIT-III PUSH DOWN AUTOMATA — Classes: 12

Push Down Automata: Definition of the Pushdown Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's, Acceptance by final state

Turing Machines: Introduction to Turing Machine, Formal Description, Instantaneous description, The language of a Turing machine

Undecidability: Undecidability, A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines

UNIT-IV	INTRODUCTION TO LEXICAL ANALYSIS	Classes: 12

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

UNIT-V	SYNTAX-DIRECTED TRANSLATION	Classes: 12

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

TEXT BOOKS

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

REFERENCE BOOKS

1. Automata Theory and Compiler Design, Dr. P Santosh Kumar Patra, Dr. R Santhosh Kumar, P Devasudha, Amaravathi Publishers.
2. Compilers: Principles, Techniques and Tools, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, 2nd Edition, Pearson.
3. Introduction to Formal languages Automata Theory and Computation, Kamala Krithivasan, Rama R, Pearson.
4. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
5. lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
6. Compiler Construction, Kenneth C. Louden, Thomson. Course Technology.

WEB REFERENCES

1. https://www.ics.uci.edu/~goodrich/teach/cs162/notes/
2. http://www.cse.iitd.ac.in/~sak/courses/toc/2011-12.index.html
3. https://web.cs.hacettepe.edu.tr/~ilyas/Courses/BBM401/

E -TEXT BOOKS

4. https://www.cis.upenn.edu/~cis262/notes/tcbook-u.pdf
5. http://people.math.sc.edu/mlevet/Lecture_Notes.pdf
6. https://www.cs.utexas.edu/~ear/cs341/automatabook/AutomataTheoryBook.pdf

MOOCS COURSE

7. https://www.udemy.com/course/formal-languages-and-automata-theory/
8. https://nptel.ac.in/courses/106/106/106106049/
9. https://www.udemy.com/course/theory-of-automata/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

ALGORITHMS DESIGN AND ANALYSIS

III B. TECH - II SEMESTER (R 22)

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

COURSE OBJECTIVES

To learn

1. Introduces 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

Upon successful completion of the course, the student 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	Classes: 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	GREEDY METHOD AND TRAVERSAL AND SEARCH TECHNIQUES	Classes: 12

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

UNIT-III	DYNAMIC PROGRAMMING	Classes: 11

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	DISJOINT SETS AND DIVIDE AND CONQUER	Classes: 11

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-V	BRANCH AND BOUND	Classes: 12

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. Algorithm Design and Analysis, Dr. P Santosh Kumar Patra, Dr. K Srinivas, K Radha, Sun Techno Publications. 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
WEB REFERENCES
1. https://www.geeksforgeeks.org/data-structures/ 2. https://www.cet.edu.in/noticefiles/278_DAA%20Complete.pdf
E -TEXT BOOKS
1. https://design-analysis-algorithms-2e-dave/dp/8131799433 2. https://www.e-booksdirectory.com/details.php?ebook=11597
MOOCS COURSE
1. https://swayam.gov.in/ 2. https://swayam.gov.in/NPTEL

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

EMBEDDED SYSTEMS

III B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT603PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

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 realtime operating systems in embedded systems.
4. Expected to evaluate the correlation between task synchronization and latency issues

UNIT-I	INTRODUCTION TO EMBEDDED SYSTEMS	Classes: 12

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	INTRODUCTION TO PROCESSOR/MICROCONTROLLER	Classes: 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	Classes: 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	Classes: 12

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	Classes: 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. Embedded Systems and Internet of Things, Dr. R nagaraju, Dr. B Hari Krishna, G Udaya Sri, G Poshamallu, Sunraise International Publishers.
2. Rajkamal, Embedded Systems Architecture, Programming and Design, Tata McGraw-Hill
3. Frank Vahid and Tony Givargis, "Embedded Systems Design" - A Unified Hardware/Software Introduction, John Wiley
4. Lyla, "Embedded Systems" –Pearson

5. David E. Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.

WEB REFERENCES

1. https://www.google.com/search?sca_esv=601309100&q=1.+http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl%3Dhttps%253A%252F%252Flibrary.oapen.org%252f+Bitstream%252F.500.12657%252F46817%252F1%252F2021+Book_EmbeddedSyste+Design.pdf&spell=1&sa=X&ved=2ahUKEwjwjvmS5PeDAxVjsVYBHRXWD3sQBSgAegQICBAC

E -TEXT BOOKS

1. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fannamalaiuniversity.ac.in%2Fstudport%2Fdownload%2Fengg%2FCSE_Engg%2Fresources%2FEMBEDDED%2520CONTROL%2520SYSTEMS%2520%26%2520IOT%2520Class%2520notes.pdf&clen=3710376&chunk=true
2. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fassets.markallengroup.com%2F%2Farticleimages%2F67055%2FEMS%2520White%2520Paper.pdf&clen=1108212&chunk=true

MOOCS COURSES

1. https://onlinecourses-archive.nptel.ac.in
2. https://swayam.gov.in/
3. https://swayam.gov.in/NPTEL

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

FULL STACK DEVELOPMENT (Professional Elective – III)

III B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT631PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. Students will become familiar to implement fast, efficient, interactive and scalable web applications using run time environment provided by the full stack components. hardware systems.

COURSE OUTCOMES

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	Classes: 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	Classes: 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	Classes: 12

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	Classes: 12

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	Classes: 12
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://www.fullstacklabs.co/references
2. https://www.w3schools.com/whatis/whatis_fullstack.asp

E -TEXT BOOKS

1. https://subjectguides.nscc.ca/fullstack/books
2. https://mashable.com/deals/stack-developer-ebooks

MOOCS COURSE

1. https://www.mooc-list.com/tags/full-stack
2. https://www.coursera.org/courses?query=full%20stack%20web%20development

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

DATA MINING (Professional Elective – III)

III B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT632PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. Students will become acquainted with both the strengths and limitations of various data mining techniques like Association, Classification, Cluster and Outlier analysis.

COURSE OUTCOMES

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

1. Understand the need of data mining and pre-processing techniques.
2. Perform market basket analysis using association rule mining.
3. Utilize classification techniques for analysis and interpretation of data.
4. Identify appropriate clustering and outlier detection techniques to handle complex data.
5. Understand the mining of data from web, text and time series data.

UNIT-I	INTRODUCTION TO DATA MINING	Classes: 12

What Data mining? Kinds of Data, Knowledge Discovery process, Data Mining Functionalities, Kinds of Patterns, Major Issues in Data Mining. Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring Data Similarity and Dissimilarity, Data Pre-processing: Major Tasks in Data Pre-processing, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.

UNIT-II	ASSOCIATION ANALYSIS	Classes: 12

Association Analysis: Basic Concepts, Market Basket Analysis, Apriori Algorithm, FP-growth, From Association Analysis to Correlation Analysis, Pattern Mining in Multilevel Associations and Multidimensional Associations.

UNIT-III	CLASSIFICATION	Classes: 12

Classification: Basic Concepts, Decision Tree Induction, Bayes Classification Methods, Rule-Based Classification, Metrics for Evaluating Classifier Performance, Ensemble Methods, Multilayer Feed Forward Neural Network, Support Vector Machines, k-Nearest-Neighbor Classifiers.

UNIT-IV	CLUSTER ANALYSIS	Classes: 12

Cluster Analysis: Requirements for Cluster Analysis, Overview of Basic Clustering Methods, Partitioning Methods-k-Means, k-Medoids, Hierarchical Methods-AGENES, DIANA, BIRCH, Density Based Method-DBSCAN, Outlier Analysis: Types of Outliers, Challenges of Outlier Detection, and Overview of Outlier Detection Methods

UNIT-V	ADVANCED CONCEPTS	Classes: 12

Advanced Concepts: Web Mining- Web Content Mining, Web Structure Mining, Web Usage Mining, Spatial Mining- Spatial Data Overview, Spatial Data Mining Primitives, Spatial Rules, Spatial Classification Algorithm, Spatial Clustering Algorithms, Temporal Mining- Modeling Temporal Events, Time Series, Pattern Detection, Sequences, Temporal Association Rules.

TEXT BOOKS

1. Jiawei Han, Micheline Kamber, Jian Pei., Data Mining: Concepts and Techniques, 3rd Edition, Morgan Kaufmann/Elsevier, 2012.

2. Margaret H Dunham, Data Mining Introductory and Advanced Topics, 2nd Edition, Pearson Education, India, 2006.

REFERENCE BOOKS

1. Data Mining, Dr. P Santosh Kumar Patra, Dr. N Krishnaiah, D Krishna Kishore, V Sudheer Goud, Seven Hills International Publishers.
2. Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.
3. Pang-Ning Tan, Michael Steinbach, Anuj Karpatne and Vipin Kumar, Introduction to Data Mining, 2nd Edition, Pearson Education India, 2021.
4. Amitesh Sinha, Data Warehousing, Thomson Learning, India, 2007.

WEB REFERENCES

1.https://www.javatpoint.com/data-mining-cluster-vs-data-warehousing
2. https://www.tutorialspoint.com/dwh/dwh_overview.htm

E -TEXT BOOKS

1. https://bookauthority.org/books/beginner-Data Mining- ebooks

MOOCS COURSE

1. https://data-mining.tmcnet.com/
2. https://www.salesforce.com/in/learning-centre/tech/Data Mining/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SCRIPTING LANGUAGES (Professional Elective – III)

III B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT633PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. This course introduces the script programming paradigm
2. Introduces scripting languages such as Perl, Ruby and TCL.
3. Learning TCL

COURSE OUTCOMES

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

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 appropriate language for solving a given problem.
3. Acquire programming skills in scripting language

UNIT-I	INTRODUCTION RUBY	Classes: 12

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 .

RubyTk – Simple Tk Application, widgets, Binding events, Canvas, scrolling.

UNIT-II	EXTENDING RUBY	Classes: 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	Classes: 12

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	Classes: 12

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	Classes: 12

TCL Structure: syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures, strings, patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, 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. Open Source Web Development with LAMP using Linux Apache, MySQL, Perl and PHP, J.Lee 2. and B. Ware (Addison Wesley) Pearson Education. 3. Perl by Example, E. Quigley, Pearson Education. 5. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD. 6. Tcl and the Tk Tool kit, Ousterhout, Pearson Education. 7. Perl Power, J. P. Flynt, Cengage Learning.
WEB REFERENCES
1. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2Fpages.di.unipi.it% 2Fcorradini%2FDidattica%2FAP-19%2FDOCS%2FScott-ch13.pdf&clen=4675371
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%2Fwww.cs.stir.ac.uk%2Fcourses%2FCSC9Y4%2Flectures%2Fscripting1a.pdf&clen=2960972&chunk=true
MOOCS COURSE
1. https://onlinecourses-archive.nptel.ac.in 2. https://swayam.gov.in/ 3. https://swayam.gov.in/NPTEL

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

MOBILE APPLICATION DEVELOPMENT (Professional Elective – III)

III B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT634PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

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

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	Classes: 14

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	Classes: 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 TextViews, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers Event Handling – Handling clicks or changes of various UI components ragments – 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	Classes: 12

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, ImplicitIntents, 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	Classes: 11

Persistent Storage: Files – Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference

UNIT-V	DATABASE	Classes: 11

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.cs.cmu.edu/~bam/uicourse/830spring09/BFeiginMobileApplicationDevelopment.pdf
2. https://www.sanfoundry.com/best-reference-books-mobile-application-development-communication/

E -TEXT BOOKS

1. https://www.techotopia.com/index.php/Free_Android_Development_eBooks
2. https://www.techotopia.com/index.php/Free_Android_Development_eBooks

MOOCS COURSE

1. https://www.my-mooc.com/en/categorie/mobile-development.
2. https://www.coursera.org/learn/aadcapstone

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SOFTWARE TESTING METHODOLOGIES (Professional Elective – III)

III B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT635PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

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

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	Classes: 13

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	Classes: 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	PATHS	Classes: 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	Classes: 11

State: State Graphs and Transition testing: state graphs, good & bad state graphs, state testing, Testability tips.

UNIT-V	GRAPH MATRICES AND APPLICATION	Classes: 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 Jmeter/selenium/soapUI/Catalon).

TEXT BOOKS

1. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr. K. V. K. K. Prasad, Dreamtech.

REFERENCE BOOKS

1. Software Testing Methodologies, Dr. P Santosh Kumar Patra, Dr. K Srinivas, P Mahesh.

2. 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
1. https://www.veracode.com/security/software-testing-methodologies-and-techniques 2. http://www.mcr.org.in/sureshmudunuri/stm/
E -TEXT BOOKS
1. https://www.bugraptors.com/ebook 2. https://www.etestinghub.com/testing_books.php
MOOCS COURSE
1. https://onlinecourses.nptel.ac.in/noc19_cs71/preview 2. https://www.my-mooc.com/en/mooc/software-testing-fundamentals/ 3. https://www.mooc-list.com/tags/software-testing

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

JAVA PROGRAMMING (Open Elective – I)

III B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT611OE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn
1. To introduce object-oriented programming principles and apply them in solving problems.
2. To introduce the implementation of packages and interfaces.
3. To introduce the concepts of exception handling and multithreading.
4. To introduce the design of Graphical User Interface using swing controls.

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to
1. Able to solve real world problems using OOP techniques.
2. Able to solve problems using java collection framework and I/O classes.
3. Able to develop multithreaded applications with synchronization.
4. Able to design GUI based applications.

UNIT-I	FOUNDATIONS OF JAVA	Classes: 12

Foundations of Java: History of Java, Java Features, Variables, Data Types, Operators, Expressions, Control Statements. Elements of Java - Class, Object, Methods, Constructors and Access Modifiers, Generics, Inner classes, String class and Annotations.
OOP Principles: Encapsulation – concept, setter and getter method usage, this keyword. Inheritance - concept, Inheritance Types, super keyword. Polymorphism – concept, Method Overriding usage and Type Casting. Abstraction – concept, abstract keyword and Interface..

UNIT-II	EXCEPTION HANDLING	Classes: 12

Exception Handling: Exception and Error, Exception Types, Exception Handler, Exception Handling Clauses – try, catch, finally, throws and the throw statement, Built-in-Exceptions and Custom Exceptions. Files and I/O Streams: The file class, Streams, The Byte Streams, Filtered Byte Streams, The Random Access File class.

UNIT-III	PACKAGES	Classes: 12

Packages- Defining a Package, CLASSPATH, Access Specifiers, importing packages. Few Utility Classes - String Tokenizer, BitSet, Date, Calendar, Random, Formatter, Scanner.
Collections: Collections overview, Collection Interfaces, Collections Implementation Classes, Sorting in Collections, Comparable and Comparator Interfaces.

UNIT-IV	MULTITHREADING	Classes: 12

Multithreading: Process and Thread, Differences between thread-based multitasking and process based multitasking, Java thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication. Java Database Connectivity: Types of Drivers, JDBC architecture, JDBC Classes and Interfaces, Basic steps in Developing JDBC Application, Creating a New Database and Table with JDBC.

UNIT-V	GUI PROGRAMMING WITH SWING	Classes: 12

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers, Layout Manager Classes, Simple Applications using AWT and Swing.
Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes.

TEXT BOOKS

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

REFERENCE BOOKS

1. Java Programming, Dr. P. Santosh Kumar Patra, J. Sudhakar, M Manohar, A Veera Babu, Surneni Publicatoins. First Edition (2022).
2. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons
3. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
4. Object Oriented Programming through Java, P. Radha Krishna, University Press.
5. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
6. Java Programming and Object-oriented Application Development, R. A. Johnson, Cengage Learning.

WEB REFERENCES

1. https://easyengineering.net/basicl-engineering-by-wadhwa/

E -TEXT BOOKS

1. https://easyengineering.net/objective-technology-by-mehta/

MOOCS COURSE

1. https://onlinecourses-archive.nptel.ac.in
2. https://swayam.gov.in/
3. https://swayam.gov.in/NPTEL

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

OBJECT ORIENTED PROGRAMMING USING C++ (Open Elective – I)

III B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT612OE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn
1. Introduces Object Oriented Programming concepts using the C++ language.
2. Understand the principles of data abstraction, inheritance and polymorphism;
3. Implementation of the principles of virtual functions and polymorphism
4. Handling formatted I/O, unformatted I/O in C++ and implementation of exception handling

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to
1. Develop programs with reusability and understand OO functions
2. Develop programs for file handling, data abstraction, data hiding
3. Develop inheritance, overloading and exceptions in programming
4. Implement I/O operations and file handling
5. Develop applications for a range of problems using object-oriented programming techniques

UNIT-I	OBJECT-ORIENTED THINKING	Classes: 12

Object-Oriented Thinking: Different paradigms for problem solving, need for OOP paradigm, differences between OOP and Procedure oriented programming, Overview of OOP concepts Abstraction, Encapsulation, Inheritance and Polymorphism. C++ Basics: Structure of a C++ program, Data types, Declaration of variables, Expressions, Operators, Operator Precedence, Evaluation of expressions, Type conversions, Pointers, Arrays, Pointers and Arrays, Strings, Structures, References. Flow control statement- if, switch, while, for, do, break, continue, goto statements. Functions - Scope of variables, Parameter passing, Default arguments, inline functions, Recursive functions, Pointers to functions. Dynamic memory allocation and deallocation operators-new and delete, Preprocessor directives.

UNIT-II	C++ CLASSES AND DATA ABSTRACTION	Classes: 12

C++ Classes and Data Abstraction: Class definition, Class structure, Class objects, Class scope, this pointer, Friends to a class, Static class members, Constant member functions, Constructors and Destructors, Dynamic creation and destruction of objects, Data abstraction, ADT and information hiding.

UNIT-III	INHERITANCE	Classes: 12

Inheritance: Defining a class hierarchy, Different forms of inheritance, Defining the Base and Derived classes, Access to the base class members, Base and Derived class construction, Destructors, Virtual base class. Virtual Functions and Polymorphism: Static and Dynamic binding, virtual functions, Dynamic binding through virtual functions, Virtual function call mechanism, Pure virtual functions, Abstract classes, Implications of polymorphic use of classes, Virtual destructors.

UNIT-IV	C++ I/O	Classes: 12

C++ I/O: I/O using C functions, Stream classes hierarchy, Stream I/O, File streams and String streams, Overloading operators, Error handling during file operations, Formatted I/O.

UNIT-V	EXCEPTION HANDLING	Classes: 12

Exception Handling: Benefits of exception handling, Throwing an exception, The try block, Catching an exception, Exception objects, Exception specifications, Stack unwinding, Rethrowing an exception, Catching all exceptions.

TEXT BOOKS

1. The Complete Reference C++, 4th Edition, Herbert Schildt, Tata McGraw Hill.
2. Problem solving with C++: The Object of Programming, 4th Edition, Walter Savitch, Pearson Education.

REFERENCE BOOKS

1. The C++ Programming Language, 3rd Edition, B. Stroustrup, Pearson Education.
2. OOP in C++, 3rd Edition, T. Gaddis, J. Walters and G. Muganda, Wiley DreamTech Press.
3. Object Oriented Programming in C++, 3rd Edition, R. Lafore, Galgotia Publications Pvt Ltd.

WEB REFERENCES

1. https://www.geeksforgeeks.org/object-oriented-programming-in-cpp/
2. https://www.cet.edu.in/noticefiles/285_OOPS%20lecture%20notes%20Complete.pdf

E -TEXT BOOKS

1. https://www.phindia.com/Books/BookDetail/9788120344624/object-oriented-programming-with-c-guru-manjunatha-nagendraswamy
2. https://skkatariaandsons.com/view_book.aspx?productid=18538&Book=Object%20Oriented%20Programming%20using%20C++%20(Bhavya%20Books)&bu

MOOCS COURSE

1. https://www.mooc-list.com/tags/c-1
2. https://www.coursera.org/learn/cs-fundamentals-1
3. https://www.mooc-list.com/tags/object-oriented-programming

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

COMPILER DESIGN LABORATORY

III B. TECH- II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT604PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To Learn

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

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

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.cse.iitd.ac.in/~sbansal/col728/references.html 2. https://gcekbpatna.ac.in/assets/documents/lecturenotes/compiler_design_Lab_manual.pdf
E -TEXT BOOKS
1. https://www.amazon.in/Concepts-Compiler-Design-Pandey-K/dp/B0075LQ56U
MOOCS COURSE
1. https://nptel.ac.in/courses 2. https://www.mooc.org/courses

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

EMBEDDED SYSTEMS LABORATORY

III B. TECH- II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT605PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To Learn
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

Upon successful completion of the course, the student 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

The following experiments have to be executed using
i) Microcontroller Kits (8051/ Raspberry Pi /Arduino)
(ii) Use embedded C/ Python/ assembly language

LIST OF EXPERIMENTS

1. Programs to perform arithmetic, logical, branching, and loop operations by a microcontroller.
2. Generate time delay using timers in a microcontroller.
3. Write a C program to count the number of times the switch is pressed and released.
4. Illustrate the use of a port header file (Port M) using an interface consisting of a keypad and LCD.
5. write a program to display "Hello world" on display of the receiving microcontroller using RS232.
6. Flash the operating System onto the device into a stable functional state by porting desktop environment with naway Packages necessary packages
7. Program available GPIO Plus of the corresponding device using native programming language, interface LEDs and interface LED / Switches and test it's functionality
8. Using the light sensor, monitor the light intensity and automatically turn ON/OFF LED.(for Predefined threshold light intensity value)
9. Dice game simulation- generate a random value Similar to dice value and display the same using 16x2 LCD
10. Export display to other system using available desktop display as display for the device using SSH client and X11 display seven.
11. Hosting a website on Board- Build and host a simple website (static) on the device and make it accessible online. (Need to install Sewn (e.g., Apache).)
12. Interface a regular USB webcam to the device and turn it into fully functional IP webcam

Note: Devices include Arduino, Raspberry Pi, and BeagleBour.

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. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Flibrary.oapen.org%2Fbitstream%2F20.500.12657%2F46817%2F1%2F2021_Book_EmbeddedSystemDesign.pdf
E -TEXT BOOKS
1. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fannamalaiuniversity.ac.in%2Fstudport%2Fdownload%2Fengg%2FCSE_Engg%2Fresources%2FEMBEDDED%2520CONTROL%2520SYSTEMS%2520%26%2520IOT%2520Class%2520notes.pdf&clen=3710376&chunk=true 2. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fassets.markallengroup.com%2F%2Farticleimages%2F67055%2FEMS%2520White%2520Paper.pdf&clen=1108212&ch unk=true
MOOCS COURSES
1. https://onlinecourses-archive.nptel.ac.in 2. https://swayam.gov.in/ 3. https://swayam.gov.in/NPTEL

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

FULL STACK DEVELOPMENT LAB (Professional Elective – III)

III B. TECH- II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT636PE	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To Learn

1. Introduce fast, efficient, interactive and scalable web applications using run time environment provided by the full stack components.

COURSE OUTCOMES

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

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

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.

WEB REFERENCES

1. https://www.fullstacklabs.co/references.
2. https://www.researchgate.net/publication/372345794_Full_Stack_Web_Development_with_Hands-On_Lab

E -TEXT BOOKS

1. https://www.elektor.com/raspberry-pi-full-stack-e-book
2. https://www.democracylab.org/projects/1290

MOOCS COURSE

1. https://www.mooclab.club/tags/full-stack/
2. https://www.coursera.org/courses?query=full%20stack%20web%20development

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

DATA MINING 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
IT637PE	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To Learn

1. The course is intended to obtain hands-on experience using data mining software.
2. Intended to provide practical exposure of the concepts in data mining algorithms

COURSE OUTCOMES

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

1. Apply preprocessing statistical methods for any given raw data.
2. Gain practical experience of constructing a data warehouse.
3. Implement various algorithms for data mining in order to discover interesting patterns from large amounts of data.
4. Apply OLAP operations on data cube construction

LIST OF EXPERIMENTS

Experiments using Weka/ Pentaho/Python

1. Data Processing Techniques:
(i) Data cleaning (ii) Data transformation – Normalization (iii) Data integration
2. Partitioning - Horizontal, Vertical, Round Robin, Hash based
3. Data Warehouse schemas – star, snowflake, fact constellation
4. Data cube construction – OLAP operations
5. Data Extraction, Transformations & Loading operations
6. Implementation of Attribute oriented induction algorithm
7. Implementation of apriori algorithm
8. Implementation of FP – Growth algorithm
9. Implementation of Decision Tree Induction
10. Calculating Information gain measures
11. Classification of data using Bayesian approach
12. Classification of data using K – nearest neighbour approach
13. Implementation of K – means algorithm
14. Implementation of BIRCH algorithm
15. Implementation of PAM algorithm
16. Implementation of DBSCAN algorithm

TEXT BOOKS

1. Data Mining – Concepts and Techniques - JIAWEI HAN &MICHELINE KAMBER, Elsevier.
2. Data Warehousing, Data Mining &OLAP- Alex Berson and Stephen J. Smith- Tata McGraw-Hill Edition, Tenth reprint 2007

REFERENCE BOOKS

1. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Anuj Karpatne, Introduction to Data Mining, Pearson Education

WEB REFERENCES
1. https://sudhagarblog.files.wordpress.com/2016/11/it6711-data-mining-lab.pdf
E -TEXT BOOKS
1. https://www.everand.com/book/37141771/Data-Mining-Cookbook-Modeling-Data-forMarketing-Risk-and-Customer-Relationship-Management
MOOCS COURSE
1. https://www.my-mooc.com/en/categorie/data-mining 2. https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_ug/31

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SCRIPTING LANGUAGES LAB (Professional Elective – III)

III B. TECH- II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT638PE	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To Learn
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

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

WEB REFERENCES

1. https://www.tutorialspoint.com/mobile_development_tutorials.htm
2. https://www.javatpoint.com/android-tutorial

E -TEXT BOOKS

1. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fwww.mediapiac.com%2Fuploads%2Fconference%2Fpresenters%2Fdocuments%2F17%2F8.pdf&chunk=true

MOOCS COURSE

1. https://onlinecourses-archive.nptel.ac.in
2. https://swayam.gov.in/
3. https://swayam.gov.in/NPTEL

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

MOBILE APPLICATION DEVELOPMENT LAB (Professional Elective – III)

III B. TECH- II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT639PE	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To Learn

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

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

1. Understand the working of Android OS Practically.
2. Develop user interfaces.
3. Develop, deploy and maintain the Android Applications.

LIST OF EXPERIMENTS

1. 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.

WEB REFERENCES

1. https://www.slideshare.net/pkaviya/cs8662-mobile-application-development-lab-manual2.
2. https://www.studocu.com/in/document/government-engineering-college-bhavnagar/computer-science-engg/mobile-application-development-lab/64473978

E -TEXT BOOKS

1. https://www.etyalab.com/en/mobile-development/
2. https://www.audisankara.ac.in/alms/csecontent.html

MOOCS COURSE

1. https://www.my-mooc.com/en/categorie/mobile-development
2. https://www.coursera.org/learn/aadcapstone

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SOFTWARE TESTING METHODOLOGIES LAB (Professional Elective – III)

III B. TECH- II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT640PE	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To Learn
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

Upon successful completion of the course, the student will be able to
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
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/
MOOCS COURSE
1. https://onlinecourses-archive.nptel.ac.in 2. https://swayam.gov.in/ 3. https://swayam.gov.in/NPTEL

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

BIG DATA-SPARK

III B. TECH- II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT606PC	B. Tech	0	0	4	2	40	60	100

COURSE OBJECTIVES

To Learn

1. The main objective of the course is to process Big Data with advance architecture like spark and streaming data in Spark

COURSE OUTCOMES

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

1.Develop MapReduce Programs to analyze large dataset Using Hadoop and Spark
2. Write Hive queries to analyze large dataset Outline the Spark Ecosystem and its components
3. Perform the filter, count, distinct, map, flatMap RDD Operations in Spark.
4. Build Queries using Spark SQL
5. Apply Spark joins on Sample Data Sets
6. Make use of sqoop to import and export data from hadoop to database and vice-versa

LIST OF EXPERIMENTS

To Study of Big Data Analytics and Hadoop Architecture
(i) know the concept of big data architecture
(ii) know the concept of Hadoop architecture
2. Loading DataSet in to HDFS for Spark Analysis
Installation of Hadoop and cluster management
(i) Installing Hadoop single node cluster in ubuntu environment
(ii) Knowing the differencing between single node clusters and multi-node clusters
(iii) Accessing WEB-UI and the port number
(iv) Installing and accessing the environments such as hive and sqoop
3. File management tasks & Basic linux commands
(i) Creating a directory in HDFS
(ii) Moving forth and back to directories
(iii) Listing directory contents
(iv) Uploading and downloading a file in HDFS
(v) Checking the contents of the file
(vi) Copying and moving files
(vii) Copying and moving files between local to HDFS environment
(viii) Removing files and paths
(ix) Displaying few lines of a file
(x) Display the aggregate length of a file
(xi) Checking the permissions of a file
(xii) Zipping and unzipping the files with & without permission pasting it to a location
(xiii) Copy, Paste commands
4. Map-reducing
(i) Definition of Map-reduce

(ii) Its stages and terminologies
(iii) Word-count program to understand map-reduce (Mapper phase, Reducer phase, Driver code)
5. Implementing Matrix-Multiplication with Hadoop Map-reduce
6. Compute Average Salary and Total Salary by Gender for an Enterprise.
(i) Creating hive tables (External and internal)
(ii) Loading data to external hive tables from sql tables(or)Structured c.s.v using scoop
(iii) Performing operations like filterations and updations
(iv) Performing Join (inner, outer etc)
(v) Writing User defined function on hive tables
8. Create a sql table of employees Employee table with id,designation Salary table (salary ,dept id) Create external table in hive with similar schema of above tables,Move data to hive using scoop and load the contents into tables,filter a new table and write a UDF to encrypt the table with AES-algorithm, Decrypt it with key to show contents
9. (i) Pyspark Definition(Apache Pyspark) and difference between Pyspark, Scala, pandas
(ii) Pyspark files and class methods
(iii) get(file name)
(iv) get root directory()
10. Pyspark -RDD'S
(i) what is RDD's?
(ii) ways to Create RDD
(iii) parallelized collections
(iv) external dataset
(v) existing RDD's
(vi) Spark RDD's operations (Count, foreach(), Collect, join,Cache()
11. Perform pyspark transformations
(i) map and flatMap
(ii) to remove the words, which are not necessary to analyze this text.
(iii) groupBy
(iv) What if we want to calculate how many times each word is coming in corpus ?
(v) How do I perform a task (say count the words 'spark' and 'apache' in rdd3) separatly on each partition and get the output of the task performed in these partition ?
(vi) unions of RDD
(vii) join two pairs of RDD Based upon their key
12. Pyspark sparkconf-Attributes and applications
(i) What is Pyspark spark conf ()
(ii) Using spark conf create a spark session to write a dataframe to read details in a c.s.v and later move that c.s.v to another location

TEXT BOOKS

1. Spark in Action, Marko Bonaci and Petar Zecevic, Manning.
2. PySpark SQL Recipes: With HiveQL, Dataframe and Graphframes, Raju Kumar Mishra and Sundar Rajan Raman, Apress Media.

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

1. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013301505844518912251 8_2_shared/overview
2. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01258388119638835242_s hared/overview
3. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012605268423008256169 2_shared/overview

E -TEXT BOOKS
1. https://xdreams.live/threads/big-data-with-apache-spark-3-and-python-from-zero-to-expert.62280/ 2. https://dl.acm.org/doi/abs/10.1145/3358505.3358519
MOOCS COURSE
1. https://www.researchgate.net/publication/360065421_System_Architecture_of_Big_Data_in_Massive_Open_Online_Courses_BD-MOOCs_System_Architecture 2. https://cloudxlab.s3.amazonaws.com/static/docs/Course+Syllabus/EICT+Big+Data+Hadoop+and+Spark+v2.pdf

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

ENVIRONMENTAL SCIENCE

III B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
*ES607MC	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

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

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	Classes: 11

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.

NIT-III	BIODIVERSITY AND BIOTIC RESOURCES	Classes: 11

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

UNIT-IV	ENVIRONMENTAL POLLUTION AND CONTROL TECHNOLOGIES	Classes: 14

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 Problems 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.

UNIT-V	Environmental Policy, Legislation & EIA:	Classes: 14

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 Socio - economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan Catching all exceptions. (EMP). Towards Sustainable Future: Concept of Sustainable Development, 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.

WEB REFERENCES

1. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=89579
2. https://environment.des.qld.gov.au/__data/assets/pdf_file/0024/90357/sampling-design-control-and-reference-sites.pdf

E -TEXT BOOKS

1. https://agrimoon.com/environmental-science-pdf-book-2/
2. https://agrimoon.com/environmental-science-pdf-book/

MOOCS COURSE

1. https://setec.ufmt.br/pesquisa/Arquivos%20GRUPOS/GRUPO%20-%20MOOCS%20CONCEITOS/ARTIGOS%20SELECIONADOS/GOOGLE/100-MOOCs_on_Climate_Change_Health_Teaching_a_Global_Audience.pdf
2. https://www.unep.org/explore-topics/education-environment/what-we-do/massive-open-online-courses

St. Martin's Engineering College
UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SMEC B. TECH R22 AUTONOMOUS

IV YEAR – I SEMESTER SYLLABUS

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

INFORMATION SECURITY

IV B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT701PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. To understand the fundamentals of Cryptography
2. To understand various key distribution and management schemes
3. To understand how to deploy encryption techniques to secure data in transit across data networks
4. To apply algorithms used for secure transactions in real world applications

COURSE OUTCOMES

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

1. Demonstrate the knowledge of cryptography, network security concepts and applications.
2. Ability to apply security principles in system design.
3. Ability to identify and investigate vulnerabilities and security threats and mechanisms to counter them.

UNIT-I	SECURITY ATTACKS	Classes: 13

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security

Classical Encryption Techniques: DES, Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of operation, Blowfish, Placement of Encryption Function, Traffic Confidentiality, key Distribution, Random Number Generation.

UNIT-II	PUBLIC KEY CRYPTOGRAPHY PRINCIPLES	Classes: 12

Public key Cryptography Principles, RSA algorithm, Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Cryptography.

Message authentication and Hash Functions: Authentication Requirements and Functions, Message Authentication, Hash Functions and MACs Hash and MAC Algorithms SHA-512, HMAC.

UNIT-III	DIGITAL SIGNATURES	Classes: 11

Digital Signatures: Authentication Protocols, Digital signature Standard, Authentication Applications, Kerberos, X.509 Directory Authentication Service.

Email Security: Pretty Good Privacy (PGP) and S/MIME.

UNIT-IV	IP SECURITY	Classes: 12

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

Web Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT-V	INTRUDERS	Classes: 12

Intruders, Viruses and Worms Intruders, Viruses and related threats Firewalls: Firewall Design Principles, Trusted Systems, Intrusion Detection Systems.

TEXT BOOKS
1. Cryptography and Network Security (principles and approaches) by William Stallings Pearson Education, 4th Edition.
REFERENCE BOOKS
1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education. 2. Principles of Information Security, Whitman, Thomson. Flutter for Beginners: An introductory guide to building cross-platform mobile applications with Flutter and Dart
WEB REFERENCES
1. https://www.grafiati.com/en/literature-selections/information-security-on-the-web/ 2. https://www.consilium.europa.eu/media/46382/introduction-to-cybersecurity-2020.pdf
E -TEXT BOOKS
1. https://igi-global.libguides.com/c.php?g=463676&p=3169489 2. https://www.splunk.com/en_us/form/the-essential-guide-to-security.html
MOOCS COURSE
1. https://www.semanticscholar.org/paper/Quality-Criteria-for-Cyber-Security-MOOCs-Fischer-H%C3%BCbner-Beckerle/e92158e3bd825600c474984bbcab50eda918635e 2. http://iotmumbai.bharatividyapeeth.edu/media/pdf/22620Network_and_Information_Security_241219.pdf

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

CLOUD COMPUTING

IV B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT702PC	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

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

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	**COMPUTING PARADIGMS**	**Classes: 11**
Computing Paradigms, Cloud Computing Fundamentals, Cloud Computing Architecture and Management		
UNIT-II	**CLOUD DEPLOYMENT MODELS**	**Classes: 13**
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**	**Classes: 12**
Virtualization, Programming Models for Cloud Computing: MapReduce, Cloud Haskell, Software Development in Cloud		
UNIT-IV	**NETWORKING FOR CLOUD COMPUTING**	**Classes: 12**
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**	**Classes: 12**
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 2. Principles of Information

WEB REFERENCES
1. https://sites.google.com/site/animeshchaturvedi07/academic-teaching/cloudcomputing 2. https://www.uio.no/studier/emner/matnat/ifi/IN3230/h22/kursmateriell/cloud-computing-lecture.pdf
E -TEXT BOOKS
1. https://www.fujitsu.com/sg/imagesgig5/white-book-of-cloud-security.pdf 2. https://openlibrary.telkomuniversity.ac.id/home/catalog/id/165710/slug/cloud-computing-bible.html
MOOCS COURSE
1. http://www.mooc-maker.org/wp-content/files/WDP1.10_Final.pdf 2. https://www.semanticscholar.org/paper/Massive-Open-Online-Courses%3A-A-Success-of-Cloud-in-Mustapha-Muhammad/f43e837ec6397e8803c063c36b2554c8aed9fe32

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

HUMAN COMPUTER INTERACTION (Professional Elective - IV)

IV B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT741PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

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

1. Apply HCI and principles to interaction design. 1. Design certain tools for blind or PH people
2. Understand the social implications of technology and ethical responsibilities as engineers.
3. Understand the importance of a design and evaluation methodology

UNIT-I	INTRODUCTION	Classes: 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	Classes: 13

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	Classes: 11

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	Classes: 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	Classes: 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://paragnachaliya.in/wp-content/uploads/2017/08/HCI_Alan_Dix.pdf
2. https://www.researchgate.net/publication/285193838_Human-Computer_Interaction

E -TEXT BOOKS

1. https://www.morganclaypoolpublishers.com/catalog_Orig/samples/9781608459018sample.pdf
2. https://www.lri.fr/~mbl/Stanford/CS477/papers/DistributedCognition-TOCHI.pdf

MOOCS COURSE

1. https://www.mooc-list.com/tags/human-computer-interaction
2. https://repositorio.grial.eu/bitstream/grial/958/1/HCI-17%20MOOC%20_preprint.pdf

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

HIGH PERFORMANCE COMPUTING (Professional Elective - IV)

IV B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT742PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. To teach students to become good at parallel computing algorithm design
2. To teach students to become good at modeling and solving problems using different types of parallel computing architectures
3. To teach students the ability to measure the performance of parallel algorithms and arrive at reasonable estimates of cost tradeoffs
4. To teach students the various paradigms in algorithm design for computationally intensive applications
5. To teach students to become good at understanding and using modern multi-processor and multi-core architectures T
6. o gain an overview of Human-Computer Interaction (HCI)

COURSE OUTCOMES

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

1. Understand different parallel computing architectures and networks
2. Design parallel algorithms and measure their performance
3. Understand vector processing, memory bottlenecks, data and thread-level parallelism
4. Understand the various programming frameworks like MPI, OpenMP and CUDA
5. Gain knowledge of writing efficient parallel programs

UNIT-I	MODERN PROCESSORS	Classes: 12

Modern Processors: Stored-Program Computer Architecture, General-Purpose cache-based Microprocessor Architecture, Memory Hierarchies, Multicore processors, Multithreaded processors, Vector processors.

Basic optimization techniques for serial code: Scalar profiling, Common sense optimizations, Simple measures, large impact, The role of compilers, Data access optimization.

UNIT-II	PARALLEL COMPUTERS	Classes: 12

Parallel computers: Taxonomy of parallel computing paradigms, Shared-memory computers, Distributed-memory computers, Hierarchical (hybrid) systems, Networks.

Basics of parallelization: Need for Parallelism, Parallel scalability

UNIT-III	SHARED-MEMORY	Classes: 12

Shared-memory parallel programming with OpenMP: Introduction to OpenMP, Profiling OpenMP programs, Performance pitfalls, Case study: OpenMP-parallel Jacobi algorithm.

UNIT-IV	DISTRIBUTED-MEMORY	Classes: 12

Distributed-memory parallel programming with MPI: Message passing, Introduction to MPI, MPI performance tools, Communication parameters, Synchronization, serialization, contention, Reducing communication overhead, Case study: Parallel sparse matrix-vector multiply.

UNIT-V	CUDA	Classes: 12

CUDA: Understanding the CUDA computing model and the API using nvcc compiler, Introduction to modern supercomputing architectures featuring NVIDIA processors Design Focus:

Shared experience Design Focus: Applications of augmented reality Information and data visualization

TEXT BOOKS

1. Introduction to Parallel Computing, Second Edition, Ananth Grama, George Karypis, Vipin Kumar, Anshul Gupta, Addison-Wesley, 2003, ISBN: 0201648652
2. Georg Hager, Gerhard Wellein, Introduction to High Performance Computing for Scientists and Engineers, Chapman & Hall / CRC Computational Science series, 2011.

REFERENCE BOOKS

1. CUDA Programming A Developer's Guide to Parallel Computing with GPUs by Shane Cook, Morgan Kaufman Publishers
2. Parallel Computing – Theory and Practice, Second Edition, Michaek J. Quinn, Tata McGraw Hill Edition.
3. Parallel Computers – Architectures and Programming, V. Rajaraman, C. Siva Ram Murthy, PHI.
4. Parallel Programming in C with MPI and OpenMP by Michael Quinn, McGraw-Hill Publisher
5. Computer Architecture A Quantitative Approach by John Hennessey and David Patterson, Morgan Kaufman Publishers

WEB REFERENCES

1. http://homepage.physics.uiowa.edu/~ghowes/teach/ihpc12/lec/ihpc12Lec_IntroHPC12.pdf
2. https://apps.dtic.mil/sti/tr/pdf/ADA458335.pdf

E -TEXT BOOKS

1. https://scholar.archive.org/work/lchizu2qufcutc4xjap2jpuoqm/access/wayback/http://pages.cs.wisc.edu/~fischer/cs701/surveys.Dec94.pdf

MOOCS COURSE

1. https://sc18.supercomputing.org/proceedings/workshops/workshop_files/ws_bphpcte110s2-file1.pdf
2. https://www.researchgate.net/publication/331429474_Massive_Open_Online_Courses_and_Cloud_Computing

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

ARTIFICIAL INTELLIGENCE (Professional Elective –IV)

IV B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT743PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

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

1. Understand search strategies and intelligent agents
2. Understand different adversarial search techniques
3. Apply propositional logic, predicate logic for knowledge representation
4. Apply AI techniques to solve problems of game playing, and machine learning.

UNIT-I	INTRODUCTION	Classes: 12

Introduction to AI, Intelligent Agents, problem-Solving Agents, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Uniform cost search, Depth-first search, Iterative deepening Depth-first search, Bidirectional search, Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Heuristic Functions, Beyond Classical Search: Hill-climbing search, Simulated annealing search, Local Search in Continuous Spaces

UNIT-II	PROBLEM SOLVING BY SEARCH-II	Classes: 13

Problem Solving by Search-II and Propositional Logic Adversarial Search:
Games, Optimal Decisions in Games, Alpha–Beta Pruning, Imperfect Real-Time Decisions. Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems. Propositional Logic: Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic, Propositional Theorem Proving: Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and backward chaining, Effective Propositional Model Checking, Agents Based on Propositional Logic.

UNIT-III	LOGIC AND KNOWLEDGE	Classes: 11

Logic and Knowledge Representation First-Order Logic: Representation, Syntax and Semantics of First-Order Logic, Using First-Order Logic, Knowledge Engineering in First-Order Logic. Inference in First-Order Logic: Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

UNIT-IV	KNOWLEDGE REPRESENTATION	Classes: 12

Knowledge Representation: Ontological Engineering, Categories and Objects, Events. Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information. Classical Planning:

Definition of Classical Planning, Algorithms for Planning with State-Space Search, Planning Graphs, other Classical Planning Approaches, Analysis of Planning approaches.		
UNIT-V	**UNCERTAIN KNOWLEDGE**	**Classes: 12**
Uncertain knowledge and Learning Uncertainty: Acting under Uncertainty, Basic Probability Notation, Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use Probabilistic Reasoning: Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distributions, Approximate Inference in Bayesian Networks, Relational and First-Order Probability, Other Approaches to Uncertain Reasoning; Dempster-Shafer theory.		

TEXT BOOKS

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

REFERENCE BOOKS

1. Introduction to Artificial Intelligence, Dr. P Santosh Kumar Patra, Dr. G Govinda Rajulu, D Venkatesan, Amaravathi Publishers.
2. Artificial Intelligence, 3rd Edn, E. Rich and K. Knight (TMH)
3. Artificial Intelligence, 3rd Edn., Patrick Henry Winston, Pearson Education.
4. Artificial Intelligence, Shivani Goel, Pearson Education.
5. Artificial Intelligence and Expert systems – Patterson, Pearson Education

WEB REFERENCES

1. https://www.britannica.com/technology/artificial-intelligence
2. https://www.sas.com/nl_nl/insights/analytics/what-is-artificial-intelligence.html
3. https://www.st.com/content/st_com/en/about/innovation---technology/artificial- intelligence.html

E -TEXT BOOKS

1. https://eplibrary.libguides.com/CPOL/SR/AI-law/e-books

MOOCS COURSE

1. https://onlinecourses-archive.nptel.ac.in
2. https://www.mooc-list.com/tags/chemistry

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

INFORMATION RETRIEVAL SYSTEMS (Professional Elective – IV)

IV B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT744PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

Upon successful completion of the course, the student 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	Classes: 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	Classes: 12

Cataloging 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	Classes: 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	Classes: 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	Classes: 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. 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://www.rroij.com/open-access/information-retrieval-using-web-65-68.pdf 2. https://www.cs.utexas.edu/~mooney/ir-course/slides_pdfs/Intro%20notes.pdf
E -TEXT BOOKS
1. https://iopscience.iop.org/article/10.1088/1742-6596/2171/1/012009/pdf
MOOCS COURSE
1. https://ecai2023.eu/conf-data/ecai2023/files/STAIRS/stairs2023_06.pdf 2. https://www.academia.edu/84732585/Developing_An_Ontology_for_Retrieving_Massive_Open_Online_Courses_moocs_Information_in_Coursera_Platform

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

AD HOC & SENSOR NETWORKS (Professional Elective – IV)

IV B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT745PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

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

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 TO AD HOC NETWORKS	Classes: 14

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, Restricted Directional Flooding-DREAM, LAR; Other routing algorithms-QoS Routing, CEDAR.

UNIT-II	DATA TRANSMISSION	Classes: 12

Data Transmission
Broadcast Storm Problem, Rebroadcasting Schemes-Simple-flooding, Probability-based Methods, Area-based Methods, Neighbour Knowledge-based: SBA, Multipoint Relaying, AHBP. Multicasting: Tree-based: AMRIS, MAODV; Mesh-based: ODMRP, CAMP; Hybrid: AMRoute, MCEDAR.

UNIT-III	GEOCASTING	Classes: 12

Geocasting Data-transmission Oriented-LBM; Route Creation Oriented-GeoTORA, MGR. TCP over Ad Hoc TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT-IV	BASICS OF WIRELESS SENSORS	Classes: 12

Basics of Wireless Sensors and Lower Layer Issues-Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer, Routing Layer.

UNIT-V	UPPER LAYER ISSUES	Classes: 12

Upper Layer Issues of WSN 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.researchgate.net/publication/318435165_Ad_Hoc_and_Sensor_Networks 2. https://www.eurekaselect.com/ebook_volume/872
E -TEXT BOOKS
1. http://www.tfb.edu.mk › WSN › Kniga-w03 PDF 2. https://www.worldscientific.com/worldscibooks/10.1142/8066 3. Ad Hoc And Sensor Networks: Theory And Applications (2nd Edition) Paperback – Import, 1 March 2011 by Carlos De Morais Cordeiro, Dharma Prakash Agrawal
MOOCS COURSE
1. https://www.classcentral.com/course/swayam-wireless-ad-hoc-and-sensor- networks-7888

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

INTRUSION DETECTION SYSTEMS (Professional Elective – V)

IV B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT751PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. Compare alternative tools and approaches for Intrusion Detection through quantitative analysis to determine the best tool or approach to reduce risk from intrusion.
2. Identify and describe the parts of all intrusion detection systems and characterize new and emerging IDS technologies according to the basic capabilities all intrusion detection systems share.

COURSE OUTCOMES

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

1. Understand fundamental knowledge of intrusion detection and prevention
2. Understand different types of attacks in network layer and code injection human layer
3. Analyze different anomaly detection algorithms

UNIT-I	STATE OF THREATS AGAINST COMPUTERS	Classes: 12

The state of threats against computers, and networked systems-Overview of computer security solutions and why they fail-Vulnerability assessment, firewalls, VPN's -Overview of Intrusion Detection and Intrusion Prevention, Network and Host-based IDS

UNIT-II	CLASSES OF ATTACKS	Classes: 12

Classes of attacks - Network layer: scans, denial of service, penetration Application layer: software exploits, code injection-Human layer: identity theft, root access-Classes of attackers-Kids/hackers/sop Hesitated groups-Automated: Drones, Worms, Viruses

UNIT-III	GENERAL IDS MODEL	Classes: 12

A General IDS model and taxonomy, Signature-based Solutions, Snort, Snort rules, Evaluation of IDS, Cost sensitive IDS

UNIT-IV	ANOMALY DETECTION SYSTEMS	Classes: 12

Anomaly Detection Systems and Algorithms-Network Behavior Based Anomaly Detectors (rate based)- Host-based Anomaly Detectors-Software Vulnerabilities-State transition, Immunology, Payload Anomaly Detection

UNIT-V	ATTACK TREES AND CORRELATION OF ALERTS	Classes: 12

Attack trees and Correlation of alerts- Autopsy of Worms and Botnets-Malware detection - Obfuscation, polymorphism- Document vectors, Email/IM security issues-Viruses/Spam-From signatures to thumbprints to zero day detection-Insider, Threat issues-Taxonomy-Masquerade and Impersonation Traitors, Decoys and Deception-Future: Collaborative Security

TEXT BOOKS

1. Peter Szor, The Art of Computer Virus Research and Defense, Symantec Press ISBN 0-321-30545-3.
2. Markus Jakobsson and Zulfikar Ramzan, Crimeware, Understanding New Attacks and Defenses.

REFERENCE BOOKS

1. Saiful Hasan, Intrusion Detection System, Kindle Edition.
2. Ankit Fadia, Intrusion Alert: An Ethical Hacking Guide to Intrusion Detection.

WEB REFERENCES
1. https://www.researchgate.net/publication/316599266_INTRUSION_DETECTION_SYSTEM
E -TEXT BOOKS
1. https://www.intechopen.com/books/intrusion-detection-systems
MOOCS COURSE
1. https://www.sans.org/course/intrusion-detection-in-depth 2. https://www.cybrary.it/skill-certification-course/ids-ips-certification-training-course

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

REAL TIME SYSTEMS (Professional Elective – V)

IV B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT752PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. To provide a broad understanding of the requirements of Real Time Operating Systems.
2. To make the student understand, applications of these Real Time features using case studies.

COURSE OUTCOMES

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

1. Understand the key concepts of Real-Time systems
2. To facilitate task scheduling and designing concurrency within an application using Semaphores, Message queues.
3. Explore other kernel objects common to embedded system development.
4. Attain knowledge of exception and interrupt handling in real time systems
5. Understand real time operating systems like RT Linux, VxWorks, MicroC /OSII, TinyOs

UNIT-I	INTRODUCTION	Classes: 12

Introduction: Introduction to UNIX/LINUX, Overview of Commands, File I/O (open, create, close, lseek, read, write), Process Control (fork, vfork, exit, wait, waitpid, exec).

UNIT-II	REAL TIME OPERATING SYSTEMS	Classes: 13

Real Time Operating Systems: Brief History of OS, Defining RTOS, The Scheduler, Objects, Services, Characteristics of RTOS, Defining a Task, asks States and Scheduling, Task Operations, Structure, Synchronization, Communication and Concurrency. Defining Semaphores, Operations and Use, Defining Message Queue, States, Content, Storage, Operations and Use

UNIT-III	OBJECTS, SERVICES AND I/O	Classes: 12

Objects, Services and I/O: Pipes, Event Registers, Signals, Other Building Blocks, Component Configuration, Basic I/O Concepts, I/O Subsystem

UNIT-IV	EXCEPTIONS, INTERRUPTS AND TIMERS	Classes: 12

Exceptions, Interrupts and Timers: Exceptions, Interrupts, Applications, Processing of Exceptions and Spurious Interrupts, Real Time Clocks, Programmable Timers, Timer Interrupt Service Routines (ISR), Soft Timers, Operations.

UNIT-V	CASE STUDIES OF RTOS	Classes: 11

Case Studies of RTOS: RT Linux, MicroC/OS-II, VxWorks, Embedded Linux, and Tiny OS.

TEXT BOOKS

1. Real Time Concepts for Embedded Systems – Qing Li, Elsevier, 2011 2. Embedded Systems-Architecture, Programming and Design by Rajkamal, 2007, TMH.

REFERENCE BOOKS

1. Advanced UNIX Programming, Richard Stevens
2. Embedded Linux: Hardware, Software and Interfacing – Dr. Craig Hollabaugh

E -TEXT BOOKS
1. https://users.ece.cmu.edu/~koopman/des_s99/real_time/ 2. https://www.real-time-systems.com/
MOOCS COURSE
1. https://www.coursera.org/learn/real-time-systems 2. https://nptel.ac.in/courses/106/105/106105036/ 3. https://www.mooc-list.com/tags/real-time-systems

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

BLOCKCHAIN TECHNOLOGY (Professional Elective – V)

IV B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT753PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. To learn the fundamentals of Blockchain and various types of block chain and consensus mechanisms.
2. To understand the public block chain system, Private block chain system and consortium blockchain.
3. Able to know the security issues of blockchain technology.

COURSE OUTCOMES

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

1. Understanding concepts behind crypto currency
2. Applications of smart contracts in decentralized application development
3. Understand frameworks related to public, private and hybrid blockchain
4. Create blockchain for different application case studies

UNIT-I	FUNDAMENTALS OF BLOCKCHAIN	Classes: 12

Fundamentals of Blockchain: Introduction, Origin of Blockchain, Blockchain Solution, Components of Blockchain, Block in a Blockchain, The Technology and the Future. Blockchain Types and Consensus Mechanism: Introduction, Decentralization and Distribution, Types of Blockchain, Consensus Protocol.

Cryptocurrency – Bitcoin, Altcoin and Token: Introduction, Bitcoin and the Cryptocurrency, Cryptocurrency Basics, Types of Cryptocurrencies, Cryptocurrency Usage.

UNIT-II	PUBLIC BLOCKCHAIN SYSTEM	Classes: 11

Public Blockchain System: Introduction, Public Blockchain, Popular Public Blockchains, The Bitcoin Blockchain, Ethereum Blockchain.

Smart Contracts: Introduction, Smart Contract, Characteristics of a Smart Contract, Types of Smart Contracts, Types of Oracles, Smart Contracts in Ethereum, Smart Contracts in Industry.

UNIT-III	PRIVATE BLOCKCHAIN SYSTEM	Classes: 13

Private Blockchain System: Introduction, Key Characteristics of Private Blockchain, Need of Private Blockchain, Private Blockchain Examples, Private Blockchain and Open Source, E- commerce Site Example, Various Commands (Instructions) in E-commerce Blockchain, Smart Contract in Private Environment, State Machine, Different Algorithms of Permissioned Blockchain, ByzantineFault, Multichain.

Consortium Blockchain: Introduction, Key Characteristics of Consortium Blockchain, Need of Consortium Blockchain, Hyperledger Platform, Overview of Ripple, Overview of Corda. Initial Coin Offering: Introduction, Blockchain Fundraising Methods, Launching an ICO, Investing in an ICO, Pros and Cons of Initial Coin Offering, Successful Initial Coin Offerings, Evolution of ICO, ICO Platforms.

UNIT-IV	SECURITY IN BLOCKCHAIN	Classes: 12

Security in Blockchain: Introduction, Security Aspects in Bitcoin, Security and Privacy Challenges of Blockchain in General, Performance and Scalability, Identity Management and Authentication, Regulatory Compliance and Assurance, Safeguarding Blockchain Smart Contract (DApp), Security Aspects in Hyperledger Fabric.

Applications of Blockchain: Introduction, Blockchain in Banking and Finance, Blockchain in Education, Blockchain in Energy, Blockchain in Healthcare, Blockchain in Real-estate, Blockchain In Supply Chain, The Blockchain and IoT. Limitations and Challenges of Blockchain.

UNIT-V	BLOCKCHAIN CASE STUDIES	Classes: 12

Blockchain Case Studies: Case Study 1 – Retail, Case Study 2 – Banking and Financial Services, Case Study 3 – Healthcare, Case Study 4 – Energy and Utilities.

Blockchain Platform using Python: Introduction, Learn How to Use Python Online Editor, Basic Programming Using Python, Python Packages for Blockchain.

Blockchain platform using Hyperledger Fabric: Introduction, Components of Hyper ledger Fabric Network, Chain codes from Developer.ibm.com, Blockchain Application Using Fabric Java SDK.

TEXT BOOKS

1. "Blockchain Technology", Chandramouli Subramanian, Asha A. George, Abhilasj K A and Meena Karthikeyan, Universities Press.

REFERENCE BOOKS

1. Michael Juntao Yuan, Building Blockchain Apps, Pearson, India.
2. Blockchain Blueprint for Economy, Melanie Swan, SPD O'reilly.
3. Blockchain for Business, Jai Singh Arun, Jerry Cuomo, Nitin Gaur, Pearson.

WEB REFERENCES

1. https://www.diva-portal.org/smash/get/diva2:1365314/FULLTEXT01.pdf
2. https://scet.berkeley.edu/wp-content/uploads/AIR-2016-Blockchain.pdf

E -TEXT BOOKS

1. https://freecomputerbooks.com/Building-Blockchain-Projects.html
2. https://books.emeraldinsight.com/resources/pdfs/chapters/9781789738681-TYPE23-NR2.pdf

MOOCS COURSE

1. https://www.col.org/news/new-mooc-to-demystify-blockchain-with-help-from-industry-partners/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

DEEP LEARNING (Professional Elective –V)

IV B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT754PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. To understand deep Learning algorithms and their applications in real-world data.

COURSE OUTCOMES

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

1. Understand machine learning basics and neural networks
2. Understand optimal usage of data for training deep models
3. Apply CNN and RNN models for real-world data
4. Evaluate deep models
5. Develop deep models for real-world problems

UNIT-I	MACHINE LEARNING BASICS	Classes: 13

Machine Learning Basics Learning Algorithms, Capacity, Overfitting and Underfitting, Hyperparameters and Validation Sets, Estimators, Bias and Variance, Maximum Likelihood Estimation, Bayesian Statistics, Supervised Learning Algorithms, Unsupervised Learning Algorithms, Stochastic Gradient Descent, Building a Machine Learning Algorithm, Challenges Motivating

Deep Learning Deep Feedforward Networks Learning XOR, Gradient-Based Learning, Hidden Units, Architecture Design, Back-Propagation and Other Differentiation Algorithms

UNIT-II	REGULARIZATION FOR DEEP LEARNING	Classes: 13

Regularization for Deep Learning Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging and Other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, Tangent Prop, and Manifold Tangent Classifier, Optimization for Training Deep Models, Learning vs Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates

UNIT-III	CONVOLUTIONAL NETWORKS	Classes: 10

Convolutional Networks The Convolution Operation, Motivation, Pooling, Convolution and Pooling as an Infinitely Strong Prior, Variants of the Basic Convolution Function, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features

UNIT-IV	RECURRENT AND RECURSIVE NETS	Classes: 12

Recurrent and Recursive Nets Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, The Challenge of Long-Term Dependencies, Echo State Networks, Leaky Units and Other Strategies for Multiple Time Scales, The Long Short-Term Memory and Other Gated RNNs, Optimization for Long Term Dependencies, Explicit Memory

UNIT-V	PRACTICAL METHODOLOGY:	Classes: 12

Practical Methodology: Performance Metrics, Default Baseline Models, Determining Whether to

Gather More Data, Selecting Hyperparameters, Debugging Strategies, Example: Multi-Digit Number Recognition Applications: Large-Scale Deep Learning, Computer Vision, Speech Recognition, Natural Language Processing, Other Applications.
TEXT BOOKS
1. Deep Learning by Ian Goodfellow, Yoshua Bengio and Aaron Courville, MIT Press.
REFERENCE BOOKS
1. The Elements of Statistical Learning. Hastie, R. Tibshirani, and J. Friedman, Springer. 2. Probabilistic Graphical Models. Koller, and N. Friedman, MIT Press. 3. Bishop, C., M., Pattern Recognition and Machine Learning, Springer, 2006. 4. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009. 5. Golub, G., H., and Van Loan, C.,F., Matrix Computations, JHU Press, 2013. 6. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education, 2004.
WEB REFERENCES
1. https://www.tutorialspoint.com/machine_engineering/index.htm
E -TEXT BOOKS
1. https://www.geeksforgeeks.org/Machine Learning
MOOCS COURSE
1. https://nptel.ac.in/courses/106105087/pdf/m01L01.pdf 2. https://onlinecourses.nptel.ac.in/noc21_cs13/preview

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SOFTWARE PROCESS & PROJECT MANAGEMENT (Professional Elective – V)

IV B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT755PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. To acquire knowledge on software process management.
2. To acquire managerial skills for software project development.
3. To understand software economics. .

COURSE OUTCOMES

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

1. Understand the software process change, assessment, project plans and Quality Standards.
2. Examine the life cycle phases, artifacts, workflows and checkpoints of a process.
3. Design and develop software products using conventional and modern principles of software project management.
4. Identify the new project management process and practices.

UNIT-I	BASICSSOFTWARE PROCESS MATURITY	Classes: 12

Software Process Maturity Software maturity Framework, Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process, Process Reference Models Capability Maturity Model (CMM), CMMI, PCMM, PSP, TSP).

UNIT-II	SOFTWARE PROJECT MANAGEMENT RENAISSANCE	Classes: 13

Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, Life-Cycle Phases and Process artifacts Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model-based software architectures.

UNIT-III	WORKFLOWS AND CHECKPOINTS OF PROCESS	Classes: 12

Workflows and Checkpoints of process Software process workflows, Iteration workflows, Major milestones, minor milestones, periodic status assessments, Process Planning Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning.

UNIT-IV	NETS PROJECT ORGANIZATIONS	Classes: 12

Project Organizations Line-of- business organizations, project organizations, evolution of organizations, process automation. Project Control and process instrumentation, The seven-core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation.

UNIT-V	CCPDS-R CASE STUDY	Classes: 11

CCPDS-R Case Study and Future Software Project Management Practices, Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

TEXT BOOKS

1. Managing the Software Process, Watts S. Humphrey, Pearson Education
2. Software Project Management, Walker Royce, Pearson Education

REFERENCE BOOKS

1. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education, 2000
2. Process Improvement essentials, James R. Persse, O'Reilly, 2006
3. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH, 2006
4. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
5. Software Engineering Project Management, Richard H. Thayer & Edward Yourdon, 2nd edition, Wiley India, 2004.
6. Agile Project Management, Jim Highsmith, Pearson education, 2004.

WEB REFERENCES

1. https://www.projectsmind.com/wp-content/uploads/2023/04/Software-Project-Management-1.pdf
2. https://www.academia.edu/8133166/PROJECT_MANAGEMENT_REFERENCES

E -TEXT BOOKS

1. https://mrcet.com/downloads/digital_notes/CSE/IV%20Year/SOFTWARE%20PROCESS%20&%20PROJECT%20MANAGEMENT(R17A0539).pdf
2. https://www.routledge.com/Introduction-to-Software-Project-Management/Villafiorita/p/book/9781466559530

MOOCS COURSE

1. https://www.coursera.org/courses?query=software%20project%20management
2. https://www.learningtree.com/courses/340/software-development-project- management/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

FULL STACK DEVELOPMENT (Open Elective – II)

IV B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT721OE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

Upon successful completion of the course, the student 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	Classes: 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	Classes: 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	Classes: 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:	Classes: 12

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	Classes: 12
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://www.irjmets.com/uploadedfiles/paper//issue_6_june_2023/42018/final/fin_irjmets1686883035.pdf
2. https://edu-versity.in/wp-content/uploads/2022/03/Full-Stack-Web-development.pdf

E -TEXT BOOKS

1 https://yasham.academy/wp-content/uploads/Fullstack-Web-Developer.pdf

MOOCS COURSE

1. https://www.oerknowledgecloud.org/archive/MOOC_Final.pdf
2. https://testbook.com/question-answer/what-is-the-full-form-of-mooc--5fbccb1a1fcfb45292733352

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SCRIPTING LANGUAGES (Open Elective – II)

IV B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT722OE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. This course introduces the script programming paradigm
2. Introduces scripting languages such as Perl, Ruby and TCL.
3. Learning TCL.

COURSE OUTCOMES

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

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 appropriate language for solving a given problem.
3. Acquire programming skills in scripting language

UNIT-I	INTRODUCTION	Classes: 12

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
RubyTk – Simple Tk Application, widgets, Binding events, Canvas, scrolling

UNIT-II	EXTENDING RUBY	Classes: 11

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	Classes: 13

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 PER	Classes: 11

Advanced perl Finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT-V	TCL	Classes: 13

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 uplevel commands, Name spaces, 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. 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://docs.oracle.com/javase/10/scripting/scripting-languages-and-java.htm#JSJSG107
2. https://www.geeksforgeeks.org/introduction-to-scripting-languages/
3. https://careerkarma.com/blog/what-is-a-scripting-language/
4. https://www.javatpoint.com/scripting-vs-programming

E -TEXT BOOKS

1. http://www.freebookcentre.net/Language/langCategory.html
2. https://open.umn.edu/opentextbooks/textbooks/35

MOOCS COURSE

1. https://www.udemy.com/courses/development/programming-languages/
2. https://freevideolectures.com/blog/free-courses-learn-scripting-language/
3. https://www.coursera.org/courses?query=programming%20languages

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

INFORMATION SECURITY LABORATORY

IV B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT703PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To Learn

1. To understand the fundamentals of Cryptography
2. To understand various key distribution and management schemes
3. To understand how to deploy encryption techniques to secure data in transit across data networks
4. To apply algorithms used for secure transactions in real world applications .

COURSE OUTCOMES

Upon successful completion of the course, the student is able

1. Demonstrate the knowledge of cryptography, network security concepts and applications.
2. Ability to apply security principles in system design.
3. Ability to identify and investigate vulnerabilities and security threats and mechanisms to counter them.

LIST OF EXPERIMENTS

1. Implementation of symmetric cipher algorithm (AES and RC4)
2. Random number generation using a subset of digits and alphabets.
3. Implementation of RSA based signature system
4. Implementation of Subset sum
5. Authenticating the given signature using the MD5 hash algorithm.
6. Implementation of Diffie-Hellman algorithm
7. Implementation of the ELGAMAL cryptosystem
8. Implementation of Goldwasser-Micali probabilistic public key system
9. Implementation of Rabin Cryptosystem. (Optional).
10. Implementation of Kerberos cryptosystem
11. Implementation of a trusted secure web transaction. Digital Certificates and Hybrid (ASSY/SY) encryption, PKI.
12. Message Authentication Codes. 14. Elliptic Curve cryptosystems (Optional)

TEXT BOOKS

1. Cryptography and Network Security (principles and approaches) by William Stallings Pearson Education, 4th Edition.

REFERENCE BOOKS

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Principles of Information Security, Whitman, Thomson.

WEB REFERENCES

1. https://www.srmvalliammai.ac.in/qb/IT/VII%20Semester/IT8761- Security%20Lab%20Manual.pdf
2. https://www.scribd.com/document/293765082/Lab-Programs-for-Information-security-lab

E -TEXT BOOKS

1. https://www.srmvalliammai.ac.in/qb/IT/VII%20Semester/IT8761-Security%20Lab%20Manual.pdf 2. https://www.scribd.com/document/293765082/Lab-Programs-for-Information-security-lab
MOOCS COURSE
1. https://www.mooc-list.com/tags/cybersecurity 2. https://www.cybersecurityeducationguides.org/moocs/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

CLOUD COMPUTING LABORATORY

IV B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT704PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To Learn

1. This course provides an insight into cloud computing
2. Topics covered include- distributed system models, different cloud service models, service oriented architectures, cloud programming and software environments, resource management.

COURSE OUTCOMES

Upon successful completion of the course, the student is able

1. Understand various service types, delivery models and technologies of a cloud computing environment.
2. Understand the ways in which the cloud can be programmed and deployed.
3. Understand cloud service providers like Cloudsim, Globus Toolkit etc.
4. Examine various programming paradigms suitable to solve real world and scientific problems using cloud services.

LIST OF EXPERIMENTS

1. Install Virtualbox/VMware Workstation with different flavors of Linux or windows OS on top of windows7 or 8.
2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
3. Create an Amazon EC2 instance and set up a web-server on the instance and associate an IP address with the instance.
4. Install Google App Engine. Create a hello world app and other simple web applications using python/java.
5. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.
6. Find a procedure to transfer the files from one virtual machine to another virtual machine.
7. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)
8. Install Hadoop single node cluster and run simple applications like word count.
9. Create a database instance in the cloud using Amazon RDS.
10. Create a database instance in the cloud using Google Cloud SQL

TEXT BOOKS

1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014

REFERENCE BOOKS

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.

3. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010
WEB REFERENCES
1. https://www.jbiet.edu.in/pdffls/IT-coursematerial/Cloud-Computing-Notes.pdf 2. https://www.researchgate.net/publication/364180107_Introduction_to_Cloud_Computing_Computing
E -TEXT BOOKS
1. https://bookauthority.org/books/beginner-cloud-computing-ebooks 2. The Cloud Computing Book The Future of Computing Explained, 1st Edition, By Douglas Comer,Copyright Year 2021
MOOCS COURSE
1. https://cloud-computing.tmcnet.com/ 2. https://www.salesforce.com/in/learning-centre/tech/cloudcomputing/

St. Martin's Engineering College
UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

SMEC B. TECH R22 AUTONOMOUS

IV YEAR – II SEMESTER SYLLABUS

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

ORGANIZATIONAL BEHAVIOUR

IV B. TECH - II SEMESTER (R 22)

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. To Analyze the behavior of individuals and groups in organizations in terms of the key factors that influence organizational behaviour.
2. To Assess the potential effects of organizational level factors (such as structure, culture and change) on organizational behaviour.
3. To evaluate the potential effects of important developments in the external Environment (such as globalization and advances in technology) on organizational behaviour.
4. To Analyse organizational behavioural issues in the context of organizational behaviour Theories, models and concepts.
5. To learn and appreciate different cultures and diversity in the workplace.

COURSE OUTCOMES

Upon the completion of the subject, the student will be able to

1. Analyse the behavior of individuals and groups in organizations in terms of the key factors that influence organizational behaviour.
2. Assess the potential effects of organizational level factors (such as structure, culture and change) on organizational behaviour.
3. Critically evaluate the potential effects of important developments in the external Environment (such as globalization and advances in technology) on organizational behaviour.
4. Analyse organizational behavioural issues in the context of organizational behaviour Theories, models and concepts.
5. Learn and appreciate different cultures and diversity in the workplace.

UNIT-I	ORGANIZATIONAL BEHAVIOUR	Classes: 10

Definition, need and importance of organizational behaviour – Nature and scope – Frame work – Organizational behaviour models.

UNIT-II	INDIVIDUAL BEHAVIOUR	Classes: 14

Personality – types – Factors influencing personality – Theories – Learning – Types of learners – The learning process – Learning theories – Organizational behaviour modification, Misbehaviour – 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	Classes: 12

Organization structure – Formation – Groups in organizations – Influence – Group dynamics – Emergence of informal leaders and working norms – Group decision making techniques – Team building - Interpersonal relations – Communication – Control.

UNIT-IV	LEADERSHIP AND POWER	Classes: 11

Meaning – Importance – Leadership styles – Theories of leadership – Leaders Vs Managers – Sources of power – Power centers – Power and Politics.

UNIT-V	DYNAMICS OF ORGANIZATIONAL BEHAVIOUR	Classes: 13

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, Organisational Behavior, PHI Learning / Pearson Education, 11th edition, 2008.
2. Fred Luthans, Organisational Behavior, McGraw Hill, 11th Edition, 2001.

REFERENCE BOOKS

1. Schermerhorn, Hunt and Osborn, Organisational behavior, John Wiley, 9th Edition, 2008.
2. Udai Pareek, Understanding Organisational Behaviour, 2nd Edition, Oxford Higher Education, 2004. .

WEB REFERENCES

1. Organizational Behaviour: https://nptel.ac.in/courses/110/105/110105034/
2. Organizational culture: https://nptel.ac.in/courses/110/105/110105033/

E -TEXT BOOKS

1. library genesis: http://libgen.rs/book/index.php?md5=59EC38CD4DD8DB8517CF966E11C4F910
2. http://libgen.rs/book/index.php?md5=1122D0A4E660BF20DC7D77AF5B1BFEF8
3. http://libgen.rs/book/index.php?md5=C3F143F3AB18FDB3655D4F16EE19D718
4. http://libgen.rs/book/index.php?md5=6B8A4D77E54A79489DD71D5D2DEC49C5

MOOCS COURSE

1. https://nptel.ac.in/courses/110/106/110106145/
2. https://nptel.ac.in/courses/110/105/110105154/
3. https://nptel.ac.in/courses/110/105/110105033/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

NATURAL LANGUAGE PROCESSING (Professional Elective – VI)

IV B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT861PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

Upon successful completion of the course, the student 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 modeling Techniques. .

UNIT-I	FINDING THE STRUCTURE OF WORDS	Classes: 13

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	PARSING NATURAL LANGUAGE	Classes: 11

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

UNIT-III	MODELS FOR AMBIGUITY	Classes: 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	Classes: 11

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

UNIT-V	LANGUAGE MODELING	Classes: 13

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. K Srinivas, T Selvamuthukumar, Sunraise International Publishers.
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. https://www.tableau.com/learn/articles/natural-language-processing-books
E -TEXT BOOKS
1. https://machinelearningmastery.com/books-on-natural-language- processing/
MOOCS COURSE
1. https://analyticsindiamag.com/top-rated-moocs-for-learning-natural-language- Processing

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

DISTRIBUTED SYSTEMS (Professional Elective –VI)

IV B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT862PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. To provide an insight into Distributed systems.
2. To introduce concepts related to Peer to Peer Systems, Transactions and Concurrency control, Security and Distributed shared memory. .

COURSE OUTCOMES

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

1. Understand Transactions and Concurrency control.
2. Understand distributed shared memory.
3. Design a protocol for a given distributed application. .

UNIT-I	CHARACTERIZATION OF DISTRIBUTED SYSTEMS	Classes: 13

Characterization of Distributed Systems: Examples of Distributed systems, Resource sharing and web, challenges System models: Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication

Distributed objects and Remote Invocation: Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI.

UNIT-II	OPERATING SYSTEM SUPPORT	Classes: 11

Operating System Support- OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture.

Distributed File Systems-Introduction, File Service architecture.

UNIT-III	PEER TO PEER SYSTEMS	Classes: 12

Peer to Peer Systems– Napster and its legacy, Peer to Peer middleware Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging.

Coordination and Agreement- Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT-IV	TRANSACTIONS AND CONCURRENCY CONTROL	Classes: 12

Transactions and Concurrency Control- Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering.

Distributed Transactions-Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions Distributed deadlocks: Transaction recovery.

UNIT-V	REPLICATION	Classes: 12

Replication: Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.

Distributed shared memory: Design and Implementation issues, Consistency models.

TEXT BOOKS

1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems, S. Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.

REFERENCE BOOKS
1. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson Education. 2. Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshemakalyani and Mukesh Singhal, Cambridge, rp 2010.
WEB REFERENCES
1. https://www.geeksforgeeks.org/distributed-database-system/ 2. https://docs.oracle.com/cd/A57673_01/DOC/server/doc/SCN73/ch21.htm
E -TEXT BOOKS
1. Distributed Database Systems 1st Edition, Kindle Edition by Chhanda Ray 2. https://link.springer.com/book/10.1007/978-1-4419-8834-8
MOOCS COURSE
1. https://www.coursera.org/lecture/introduction-to-nosql-databases/distributed-databases- Y5y2o 2. https://www.academyeurope.org/course/distributed-database-management-system-course/ 3. https://www.udemy.com/course/from-0-to-1-the-cassandra-distributed-database/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

AUGMENTED REALITY & VIRTUAL REALITY (Professional Elective –VI)

IV B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT863PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. Provide a foundation to the fast growing field of AR and make the students aware of the various AR concepts.
2. To give historical and modern overviews and perspectives on virtual reality. It describes the fundamentals of sensation, perception, technical and engineering aspects of virtual reality systems. .

COURSE OUTCOMES

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

1. Describe how AR systems work and list the applications of AR.
2. Understand the software architectures of AR.
3. Understand the Visual perception and rendering in VR
4. Understand the interaction, auditory perception and rendering in VR

UNIT-I	INTRODUCTION TO AUGMENTED REALITY	Classes: 12

Introduction to Augmented Reality: Augmented Reality - Defining augmented reality, history of augmented reality, Examples, Related fields

Displays: Multimodal Displays, Visual Perception, Requirements and Characteristics, Spatial Display Model, Visual Displays

Tracking: Tracking, Calibration, and Registration, Coordinate Systems, Characteristics of Tracking Technology, Stationary Tracking Systems, Mobile Sensors

UNIT-II	COMPUTER VISION FOR AUGMENTED REALITY	Classes: 12

Computer Vision for Augmented Reality: Marker Tracking, Multiple-Camera Infrared Tracking, Natural Feature Tracking by Detection, Outdoor Tracking.

Interaction: Output Modalities, Input Modalities, Tangible Interfaces, Virtual User Interfaces on Real Surfaces, Augmented Paper, Multi-view Interfaces, Haptic Interaction

Software Architectures: AR Application Requirements, Software Engineering Requirements, Distributed Object Systems, Dataflow, Scene Graphs .

UNIT-III	INTRODUCTION TO VIRTUAL REALITY	Classes: 12

Introduction to Virtual Reality: Defining Virtual Reality, History of VR, Human Physiology and Perception The Geometry of Virtual Worlds:

Geometric Models, Axis-Angle Representations of Rotation, Viewing Transformations

Light and Optics: Basic Behavior of Light, Lenses, Optical Aberrations, The Human Eye, Cameras, Displays

UNIT-IV	THE PHYSIOLOGY OF HUMAN VISION	Classes: 12

The Physiology of Human Vision: From the Cornea to Photoreceptors, From Photoreceptors to the Visual Cortex, Eye Movements, Implications for VR Visual Perception:

Visual Perception - Perception of Depth, Perception of Motion, Perception of Color

Visual Rendering: Visual Rendering -Ray Tracing and Shading Models, Rasterization, Correcting Optical Distortions, Improving Latency and Frame Rates, Immersive Photos and Videos

UNIT-V	MOTION IN REAL AND VIRTUAL WORLDS	Classes: 12

Motion in Real and Virtual Worlds: Velocities and Accelerations, The Vestibular System, Physics in the Virtual World, Mismatched Motion and Vection
Interaction: Motor Programs and Remapping, Locomotion, Social Interaction
Audio: The Physics of Sound, The Physiology of Human Hearing, Auditory Perception, Auditory Rendering

TEXT BOOKS

1. Augmented Reality: Principles & Practice by Schmalstieg / Hollerer, Pearson Education India;First edition (12 October 2016),ISBN-10: 9332578494
2. Virtual Reality, Steven M. LaValle, Cambridge University Press, 2016

REFERENCE BOOKS

1. Allan Fowler-AR Game Development‖, 1st Edition, A press Publications, 2018, ISBN 978-1484236178
2. Understanding Virtual Reality: Interface, Application and Design, William R Sherman and Alan B Craig, (The Morgan Kaufmann Series in Computer Graphics)". Morgan Kaufmann Publishers, San Francisco, CA, 2002
3. Developing Virtual Reality Applications: Foundations of Effective Design, Alan B Craig, William R Sherman and Jeffrey D Will, Morgan Kaufmann, 2009
4. Designing for Mixed Reality, Kharis O'Connell Published by O'Reilly Media, Inc., 2016, ISBN: 9781491962381
5. Sanni Siltanen- Theory and applications of marker-based augmented reality. Julkaisija – Utgivare Publisher. 2012. ISBN 978-951-38-7449-0
6. Gerard Jounghyun Kim, "Designing Virtual Systems: The Structured Approach", 2005.

WEB REFERENCES

1. https://onlinelibrary.wiley.com/doi/abs/10.1002/9781118783764.wbieme0172
2. https://www.academia.edu/70468758/Augmented_Reality_and_Virtual_Reality

E -TEXT BOOKS

1. https://www.degruyter.com/document/doi/10.1515/9783110790146-014/html?lang=en
2. https://openlibrary.telkomuniversity.ac.id/pustaka/177985/reality-media-augmented-and-virtual-reality.html

MOOCS COURSE

1. https://www.researchgate.net/publication/328902157_MOOC_for_AR_VR_Training

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

WEB SECURITY (Professional Elective –VI)

IV B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT864PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. Give an Overview of information security
2. Give an overview of Access control of relational databases.

COURSE OUTCOMES

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

1. Understand the Web architecture and applications
2. Understand client side and service side programming
3. Understand how common mistakes can be bypassed and exploit the application
4. Identify common application vulnerabilities

UNIT-I	WEB SECURITY	Classes: 12

The Web Security, The Web Security Problem, Risk Analysis and Best Practices Cryptography and the Web: Cryptography and Web Security, Working Cryptographic Systems and Protocols, Legal Restrictions on Cryptography, Digital Identification

UNIT-II	WEB'S WAR ON YOUR PRIVACY	Classes: 12

The Web's War on Your Privacy, Privacy-Protecting Techniques, Backups and Antitheft, Web Server Security, Physical Security for Servers, Host Security for Servers, Securing Web Applications

UNIT-III	DATABASE SECURITY	Classes: 12

Database Security: Recent Advances in Access Control, Access Control Models for XML, Database Issues in Trust Management and Trust Negotiation, Security in Data Warehouses and OLAP Systems

UNIT-IV	SECURITY RE-ENGINEERING FOR DATABASES	Classes: 12

Security Re-engineering for Databases: Concepts and Techniques, Database Watermarking for Copyright Protection, Trustworthy Records Retention, Damage Quarantine and Recovery in Data Processing Systems, Hippocratic Databases: Current Capabilities and

UNIT-V	FUTURE TRENDS PRIVACY IN DATABASE	Classes: 12

Future Trends Privacy in Database Publishing: A Bayesian Perspective, Privacy-enhanced Location Based Access Control, Efficiently Enforcing the Security and Privacy Policies in a Mobile Environment

TEXT BOOKS

1. Web Security, Privacy and Commerce Simson G Arfinkel, Gene Spafford, O'Reilly.
2. Handbook on Database security applications and trends Michael Gertz, Sushil Jajodia

REFERENCE BOOKS

1. https://www.amazon.com/Books-Web-Security/s?rh=n%3A283155%2Cp_28%3AWeb+Security

WEB REFERENCES

1. https://www.geeksforgeeks.org/real-time-systems/

E -TEXT BOOKS
1. https://bookauthority.org ›Cyber Security Books 2. http://www.webappsec.org › web_security_books
MOOCS COURSE
1. https://www.jigsawacademy.com/blogs/cyber-security 2. https://nptel.ac.in/course.html 3. https://portswigger.net/web-security

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

CYBER FORENSICS (Professional Elective –VI)

IV B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT865PE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. A brief explanation of the objective is to provide digital evidence which is obtained from digital media.
2. In order to understand the objectives of computer forensics, first of all, people have to recognize the different roles computers play in a certain crime.
3. According to a snippet from the United States Security Service, the computer functions in different kinds of crimes.

COURSE OUTCOMES

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

1. Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
2. It gives an opportunity to students to continue their zeal in research in computer forensics

UNIT-I	INTRODUCTION OF CYBERCRIME	Classes: 12

Introduction of Cybercrime: Types, The Internet spawns crime, Worms versus viruses, Computers' roles in crimes, Introduction to digital forensics, Introduction to Incident - Incident Response Methodology – Steps - Activities in Initial Response, Phase after detection of an incident

UNIT-II	INITIAL RESPONSE AND FORENSIC	Classes: 12

Initial Response and forensic duplication, Initial Response & Volatile Data Collection from Windows system -Initial Response & Volatile Data Collection from Unix system – Forensic Duplication: Forensic duplication: Forensic Duplicates as Admissible Evidence, Forensic Duplication Tool Requirements, Creating a Forensic. Duplicate/Qualified Forensic Duplicate of a Hard Drive

UNIT-III	FORENSICS ANALYSIS AND VALIDATION	Classes: 12

Forensics analysis and validation: Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions

Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project.

UNIT-IV	CURRENT FORENSIC TOOLS	Classes: 13

Current Forensic tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software E-Mail Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools.

Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

UNIT-V	WINDOWS AND DOS SYSTEMS	Classes: 11

Working with Windows and DOS Systems: understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startup tasks, virtual machines.

TEXT BOOKS

1. Kevin Mandia, Chris Prosise, "Incident Response and computer forensics", Tata McGraw Hill, 2006.
2. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.
3. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

REFERENCE BOOKS

1. Real Digital Forensics by Keith J. Jones, Richard Bejtiich, Curtis W. Rose, Addison- Wesley Pearson Education
2. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.

WEB REFERENCES

1. https://en.wikipedia.org/wiki/Computer_forensics

E -TEXT BOOKS

1. https://mrcet.com/pdf/Lab%20Manuals/IT/R15A0533%20CF.pdf

MOOCS COURSE

1. https://www.my-mooc.com/en/mooc/computer-forensics-ritx-cyber502x/.

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

BIG DATA TECHNOLOGIES (Open Elective –III)

IV B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT831OE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. The purpose of this course is to provide the students with knowledge of Big data Analytics principles and techniques.
2. This course is also designed to give an exposure of the frontiers of Big data Analytics.

COURSE OUTCOMES

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

1. Ability to explain the foundations, definitions, and challenges of Big Data and various Analytical tools.
2. Ability to program using HADOOP and Map reduce, NOSQL
3. Ability to understand the importance of Big Data in Social Media and Mining.

UNIT-I	OVERVIEW OF BIG DATA BIG DATA	Classes: 12

Getting an Overview of Big Data Big Data, History of Data Management – Evolution of Big Data, Structuring Big Data, Elements of Big Data, Big Data Analytics, Careers in Big Data, Future of Big Data

Technologies for Handling Big Data Distributed and Parallel Computing for Big Data, Introducing Hadoop, Cloud Computing and Big Data, In-Memory Computing Technology for Big Data.

UNIT-II	HADOOP ECOSYSTEM	Classes: 12

Understanding Hadoop Ecosystem Hadoop Ecosystem, Hadoop Distributed File System, MapReduce, Hadoop YARN, Hbase, Hive, Pig and Pig Latin, Sqoop, ZooKeeper, Flume, Oozie Understanding MapReduce Fundamentals and HBase The MapReduce Framework, Techniques to Optimize MapReduce Jobs, Uses of MapReduce, Role of HBase in Big Data Processing

UNIT-III	EXPLORING HIVE	Classes: 12

Exploring Hive Introducing Hive, Getting Started with Hive, Data Types in Hive, Built-In Functions in Hive, Hive DDL, Data Manipulation in Hive, Data Retrieval Queries, Using JOINS in Hive

Analyzing Data with Pig Introducing Pig, Running Pig, Getting Started with Pig Latin, Working with Operators in Pig, Working with Functions in Pig .

UNIT-IV	INTRODUCING OOZIE	Classes: 12

Using Oozie Introducing Oozie, Installing and Configuring Oozie, Understanding the Oozie Workflow, Oozie Coordinator, Oozie Bundle, Oozie Parameterization with EL, Oozie Job Execution Model, Accessing Oozie, Oozie SLA

NoSQL Data Management Introduction to NoSQL, Aggregate Data Models, Key Value Data Model, Document Databases, Relationships, Graph Databases, Schema-Less Databases, Materialized Views, Distribution Models, Sharding, MapReduce Partitioning and Combining, Composing MapReduce Calculations.

UNIT-V	WINDOWS AND DOS SYSTEMS	Classes: 12

ZooKeeper: Installing and Running ZooKeeper, An Example, Group Membership in ZooKeeper, Creating the Group, Joining a Group, Listing Members in a Group, The ZooKeeper Service, Data Model, Operations, Implementation, Consistency, Sessions, Building Applications with ZooKeeper, A Configuration, Service, The Resilient ZooKeeper Application, A Lock Service, More Distributed Data Structures and Protocols, ZooKeeper in Production

Sqoop: Getting Sqoop, Sqoop Connectors, A Sample Import, Generated Code, Imports: A Deeper Look, Working with Imported Data, Importing Large Objects, Performing an Export, Exports: A Deeper Look.

TEXT BOOKS

1. Big data, blackbook, DreamTech Press, 2015
2. Hadoop: The Definitive Guide, Tom White, 3rd Edition, O'Reilly Media, 2012.

REFERENCE BOOKS

1. Big Data Analytics, Seema Acharya, Subhashini Chellappan, Wiley 2015.
2. Simon Walkowiak, Big Data Analytics with R, Packt Publishing, ISBN: 9781786466457
3. Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Business, Michael Minelli, Michehe Chambers, 1st Edition, Ambiga Dhiraj, Wiley CIO Series, 2013.
4. Big Data Analytics: Disruptive Technologies for Changing the Game, Arvind Sathi, 1st Edition, IBM Corporation, 2012.

WEB REFERENCES

1. https://people.ece.ubc.ca/minchen/min_paper/2014/2014-29-Springer-1-BigDataBook.pdf

E -TEXT BOOKS

1. http://bookboon.com/en/communication-ebooks-zip
2. http://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fmu.ac.in
3. %2Fwp-content%2Fuploads%2F2021%2F01%2FBIG-DATA-ANALYTICS.pdf&clen=4649352&chunk=true

MOOCS COURSE

1. https://nptel.ac.in/noc/
2. https://www.mooc.org/

St. Martin's Engineering College

UGC Autonomous
Dhulapally, Secunderabad-500 100
NBA & NAAC A+ Accredited
www.smec.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

DEVOPS (Open Elective – III)

IV B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
IT832OE	B. Tech	3	0	0	3	40	60	100

COURSE OBJECTIVES

To learn

1. Understand the skill sets and high-functioning teams involved in Agile, DevOps and related methods to reach a continuous delivery capability.
2. Implement automated system update and DevOps lifecycle.

COURSE OUTCOMES

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

1. Understand the various components of DevOps environment.
2. Identify Software development models and architectures of DevOps
3. Use different project management and integration tools.
4. Select an appropriate testing tool and deployment model for project.

UNIT-I	INTRODUCTION TO DEVOPS	Classes: 11

Introduction to DevOps: Introduction, Agile development model, DevOps and ITIL. DevOps process and Continuous Delivery, Release management, Scrum, Kanban, delivery pipeline, identifying bottlenecks.

UNIT-II	SOFTWARE DEVELOPMENT MODELS	Classes: 12

Software development models and DevOps: DevOps Lifecycle for Business Agility, DevOps, and Continuous Testing. DevOps influence on Architecture: Introducing software architecture, The monolithic scenario, Architecture rules of thumb, The separation of concerns, Handling database migrations, Micro services and the data tier, DevOps, architecture, and resilience.

UNIT-III	INTRODUCTION TO PROJECT MANAGEMENT	Classes: 12

Introduction to project management: The need for source code control, the history of source code management, Roles and code, source code management system and migrations, shared authentication, Hosted Git servers, Different Git server implementations, Docker intermission, Gerrit, The pull request model, GitLab.

UNIT-IV	INTEGRATING THE SYSTEM	Classes: 12

Integrating the system: Build systems, Jenkins build server, Managing build dependencies, Jenkins plugins, and file system layout, The host server, Build slaves, Software on the host, Triggers, Job chaining and build pipelines, Build servers and infrastructure as code, Building by dependency order, Build phases, Alternative build servers, Collating quality measures.

UNIT-V	TESTING TOOLS AND DEPLOYMENT	Classes: 13

Testing Tools and Deployment: Various types of testing, Automation of testing Pros and cons, Selenium - Introduction, Selenium features, JavaScript testing, Testing backend integration points, Test-driven development, REPL-driven development. Deployment of the system: Deployment systems, Virtualization stacks, code execution at the client, Puppet master and agents, Ansible, Deployment tools: Chef, SaltStack and Docker.

TEXT BOOKS

1. Joakim Verona., Practical DevOps, Packt Publishing, 2016

REFERENCE BOOKS
1. Devops, Dr. P Santosh Kumar Patra, Dr. N Krishnaiah, D Venkatesan, N Rahdamma, Spectrum Educational Books. 2. Deepak Gaikwad, Viral Thakkar. DevOps Tools from Practitioner's Viewpoint. Wiley publications. 3. Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. Addison Wesley.
WEB REFERENCES
1. https://www.immagic.com/eLibrary/ARCHIVES/EBOOKS/W150421S.pdf 2. http://www.sauleh.ir/fc98/static_files/materials/Effective_DevOps.pdf
E -TEXT BOOKS
1. https://www.devopsschool.com/blog/free-ebooks-collection/
MOOCS COURSE
1. https://www.my-mooc.com/en/categorie/devops 2. https://sriindu.ac.in/wp-content/uploads/2022/03/MOOCs-Massive-Open-Online-Courses.pdf