



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

I YEAR II SEMESTER

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

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	IT313PC	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	IT314PC	Internet of Things Lab	0	0	3	1.5	40	60	100
9	CS310PC	Data visualization-R Programming/ Power BI	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

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	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



MATRICES AND CALCULUS

I B. TECH- I SEMESTER (R 22)								
Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
MA101BS	B. Tech	3	1	0	4	40	60	100
COURSE OBJECTIVES								
To learn								
<ol style="list-style-type: none"> Types of matrices and their properties. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations. Concept of Eigen values and Eigen vectors and to reduce the quadratic form to canonical form Geometrical approach to the mean value theorems and their application to the mathematical problems Evaluation of surface areas and volumes of revolutions of curves. Evaluation of improper integrals using Beta and Gamma functions. Partial differentiation, concept of total derivative Finding maxima and minima of function of two and three variables. Evaluation of multiple integrals and their applications 								
COURSE OUTCOMES								
Upon successful completion of the course, the student is able to								
<ol style="list-style-type: none"> Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations Find the Eigen-values and Eigen vectors Reduce the quadratic form to canonical form using orthogonal transformations. Solve the applications on the mean value theorems. Evaluate the improper integrals using Beta and Gamma functions Find the extreme values of functions of two variables with/ without constraints. 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
<p>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.</p> <p>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.</p>		
UNIT-IV	MULTIVARIABLE CALCULUS (PARTIAL DIFFERENTIATION AND APPLICATIONS)	Classes: 10
<p>Definitions of Limit and continuity.</p> <p>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.</p>		
UNIT-V	MULTIVARIABLE CALCULUS (INTEGRATION)	Classes: 10
<p>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.</p> <p>Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).</p>		
TEXT BOOKS		
<ol style="list-style-type: none"> 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		
<ol style="list-style-type: none"> 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, 9th Edition, 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		
<ol style="list-style-type: none"> 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		
<ol style="list-style-type: none"> 1. https://www.e-booksdirectory.com/listing.php?category=4 2. https://www.e-booksdirectory.com/details.php?ebook=10830 		
MOOCS COURSE		
<ol style="list-style-type: none"> 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

NBA & NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

www.smeac.ac.in



ENGINEERING CHEMISTRY

I B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		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 skills required to become a perfect engineer.
2. To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion its 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 and Lubricants.

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 corrosion and its control.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They can learn the fundamentals and general properties of polymers and other engineering materials.
4. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

UNIT-I

WATER AND ITS TREATMENT

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 breakpoint 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
<p>Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements 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.</p> <p>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.</p>		
UNIT-III	POLYMERIC MATERIALS	Classes: 10
<p>Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples – Nylon 6:6, Terylene</p> <p>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.</p> <p>Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.</p> <p>Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.</p> <p>Biodegradable polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.</p>		
UNIT-IV	ENERGY SOURCES	Classes: 10
<p>Introduction, Calorific value of fuel – HCV, LCV- Dulong's 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.</p>		
UNIT-V	ENGINEERING MATERIALS	Classes: 10
<p>Cement: Portland cement, its composition, setting and hardening.</p> <p>Smart materials and their engineering applications Shape memory materials- Poly L- Lactic acid. Thermoresponse materials- Polyacryl amides, Poly vinylamides</p> <p>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.</p>		

TEXT BOOKS

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K.Shashikala, Pearson Publications, 2021.
4. Text book of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

REFERENCE BOOKS

1. A. Aditya Prasad , S.Hemambika and N.V.V. PandurangaRao “Engineering Chemistry”, Spectrum Medico Plus Pharma Publishers., Hyderabad, 1st edition (2020)
2. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
3. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)
4. Engineering Chemistry by 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
 NBA & NAAC A+ Accredited
 Dhulapally, Secunderabad-500 100
 www.smeac.ac.in



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
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 with examples, 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
<p>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) Enumeration data type</p>		
UNIT-III	Preprocessor and File handling in C	Classes:12
<p>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.</p>		
UNIT-IV	Function and Dynamic Memory Allocation	Classes:12
<p>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</p>		
UNIT-V	Searching and Sorting	Classes:10
<p>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</p>		
TEXT BOOKS		
<ol style="list-style-type: none"> 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		
<ol style="list-style-type: none"> 1. Dr.P.Santosh Kumar Patra, "Programming for Problem Solving in C", Amaravati Publicatoins, 1st Edition, 2020. 2. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India 3. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill 4. Yashavant Kanetkar, Let Us C, 18th Edition, BPB 5. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression) 6. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education. 7. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition 8. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill 		

WEB REFERENCES

1. <https://www.tutorialspoint.com/cprogramming/>
2. <https://www.tutorialspoint.com/cplusplus/>
3. <https://www.cprogramming.com/tutorial/c-tutorial.html>

E –TEXT BOOKS

1. <https://www.amazon.com/Problem-Solving-Program-Design-7th/dp/0132936496>
2. <https://www.goodreads.com/book/show/36011306-c-programming-data-structures-for-jntu-with-cd>

MOOCS COURSE

1. nptel.ac.in/courses/106105085/4
2. <https://www.quora.com/Are-IIT-NPTEL-videos-good-to-learn-basic-C-programming>

St. Martin's Engineering College



St. Martin's Engineering College

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



BASIC ELECTRICAL ENGINEERING

I B. TECH- I SEMESTER (R 22)

Course Code	Programme	Hours /Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
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
<p>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.</p>		
<p>TEXT BOOKS</p>		
<ol style="list-style-type: none"> 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. 		
<p>REFERENCE BOOKS</p>		
<ol style="list-style-type: none"> 1. Dr.N.Ramchandra, Ch.Srinivas, S.Trilochana, “Basic Electrical Engineering”, Spectrum Techno Press, 1st Edition, 2020. 2. P. Ramana, M. Suryakalavathi, G.T. Chandrasheker, “Basic Electrical Engineering”, S. Chand, 2nd Edition, 2019. 3. D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009 4. M. S. Sukhija, T. K. Nagsarkar, “Basic Electrical and Electronics Engineering”, Oxford, 1st Edition, 2012. 5. Abhijit Chakrabarthy, Sudipta Debnath, Chandan Kumar Chanda, “Basic Electrical Engineering”, 2nd Edition, McGraw Hill, 2021. 6. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011. 7. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010. 8. V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989 		
<p>WEB REFERENCES</p>		
<ol style="list-style-type: none"> 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/ 		
<p>E –TEXT BOOKS</p>		
<ol style="list-style-type: none"> 1. https://easyengineering.net/basic-electrical-engineering-by-wadhwa/ 2. https://easyengineering.net/objective-electrical-technology-by-mehta/ 		
<p>MOOCS COURSE</p>		
<ol style="list-style-type: none"> 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.smeac.ac.in



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
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
<p>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.</p>		
<p>TEXT BOOKS</p>		
<ol style="list-style-type: none"> 1. Engineering Drawing N.D. Bhatt / Charotar 2. Engineering Drawing and graphics Using AutoCAD Third Edition, T. Jeyapoovan, Vikas: S.Chand and company Ltd. 		
<p>REFERENCE BOOKS</p>		
<ol style="list-style-type: none"> 1. Dr.D.V.Sreekanth, Dr.M.BhojendraNaik and S.Amith Kumar, “ Engineering Graphics” Spectrum University Press, First Edition (2020) 2. Engineering Drawing, Basant Agrawal and C M Agrawal, Third Edition McGraw Hill 3. Engineering Graphics and Design, WILEY, Edition 2020 4. Engineering Drawing, M. B. Shah, B.C. Rane / Pearson. 5. Engineering Drawing, N. S. Parthasarathy and Vela Murali, Oxford 6. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers <p>Note: - External examination is conducted in conventional mode and internal evaluation to be done byboth conventional as well as using computer aided drafting.</p>		
<p>WEB REFERENCES</p>		
<ol style="list-style-type: none"> 1. http://freevideolectures.com/Course/3420/Engineering-Drawing 2. https://www.slideshare.net/search/slideshow?searchfrom=header&q=engineering+dra wing 3. https://www.wiziq.com/tutorials/engineering-drawing 4. http://road.issn.org/issn/2344-4681-journal-of-industrial-design-and-engineering-graphics 		
<p>E –TEXT BOOKS</p>		
<ol style="list-style-type: none"> 1. http://rgpv-ed.blogspot.com/2009/09/development-of-surfaces.html 2. http://www.techdrawingtools.com/12/11201.htm 		
<p>MOOCS COURSE</p>		
<ol style="list-style-type: none"> 1. https://nptel.ac.in/course.php 2. https://swayam.gov.in/explorer 		



St. Martin's Engineering College

UGC Autonomous

NBA & NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

www.smec.ac.in



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
CS106ES	B. Tech	0	0	2	1	50	-	50

COURSE OBJECTIVES

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

COURSE OUTCOMES

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

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

UNIT-I

BASICS OF A COMPUTER

Classes:8

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

UNIT-II

SOFTWARE DEVELOPMENT

Classes:8

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

UNIT-III

OPERATING SYSTEMS

Classes:8

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

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

UNIT-IV

COMPUTER NETWORKS

Classes:8

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

UNIT-V	AUTONOMOUS SYSTEMS	Classes:8
IoT, Robotics, Drones, Artificial Intelligence – Learning, Game Development, natural language processing, image and video processing. Cloud Basics		
TEXT BOOKS		
1. Invitation to Computer Science, G. Michael Schneider, Macalester College, Judith L. Gersting University of Hawaii, Hilo, Contributing author: Keith Miller University of Illinois, Springfield.		
REFERENCE BOOKS		
1. Fundamentals of Computers, Reema Thareja, Oxford Higher Education, Oxford University Press. 2. Introduction to computers, Peter Norton, 8th Edition, Tata McGraw Hill. 3. Computer Fundamentals, Anita Goel, Pearson Education India, 2010. 4. Elements of computer science, Cengage.		
WEB REFERENCES		
1. https://www.tutorialspoint.com/basics_of_computers/basics_of_computers_introduction.htm 2. https://www.geeksforgeeks.org/basics-of-computer-and-its-operations/ 3. https://www.javatpoint.com/software-engineering-tutorial 4. https://www.javatpoint.com/data-structure-tutorial 5. https://www.guru99.com/operating-system-tutorial.html		
E –TEXTBOOKS		
1. https://www.amazon.com/Invitation-Computer-Science-G-Michael-Schneider/dp/1337561916		
MOOCS COURSE		
1. https://nptel.ac.in/courses/106103068 2. https://onlinecourses.nptel.ac.in/noc20_cs68/preview 3. https://archive.nptel.ac.in/courses/106/105/106105214/ 4. https://onlinecourses.nptel.ac.in/noc22_cs51/preview 5. https://archive.nptel.ac.in/courses/106/105/106105183/		



St. Martin's Engineering College

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



ENGINEERING CHEMISTRY LABORATORY

I B. TECH - I SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		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 Potentiometry.

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



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
CS107ES	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES:

To train students

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

COURSE OUTCOMES:

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

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

LIST OF EXPERIMENTS:

Practice sessions:

- a. Write a simple program that prints the results of all the operators available in C (including pre/post increment, bitwise and/or/not, etc.). Read required operand values from standard input.
- b. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.

Simple numeric problems:

- a. Write a program for finding the max and min from the three numbers.
- b. Write the program for the simple, compound interest.
- c. Write a program that declares Class awarded for a given percentage of marks, where mark <40%= Failed, 40% to <60% = Second class, 60% to <70% =First class, >= 70% = Distinction. Read percentage from standard input.
- d. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output

should be:

- e. $5 \times 1 = 5$
- f. $5 \times 2 = 10$
- g. $5 \times 3 = 15$
- 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 $s = ut + \frac{1}{2}at^2$ where u and a are the initial velocity in m/sec ($= 0$) and acceleration in m/sec^2 ($= 9.8 \text{ m/s}^2$)).
- b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators $+$, $-$, $*$, $/$, $\%$ and use Switch Statement)
- c. Write a program that finds if a given number is a prime number
- d. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
- e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- f. Write a C program to generate all the prime numbers between 1 and n , where n is a value supplied by the user.
- g. Write a C program to find the roots of a Quadratic equation.
- h. Write a C program to calculate the following, where x is a fractional value. i. $1 - \frac{x}{2} + \frac{x^2}{4} - \frac{x^3}{6}$
- j. Write a C program to read in two numbers, x and n , and then compute the sum of this geometric progression: $1 + x + x^2 + x^3 + \dots + x^n$. 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 a single 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 column counts 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 using the 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 name and 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 are given in the command line. (hint: convert the strings using atoi function)
Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function)
The program should then read all 10 values and print them back.
- e. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

Strings:

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

Miscellaneous:

- a. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.

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

```

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

```

Sorting and Searching:

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

TEXTBOOKS:

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

REFERENCE BOOKS:

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

WEB REFERENCES

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

E -TEXT BOOKS

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

MOOCS COURSE

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



St. Martin's Engineering College

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



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
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 using conventional 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 through various 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 a Single-Phase Transformer
7. Performance Characteristics of a DC Shunt Motor
8. Torque-Speed Characteristics of a Three-phase Induction Motor.

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

1. Verification of Superposition theorem.
2. 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. S. Trilochana, Ch. Srinivas, V.Vishnu Vardhan “Basic Electrical Engineering Lab”, Spectrum Techno Press, 1st Edition, 2020.
2. P. Ramana, M. Suryakalavathi, G.T.Chandrasheker,”Basic Electrical Engineering”, S. Chand, 2nd Edition, 2019.
3. D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009
4. M. S. Sukhija, T. K. Nagsarkar, “Basic Electrical and Electronics Engineering”, Oxford, 1st Edition, 2012.
5. Abhijit Chakrabarhi, Sudipta Debnath, Chandan Kumar Chanda, “Basic Electrical Engineering”, 2nd Edition, McGraw Hill, 2021.
6. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.
7. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
8. 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.smeac.ac.in



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
MA201BS	B. Tech	3	1	0	4	40	60	100
<p>COURSE OBJECTIVES</p> <p>To learn</p> <ol style="list-style-type: none"> 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. <p>COURSE OUTCOMES</p> <p>Upon successful completion of the course, the student is able to</p> <ol style="list-style-type: none"> 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
<p>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.</p>		
UNIT-IV	VECTOR DIFFERENTIATION	Classes: 10
<p>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.</p>		
UNIT-V	VECTOR INTEGRATION	Classes: 10
<p>Line, Surface and Volume Integrals, Theorems of Green, Gauss and Stokes (without proofs) and their applications.</p>		
TEXT BOOKS		
<ol style="list-style-type: none"> 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		
<ol style="list-style-type: none"> 1. Dr. D. Ranadheer Reddy, Dr. S. Someshwar & Mrs. M. Jhansi Lakshmi, Advanced Calculus for Engineers, M/s Students Helpline Publishing House Pvt. Ltd, First Edition-2020. 2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006. 3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint,2002. 4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi. 5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008. 		
WEB REFERENCES		
<ol style="list-style-type: none"> 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		
<ol style="list-style-type: none"> 1. https://www.e-booksdirectory.com/listing.php?category=4 2. https://www.e-booksdirectory.com/details.php?ebook=10830 		
MOOCS COURSE		
<ol style="list-style-type: none"> 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
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in



APPLIED PHYSICS

I B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		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 fabrication techniques.
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
<p>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.</p> <p>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.</p>		
UNIT-II	SEMICONDUCTORS AND DEVICES	Classes: 12
<p>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.</p>		

UNIT-III	DIELECTRIC, MAGNETIC AND ENERGY MATERIALS	Classes: 12
<p>Dielectric Materials: Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric, and pyroelectric materials – applications – liquid crystal displays (LCD) and crystal oscillators.</p> <p>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.</p>		
UNIT-IV	NANOTECHNOLOGY	Classes: 12
<p>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.</p>		
UNIT-V	LASER AND FIBER OPTICS	Classes: 12
<p>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.</p> <p>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.</p>		
TEXT BOOKS		
<ol style="list-style-type: none"> 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		
<ol style="list-style-type: none"> 1. Dr. K. Venkanna and Dr. P. NageswarRao, Applied Physics, Seven Hills International Publishers, 2021. 2. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012. 3. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley & Sons, 11th Edition, 2018. 4. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019. 5. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019. 6. A.K. Bhandhopadhyaya - Nano Materials, New Age International, 1stEdition, 2007. 7. Energy Materials a Short Introduction to Functional Materials for Energy Conversion andStorage Aliaksandr S. Bandarenka, CRC Press Taylor & Francis Group 8. Energy Materials, Taylor & Francis Group, 1st Edition, 2022. 		

WEB REFERENCES

1. <https://ocw.tudelft.nl/courses/solid-state-physics/subjects/3-quantum-theory-of-solids/>
2. <https://byjus.com/physics/semiconductor-devices/>
3. <https://www.nano.gov/nanotech-101/what/definition>
4. <https://www.studocu.com/in/document/delhi-technological-university/engineering-physics/fiber-optics-laser-notes/26618092>

E -TEXT BOOKS

1. <https://www.pdfdrive.com/physics-for-scientists-engineers-modern-physics-9th-ed-e51722698.html>
2. <https://www.pdfdrive.com/physics-for-scientists-engineers-modern-physics-9th-ed-e43567270.html>

MOOCS COURSE

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



St. Martin's Engineering College

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



ENGINEERING WORKSHOP

I B. TECH - II SEMESTER (R 22)

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

COURSE OBJECTIVES

1. To Study of different hand operated power tools, uses and their demonstration.
2. To gain a good basic working knowledge required for the production of various engineering products.
3. To provide hands on experience about use of different engineering materials, tools, equipments and 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, equipment and 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 plumbing, 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
<ol style="list-style-type: none"> 1. Workshop Practice /B. L. Juneja / Cengage 2. Workshop Manual / K. Venugopal / Anuradha.
REFERENCE BOOKS
<ol style="list-style-type: none"> 1. Work shop Manual - R.HanumaNaik/R.SuvaranaBabu/Sun Techno Publications 2. Work shop Manual - P. Kannaiah/ K.L. Narayana/ Scitech 3. Workshop Manual / Venkat Reddy/ BSP
WEB REFERENCES
<ol style="list-style-type: none"> 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
<ol style="list-style-type: none"> 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
<ol style="list-style-type: none"> 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
 NBA & NAAC A+ Accredited
 Dhulapally, Secunderabad-500 100
 www.smec.ac.in



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
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 theoretical and 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 and Culture*" 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 and Subject-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
<p>Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.</p> <p>Reading: Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises for Practice.</p> <p>Writing: Format of a Formal Letter-Writing Formal Letters eg., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume.</p>		
UNIT-IV	Chapter entitled 'Art and Literature' by Abdul Kalam from "English: Language, Context and Culture" published by Orient BlackSwan, Hyderabad.	Classes: 10
<p>Vocabulary: Standard Abbreviations in English</p> <p>Grammar: Redundancies and Clichés in Oral and Written Communication.</p> <p>Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice</p> <p>Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion -Précis Writing.</p>		
UNIT-V	Chapter entitled 'Go, Kiss the World' by Subroto Bagchi from "English: Language, Context and Culture" published by Orient BlackSwan, Hyderabad.	Classes: 10
<p>Vocabulary: Technical Vocabulary and their Usage</p> <p>Grammar: Common Errors in English (<i>Covering all the other aspects of grammar which were notcovered in the previous units</i>)</p> <p>Reading: Reading Comprehension-Exercises for Practice</p> <p>Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.</p>		
<p>Note: <i>Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum are covered in the syllabus of ELCS Lab Course.</i></p> <ul style="list-style-type: none"> ➤ 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 the needs of the students in their respective colleges for effective teaching/learning in the class. ➤ Note: 2. Based on the recommendations of NEP2020, teachers are requested to be flexible to adopt Blended Learning in dealing with the course contents. They are advised to teach 40 percent of each topic from the syllabus in blended mode. 		

TEXT BOOKS

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

REFERENCE BOOKS

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

WEB REFERENCES

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

E -TEXT BOOKS

1. <http://bookboon.com/en/communication-ebooks-zip>
2. <http://learningenglishvocabularygrammar.com/files/idiomsandphraseswithmeaningsandexamplespdf.pdf>

MOOCS COURSE

1. <https://mooc.com/courses/grammar-guru-1>
2. <https://mooc.com/courses/learning-styles>



St. Martin's Engineering College

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



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
EC203ES	B. Tech	2	0	0	2	40	60	100
<p>COURSE OBJECTIVES</p> <p>To learn</p> <ol style="list-style-type: none"> To introduce components such as diodes, BJTs and FETs. To know the applications of devices. To know the switching characteristics of devices. <p>COURSE OUTCOMES</p> <p>Upon successful completion of the course, the student is able</p> <ol style="list-style-type: none"> Acquire the knowledge of various electronic devices and their use on real life. Know the applications of various devices. 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/trans_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

NBA & NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

www.smeac.ac.in



APPLIED PHYSICS LABORATORY

I B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		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 the material 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
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
www.smec.ac.in



PYTHON PROGRAMMING LABORATORY

I B. TECH- II SEMESTER (R 22)

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

COURSE OBJECTIVES

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

COURSE OUTCOMES

Upon successful completion of the course, the student is able

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

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

LIST OF EXPERIMENTS

Week -1:

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

Week - 2:

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

Week - 3:

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

Week - 4:

1. Write a function called is_sorted that takes a list as a parameter and returns true if the list is sorted in ascending order and False otherwise.
2. Write a function called has_duplicates that takes a list and returns True if there is any element that appears more than once. It should not modify the original list.
 - i). Write a function called remove_duplicates that takes a list and returns a new list with only the unique elements from the original. Hint: they don't have to be in the same order.
 - ii). The 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 its content. i.e., keys should be values and values should be keys.
3. i) Add a comma between the characters. If the given word is 'Apple', it should become 'A,p,p,l,e'
ii) Remove the given word in all the places in a string?
iii) Write a function that takes a sentence as an input parameter and replaces the first letter of every word with the corresponding upper case letter and the rest of the letters in the word by corresponding letters in lower case without using a built-in function?
4. Write a recursive function that generates all binary strings of n-bit length

Week - 5:

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

Week-6:

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

Week- 7

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

Week - 8:

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

TEXT BOOKS

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

REFERENCE BOOKS

1. Python 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

NBA & NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

www.smec.ac.in



ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

I B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		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 professional contexts
- 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 contents of 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 University Press.
- 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§ion=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



St. Martin's Engineering College

UGC Autonomous

NBA & NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

www.smec.ac.in

IT WORKSHOP



I B. TECH - II SEMESTER (R 22)

Course Code	Programme	Hours / Week			Credits	Maximum Marks		
		L	T	P		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. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, 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 instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both Windows and Linux. Lab instructor should 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 as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

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

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

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

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, *WILEY Dreamtech*
3. Introduction to Information Technology, ITL Education Solutions limited, *Pearson Education*.
4. PC Hardware - A Handbook – Kate J. Chase *PHI* (Microsoft)
5. LaTeX Companion – Leslie Lamport, *PHI/Pearson*.
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and 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?id=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

NBA & NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

www.smec.ac.in



ENVIRONMENTAL SCIENCE

I B. TECH- II SEMESTER (R 22)

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
*CH209MC	B. Tech	3	0	0	0	40	60	100

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

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

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

UNIT-I	ECOSYSTEMS	Classes: 10
Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.		
UNIT-II	NATURAL RESOURCES	Classes: 10
Classification Of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.		
UNIT-III	BIODIVERSITY AND BIOTIC RESOURCES	Classes: 10
Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In- Situ and Ex-situ conservation. National Biodiversity act.		
UNIT-IV	ENVIRONMENTAL POLLUTION AND CONTROL TECHNOLOGIES	Classes: 10
Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Sources and types of pollution, drinking water quality standards. Soil Pollution:		

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

UNIT-V

ENVIRONMENTAL POLICY, LEGISLATION & EIA

Classes: 10

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

TEXT BOOKS

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

REFERENCE BOOKS

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

WEB REFERENCES

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

E-TEXTBOOKS

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

MOOCS COURSE

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



St. Martin's Engineering College

UGC Autonomous

NBA & NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

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
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								
<ol style="list-style-type: none"> 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		
<ol style="list-style-type: none"> 1. Digital Design-Morris Mano, PHI, 4th Edition, 2006 2. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed, John Wiley & Sons Inc. 3. Fundamentals of Logic Design Charles H. Roth, Cengage Learning, 5th, Edition, 2004. 		
REFERENCE BOOKS		
<ol style="list-style-type: none"> 1. Switching and Finite Automata Theory Zvi Kohavi & Niraj K. Jha, 3rd Edition, Cambridge, 2010. 2. Digital Principles, 3/e, Roger L. Tokheim, Schaum's outline series, 1994. 3. Modern Digital electronics R P Jain 4th Edition, McGraw Hill 4. Switching Theory and Logic Design – A Anand Kumar, PHI, 2013. 		
WEB REFERENCES		
<ol style="list-style-type: none"> 1 http://blog.digitalelectronics.co.in/ 2 www.nesoacademy.org/electronics-engineering/digital-electronics/digital 3 https://www.slideshare.net/JournalsPubwwwjournai/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		
<ol style="list-style-type: none"> 1. https://pages.uoregon.edu/rayfrey/DigitalNotes.pdf 2. https://easyengineering.net/fundamentals-of-digital-circuits-by-anand-kumar/ 		
MOOCS COURSE		
<ol style="list-style-type: none"> 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.smartworld.com/notes/digital-logic-design-dld/ 		



St. Martin's Engineering College

UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
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		
CS301PC	B. Tech	L	T	P	C	CIE	SEE	Total
		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 or combinations.
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 general tree 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
<p>Graph Implementation Methods. Graph Traversal Methods. Sorting: Quick Sort, Heap Sort, External Sorting- Model for external sorting, Merge Sort.</p>		
UNIT-V	PATTERN MATCHING	Classes: 12
<p>Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.</p>		
TEXT BOOKS		
<ol style="list-style-type: none"> 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		
<ol style="list-style-type: none"> 1. Dr.P.Santosh Kumar Patra,Dr.R.Nagaraju,Mr.C.Yosepu, Mr.A.Mruthyunjayam,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		
<ol style="list-style-type: none"> 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		
<ol style="list-style-type: none"> 1. https://www.freetechbooks.com/algorithms-and-data-structures-f111.html 2. https://opendatastructures.org/ 		
MOOCS COURSE		
<ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/106102064/ 2. https://swayam.gov.in/explorer?searchText=data+structures 		



St. Martin's Engineering College

UGC Autonomous
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
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
MA302BS	B. Tech	3	1	0	4	40	60	100

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

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

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.](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

NBA & NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

www.smec.ac.in



DEPARTMENT OF INFORMATION TECHNOLOGY COMPUTER ORGANIZATION AND MICROPROCESSOR

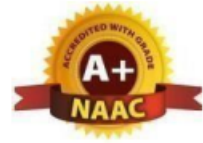
II B. TECH- I SEMESTER (R 22)								
Course Code	Programme	Hours /Week			Credits	Maximum Marks		
IT303PC	B. Tech	L	T	P	C	CIE	SEE	Total
		3	0	0	3	40	60	100
<p>COURSE OBJECTIVES:</p> <p>To learn</p> <ol style="list-style-type: none"> 1. To understand basic components of computers. 2. To understand the 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. <p>COURSE OUTCOMES:</p> <ol style="list-style-type: none"> 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	
<p>Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.</p> <p>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.</p>								
UNIT-II	CENTRAL PROCESSING UNIT						Classes:9	
<p>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.</p>								
UNIT-III	ASSEMBLY LANGUAGE PROGRAMMING						Classes:10	
<p>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.</p>								

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
<p>Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.</p> <p>Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.</p>		
TEXTBOOKS:		
<ol style="list-style-type: none"> 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:		
<ol style="list-style-type: none"> 1. I.Dr.P.Santosh Kumar Patra, Mrs.G.Udaya sri, Dr.R.Nagaraj,Dr.R.Santhosh Kumar, Mr.M. Venkanna“Computer Organization and Micro Processor”, Srikrishna Publicatoin. 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:		
<ol style="list-style-type: none"> 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:		
<ol style="list-style-type: none"> 1. Fundamentals of Computer organization and Design by Shivarama Dandamudi. 2. Computer Architecture: Complexity and Correctness by Mueller and Paul 		
MOOCS COURSE:		
<ol style="list-style-type: none"> 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
 NBA & NAAC A+ Accredited
 Dhulapally, Secunderabad-500 100
 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
IT313PC	B. Tech	2	0	0	2	40	60	100
COURSE OBJECTIVES								
To learn								
<ol style="list-style-type: none"> 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								
<ol style="list-style-type: none"> 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. Waltenequs 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		



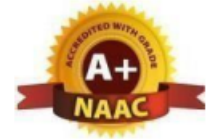
St. Martin's Engineering College

UGC Autonomous

NBA & NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

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		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 Subtractor using full adder.
4. Designing a 2 – bit Comparator using AND, OR and NOT gates. Realize 4 – bit Comparator using 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 and negative 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 timing diagram 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 Digital Electronics", McGrawHill Education, 2009.
M.M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.

REFERENCE BOOKS

1. A.Kumar, "Fundamentals of Digital Circuits", PrenticeHall India, 2016.
Switching Theory and Logic Design – Anand Kumar, 3rd Edition, PHI, 2013.
3.Modern Digital electronics RP Jain 4th Edition, McGrawHill

WEB REFERENCES

1. <http://blog.digitalelectronics.co.in/>
2. www.nesoacademy.org/electronics-engineering/digital-electronics/digital
3. <https://www.slideshare.net/JournalsPubwwwjourn/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

NBA & NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

www.smeac.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
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
NBA & NAAC A+ Accredited
Dhulapally, Secunderabad-500 100
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		CIE	SEE	Total
IT314PC	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. Walteneagus 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

NBA & NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

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		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, AVG, and Aggregate features, Creating custom calculations and fields.
4. Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Tools and Menus, Formatting specific parts of the view.
5. Editing and Formatting Axes, Manipulating Data in Tableau data, Pivoting Tableau data.
6. Structuring your data, Sorting and filtering Tableau data, Pivoting Tableau data.
7. Advanced Visualization Tools: Using Filters, Using the Detail panel, using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colors.
8. Creating Dashboards & Storytelling, creating your first dashboard and Story, Design for different displays, adding interactivity to your Dashboard, Distributing & Publishing your Visualization.
9. Tableau file types, publishing to Tableau Online, Sharing your visualizations, printing, and Exporting.
10. Creating custom charts, cyclical data and circular area charts, Dual Axis charts.

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

NBA & NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

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
*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:		
<ol style="list-style-type: none"> 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:		
<ol style="list-style-type: none"> 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:		
<ol style="list-style-type: none"> 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



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
CS401PC	B. Tech	3	0	0	3	40	60	100
COURSE OBJECTIVES								
To learn								
<ol style="list-style-type: none"> 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								
<ol style="list-style-type: none"> 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 of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutation with Constrained Repetitions, Binomial Coefficient, The Binomial and Multinomial Theorems, The Principle of Exclusion.								

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 I. 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 Mathematics Chandrasekaran, N., Umaparvathi, M. Mar
2. Discrete Mathematics And Graph Theory Biswal, Purna Chandra
3. Advanced Discrete Mathematics Rajput, Uday Singh

MOOCS COURSES

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

St. Martin's Engineering College



St. Martin's Engineering College

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



DEPARTMENT OF INFORMATION TECHNOLOGY BUSINESS ECONOMICS & FINANCIAL ANALYSIS

II B. TECH- II SEMESTER (R22)								
Course Code	Programme	Hours/Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
BE404MS	B. Tech	3	0	0	3	40	60	100
COURSE OBJECTIVES								
To learn To learn the basic business types, impact of the economy on Business and Firms specifically. To analyze the Business from the Financial Perspective.								
COURSE OUTCOMES								
The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analyzing the Financial Statements of a Company.								
UNIT-I	INTRODUCTION TO BUSINESS AND ECONOMICS						Classes: 13	
<p>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.</p> <p>Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply and Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.</p>								
UNIT-II	DEMAND AND SUPPLY ANALYSIS						Classes: 13	
<p>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.</p> <p>Supply Analysis: Determinants of Supply, Supply Function and Law of Supply.</p>								
UNIT-III	PRODUCTION, COST, MARKET STRUCTURES & PRICING						Classes: 12	
<p>Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Return to Scale, Different Types of Production Functions</p> <p>Cost analysis: Types of Costs, Short run and Long run Cost Functions.</p> <p>Market Structures: Nature of Competition, Features of Perfect competition,</p>								

Monopoly, Oligopoly, Monopolistic Competition. **Pricing:** Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, Cost Volume Profit Analysis.

UNIT-IV	FINANCIAL ACCOUNTING	Classes: 11
----------------	-----------------------------	--------------------

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

UNIT-V	FINANCIAL RATIOS ANALYSIS	Classes: 10
---------------	----------------------------------	--------------------

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

TEXT BOOKS

1. S K Agarwal, Business Economics, S Chand Publications, 2018
2. Dr. A. R. Aryasri, Business Economics and Financial Analysis, McGraw Hill Education, First Edition 2020.
3. Charles T Horngren, Gary L. Sundem, John A Elliott, Donna R Philbrick, Introduction to Financial Accounting, Pearson Education, 11th Edition, 2017.

REFERENCE BOOKS

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

WEB REFERENCES

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

E -TEXT BOOKS

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

MOOCS COURSES

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



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		
CS402PC	B. Tech	L	T	P	C	CIE	SEE	Total
		3	0	0				

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
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,problemsrelatdodecomposition, reasoning about functional dependencies, First, Second, Third								

	normal forms, BCNF, lossless join decomposition, multivalued dependencies, Fourth normal form, Fifth normal form.
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 McGraw Hill

REFERENCE BOOKS

1. Dr.P.Santosh Kumar Patra, Dr.Satheesh, Dr.R.Nagaraju, "Database Management System", Spectrum Publications. First Edition, (2022).
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/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



St. Martin's Engineering College

UGC Autonomous

NBA & NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

www.smece.ac.in



DEPARTMENT OF INFORMATION TECHNOLOGY

JAVA PROGRAMMING

II B. TECH- II SEMESTER (R22)								
Course Code	Programme	Hours/Week			Credits	Maximum Marks		
IT403PC	B. Tech	L	T	P	C	CIE	SEE	Total
		2	0	0	2	40	60	100
COURSE OBJECTIVES								
To learn								
<ol style="list-style-type: none"> 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								
<ol style="list-style-type: none"> 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	
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 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	
Process and Thread, Differences between thread-based multitasking and processbased 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-IV	MULTITHREADING:	Classes: 12
<p>Process and Thread, Differences between thread-based multitasking and processbased 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.</p>		
UNIT-V	GUI PROGRAMMING WITH SWING	Classes: 13
<p>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.</p>		

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 Publicatoin. 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. <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		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		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=DI_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

NBA & NAAC A+ Accredited

Dhulapally, Secunderabad-500 100

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
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		CIE	SEE	Total
CS411PC	B. Tech	0	0	2	1	40	60	100

COURSE OBJECTIVES

To learn

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

COURSE OUTCOMES

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

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

Exercises:

1. Build a responsive web application for shopping cart with registration, login, catalog and cart pages using CSS3 features, flex and grid.
2. Make the above web application responsive web application using Bootstrap framework.
3. Use JavaScript for doing client – side validation of the pages implemented in experiment 1 and experiment 2.
4. Explore the features of ES6 like arrow functions, callbacks, promises, async/await. Implement an application for reading the weather information from openweathermap.org and display the information in the form of a graph on the web page.
5. Develop a java stand alone application that connects with the database (Oracle / mySql) and perform the CRUD operation on the database tables.
6. Create an xml for the bookstore. Validate the same using both DTD and XSD.

7. Design a controller with servlet that provides the interaction with application developed in experiment 1 and the database created in experiment 5.
8. Maintaining the transactional history of any user is very important. Explore the various session tracking mechanism (Cookies, HTTP Session)
9. Create a custom server using http module and explore the other modules of Node JS like OS, path, event.
10. Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman)
11. For the above application create authorized end points using JWT (JSON Web Token).
12. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.
13. Create a service in react that fetches the weather information from openweathermap.org and the display the current and historical weather information using graphical representation using chart.js
14. Create a TODO application in react with necessary components and deploy it into github.

TEXT BOOKS

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

REFERENCE BOOKS

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

WEB REFERENCES

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

E -TEXT BOOKS

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

MOOCS COURSES

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



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
*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		
<ul style="list-style-type: none"> • Right to Equality • Right to Freedom • Right against Exploitation 		

	<ul style="list-style-type: none"> • 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
<ol style="list-style-type: none"> 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
<ol style="list-style-type: none"> 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-abdul/ 3. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, 5th edition, Pearson Education.
WEB REFERENCES
<ol style="list-style-type: none"> 1. https://www.wdl.org/en/item/2672/ 2. https://nptel.ac.in/courses/109103135/24
E -TEXT BOOKS
<ol style="list-style-type: none"> 1 https://iasexamportal.com/ebook/the-constitution-of-india 2 https://www.india.gov.in/my-government/documents/e-books
MOOCS COURSE
<ol style="list-style-type: none"> 1 http://nludelhi.ac.in/images/moocs/moocs-courses.pdf 2 https://www.classcentral.com/tag/constitutional-law