FACULTY OF ENGINEERING

Scheme of Instructions & Examinations

For

Four Year Degree Programme of

Bachelor of Engineering (B.E)

in

COMPUTER SCIENCE AND ENGINEERING

(Accredited by NBA)

(With effect from the academic year 2023-24)

Empower Women - Impact The World

Issued by **Dean, Academics**

STANLEY COLLEGE OF ENGINEERING AND TECHNOLOGY FOR WOMEN (AUTONOMOUS)

(Affiliated to Osmania University)

(Accredited by NAAC with "A" Grade)

Abids, Hyderabad - 500 001, Telangana.

Vision of the Institute

Empowering girl students through professional education integrated with values and character to make an impact in the World.

Mission of the Institute

M1 : Providing quality engineering education for girl students to make them competent and confident to succeed in professional practice and advanced learning.

M2 : Establish state-of-art-facilities and resources to facilitate world class education.

M3 : Integrating qualities like humanity, social values, ethics, leadership in order to encourage contribution to society.

Vision of the Department

Empowering girl students with the contemporary knowledge in computer science engineering for their success in life

Mission of the Department

M1 : To impart quality education for girl students to learn and practice various hardware and software platforms prevalent in industry.

M2 : To achieve self-sustainability and overall development through Research and Development activities.

M3: To provide education for life by focusing on the inculcation of human & moral values through an honest and scientific approach

M4 : To groom students with good attitude, team work and personality skills.

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Abbreviation	Meaning
HS	Humanities, Social Sciences and Management
BS	Basic Sciences including Mathematics, Physics and Chemistry
ES	Engineering Sciences including Workshop, Drawing, Basic Electrical / Electronics
PC	Professional Core Subjects
PE	Professional Elective Subjects
OE	Open Elective Subjects
PW	Project Work, Seminars, Internship
MC	Mandatory Courses
AC	Audit Courses
PY	Philosophy
EC	Electronics and Communication Engineering.
CE	Civil Engineering,
MP	Mechanical / Production Engineering
IT	Information Technology
CS	Computer Science Engineering
EE	Electrical and Electronics Engineering
CM	Computer Engineering
AD	Artificial Intelligence and Data Science
L	Lecture
T	Tutorial
P	Practical
G	Grade
D	Drawing
CIE	Continuous Internal Evaluation
SEE	Semester End Evaluation
	Each contact hour is a clock hour
	The duration of the Practical class is two hours; however, it can be extended wherever necessary, to enable the student to complete the experiment.

SMC901CS Induction Program (Mandatory)	**3 weeks' duration**
Induction program for students to be offered right at the start of the first year	• Physical Activity • Creative Arts • Universal Human Values-I • Literary • Proficiency Modules • Lectures by Eminent People • Visits to local Areas • Familiarization to Dept. / Branch & Innovations

CSE: Semester - I

Sl. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SBS0101MT	Mathematics-I	3	1	-	4	40	60	3	4
2	SBS0901CH	Applied Chemistry	3	1	-	4	40	60	3	4
3	SES0101CS	Programming for Problem Solving	3	-	-	3	40	60	3	3
4	SHS0901EG	English	2	-	-	2	40	60	3	2
5	SHS0902EG	Universal Human Values-II: Understanding Harmony and Ethical Human Conduct	2	-	-	2	40	60	3	2
Practical / Laboratory Courses										
6	SBS0911CH	Chemistry Lab	-	-	2	2	40	60	3	1
7	SES0111CS	Programming for Problem Solving Lab	-	-	4	4	40	60	3	2
8	SES0911ME	Engineering Graphics Lab	-	-	4	4	40	60	3	2
9	SHS0111CS	Design Thinking	-	-	2	2	40	60	3	1
		Total	**11**	**02**	**12**	**27**	**360**	**540**	**27**	**21**

CSE: Semester - II

Sl. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SBS0902PH	Applied Physics	3	1	-	4	40	60	3	4
2	SBS0201MT	Mathematics-II	3	1	-	4	40	60	3	4
3	SES0201CS	Data Structures	3	-	-	3	40	60	3	3
4	SES0204EE	Basic Electrical & Electronics Engineering	3	1	-	4	40	60	3	4
Practical / Laboratory Courses										
5	SBS0912PH	Physics Lab	-	-	2	2	40	60	3	1
6	SHS0911EG	English Lab	-	-	2	2	40	60	3	1
7	SES0211CS	Data Structures Lab	-	-	4	4	40	60	3	2
8	SES0912ME	Engineering Workshop	-	-	4	4	40	60	3	2
9	SES0214EE	Basic Electrical & Electronics Engineering Lab	-	-	2	2	40	60	3	1
10	SPW0221CS	IDEA Lab Workshop	-	-	2	2	40	60	3	1
		Total	**12**	**03**	**16**	**31**	**400**	**600**	**30**	**23**

CSE: Semester - III

Sl. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SBS0301MT	Mathematics III	4	-	-	4	40	60	3	4
2	SPC0301CS	OOPs using Java	3	1	-	4	40	60	3	4
3	SES0301EC	Logic Switching Theory	3	-	-	3	40	60	3	3
4	SPC0302CS	Computer Organization & Microprocessor	3	-	-	3	40	60	3	3
5	**SES0302EC**	Integrated Electronics	3	-	-	3	40	60	3	3
Practical/ Laboratory Courses										
6	SPC0311CS	OOPs using Java Lab	-	-	2	2	40	60	3	1
7	SPC0312CS	IT Workshop (SCI Lab/MATLAB Lab)	-	-	2	2	40	60	3	1
8	SES0312EC	Integrated Electronics Lab	-	-	2	2	40	60	3	1
9	SHS0912EG	Advanced Communication skills Lab	-	-	2	2	40	60	3	1
		Total	**16**	**1**	**8**	**25**	**360**	**540**	**27**	**21**

CSE: Semester - IV

Sl. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SPC0401CS	Mathematical Foundations for Computer Science	3	-	-	3	40	60	3	3
2	SPC0402CS	Theory of Computation	3	-	-	3	40	60	3	3
3	SPC0403CS	Database Management Systems	3	1	-	4	40	60	3	4
4	SHS0901BM	Managerial Economics & Financial Accountancy	3	-	-	3	40	60	3	3
5	SPC0404CS	Operating Systems	3	-	-	3	40	60	3	3
6	SHS0901CH	Environmental Sciences	2	-	-	2	50	-	-	0
Practical / Laboratory Course										
7	SPC0415CS	Python Programming Lab	3	-	2	2	40	60	3	4
8	SPC 0413CS	Database Management Systems Lab	-	-	2	2	40	60	3	1
9	SPC0414CS	Operating Systems Lab	-	-	2	2	40	60	3	1
10	SPW0421CS	Internship-1	The students have to undergo an Internship of 4-week duration after IV-Semester SEE				-	-	-	-
		Total	**20**	**1**	**06**	**23**	**370**	**480**	**24**	**22**

CSE: Semester - V

Sl. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SPC0501CS	Data Mining and Machine Learning	3	-	-	3	40	60	3	3
2	SPC0502CS	Computer Networks	3	-	-	3	40	60	3	3
3	SPC0503CS	Design and Analysis of Algorithms	3	-	-	3	40	60	3	3
4	SPE 190XCS	Professional Elective-I	3	-	-	3	40	60	3	3
5	SOE190XXX	Open Elective-I	3	-	-	3	40	60	3	3
6	SMC0901HS	Indian Constitution	2	-	-	2	50	-	-	0
Practical / Laboratory Courses										
7	SPC0512CS	Computer Networks Lab	-	-	2	2	40	60	3	1
8	SPC0513CS	Design and Analysis of Algorithms Lab	-	-	2	2	40	60	3	1
9	SPC0514CS	Web Technologies Lab	3		2	5	40	60	3	4
10	SPW0421CS	Internship-1	The students have to undergo an Internship of 4-week duration after IV- Semester SEE				50	-	-	1
		Total	**20**	**-**	**06**	**26**	**420**	**480**	**24**	**22**

CSE: Semester - VI

Sl. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SHS0902BM	Entrepreneurship and startups	3	-	-	3	40	60	3	3
2	SPC0601CS	Software Engineering	3	-	-	3	40	60	3	3
3	SPC0 602CS	Information Security	3	-	-	4	40	60	3	3
4	SPC0 603CS	Compiler Design	3	-	-	3	40	60	3	3
5	SPE290XCS	Professional Elective –II	3	-	-	3	40	60	3	3
Practical / Laboratory Courses										
6	SPC0611CS	Software Engineering Lab with Mini Project	-	-	2	2	40	60	3	1
7	SPC0612CS	Information Security Lab	-	-	2	2	40	60	3	1
8	SPC0613CS	Compiler Design Lab	-	-	2	2	40	60	3	1
9	S PW0622CS	Technical Seminar	-	-	2	2	50	-	-	1
10	SPW0621CS	Internship -2	The students have to undergo an Internship of 4-week duration after VI- Semester SEE				-	-	-	-
		Total	**15**	**0**	**8**	**23**	**370**	**480**	**24**	**19**

CSE: Semester - VII

Sl. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SPC0701CS	Distributed Systems	3	-	-	3	40	60	3	3
2	SPE390XCS	Professional Elective- III	3	-	-	3	40	60	3	3
3	SPE490XCS	Professional Elective – IV	3	-	-	3	40	60	3	3
4	SPE590XCS	Professional Elective – V	3	-	-	3	40	60	3	3
5	SOE290XXX	Open Elective-II	3	-	-	3	40	60	3	3
Practical / Laboratory Courses										
6	SPC0 711CS	Distributed Systems Lab	-	-	2	2	40	60	3	1
7	SPE391XCS	Professional Elective- III Lab-		-	2	2	40	60	3	1
8	SPW0721CS	Project Work – I	-	-	6	6	40	-	-	3
10	SPW0621CS	Internship -2	The students have to undergo an Internship of 4-week duration after VI- Semester SEE				50	-	-	1
		Total	**15**	**-**	**10**	**25**	**370**	**420**	**21**	**21**

CSE: Semester - VIII

Sl. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SOE390XXX	Open Elective – III	3	-	-	3	40	60	3	3
Practical / Laboratory Courses										
2	SPW0821CS	Project Work – II	-	-	16	16	40	120	3	8
		Total	**3**	**-**	**16**	**19**	**80**	**180**	**6**	**11**

LIST OF PROFESSION ELECTIVES

Professional Elective-I

Course Code	Course Name
SPE1901CS	Principles of Programming Languages
SPE1902CS	Data Science using R
SPE1903CS	Distributed Databases
SPE1904CS	Natural Language Processing
SPE1905CS	Number Theory and Cryptography

Professional Elective-II

Course Code	Course Name
SPE2901CS	OOPs using C++
SPE2902CS	Mobile Computing
SPE2903CS	Storage Area Networks
SPE2904CS	Digital Image Processing
SPE2905CS	Software Security Engineering

Professional Elective-III

Course Code	Course Name
SPE3901CS	Advanced Python Programming
SPE3902CS	Cloud Computing
SPE3903CS	Data Engineering
SPE3904CS	Exploratory data analysis
SPE3905CS	Wireless Sensor Networks

Professional Elective-IV

Course Code	Course Name
SPE4901CS	Predictive Analytics using R
SPE4902CS	Scalable Architecture for Large Applications
SPE4903CS	Information Retrieval Systems
SPE4904CS	Expert Systems
SPE4905CS	Cyber Security

Professional Elective-V

Course Code	Course Name
SPE5901CS	Human Computer Interaction
SPE5902CS	Architecting Applications for Clouding
SPE5903CS	Principles of Data Intensive Systems
SPE5904CS	Deep Learning
SPE5905CS	Block Chain Technology

Open Elective-I

Course Code	Course Name	Offered to
S0E1901CS*	OOPs Using Java	EEE, ECE
S0E1902CS*	Open Source Technologies	IT
S0E1901EC	Signal Analysis And Transformation Techniques	CSE
S0E1902EC	Signals And Systems	AIDS
S0E1901IT	Operating Systems	ECE
S0E1901EE	Reliability Engineering	IT
S0E1901BM	Entrepreneurship	CSE
S0E1902BM	Operations Research	AIDS
S0E1901EG	Soft Skills & Interpersonal Skills	CSE
S0E1902EG	Effective Technical Communication In English	AIDS
S0E1901MT	Operations Research	AIDS

Note: * Denotes Course offered to other departments

Open Elective-II

Course Code	Course Name	Offered to
S0E2901CS*	Software Engineering	EEE
S0E1902CS*	Data Science Using R	ECE
S0E2901EC	Internet Of Things	CSE
S0E2902EC	FUNDAMNETALS OF Iot	EEE
S0E2903EC	Digital Signal Processing	CME
S0E2904EC	Embedded Systems And Its Applications	AIDS
S0E2901IT	Cyber Security	EEE,ECE
S0E2902OTH	Intellectual Property Rights	IT
S0E2901AD	Database Management Systems	ECE
S0E2901BM	Human Resource Management	CME
S0E2902BM	Management Science	CSE
S0E2903BM	Advanced Entrepreneurship	AIDS
S0E2904BM	Quantitative Analysis For Business Decisions	IT
S0E2901EG	Technical Writing For Research	CME
S0E2901MT	Quantitative Analysis For Business Decisions	IT

Note: * Denotes Course offered to other departments

Open Elective-III

Course Code	Course Name	Offered to
S0E3901CS*	Database Management Systems	EEE
S0E3901EC	Embedded Systems	CSE
S0E3902EC	Power Management For IoT Devices	CME
S0E3903EC	Internet Of Things	AIDS
S0E3901IT	Software Engineering	ECE
S0E3902OTH	Intellectual Property Rights	ECE
S0E3901AD	Data Science Using R	EEE
S0E3901EE	Energy Conservation And Management	IT
S0E3901BM	Basics Of Entrepreneurship	IT
S0E3902BM	Human Resource Management	CSE
S0E3903BM	Management Information System	CME
S0E3904BM	Supply Chain Management	AIDS
S0E3901EG	Technical Writing For Research	AIDS

Note: * Denotes Course offered to other departments

CSE
SEMESTER - I

Course Code	Course Title						Core / Elective
SBS0101MT	Mathematics - I (Common to All)						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	3	1	–	–	40	60	4

Course Objectives:

1. To introduce the concepts of mean value theorems and curvature.
2. To introduce the concept of multiple integrals.
3. To study vector differential and vector integral calculus.

Course Outcomes:

1. Identify the nature of sequences and series.
2. Analyze the consequences of the mean value Theorems for differentiable functions and Evaluate the Curvature.
3. Analyze the properties of functions of two variables.
4. Evaluate double and triple integrals in engineering problems.
5. Solve problems based on vector differentiation and integration

UNIT-I

Sequence and series: Sequences – General properties of series, Convergence and Divergence of sequence. Series of positive terms, Comparison test, tests of convergence D'Alembert's Ratio test, Cauchy's nth root test, Raabe's test, Logarithmic test, Alternating series, Series of positive and negative terms, Absolute convergence, and Conditional convergence.

UNIT-II

Differential Calculus: Rolle's, Lagrange's, Cauchy's Mean value theorems (without proofs), Taylor's series, Curvature, Radius of curvature, Circle of Curvature, Envelope of family of curves, Evolutes.

UNIT-III

Multivariable Calculus (Differentiation): Functions of two variables, Limits and continuity, Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions (Chain rule), Jacobian, Higher order partial derivatives, Taylor's series of functions of two variables, Maximum and minimum of values of functions of two variables, Method of Lagrange Multipliers.

UNIT-IV

Multiple Integrals: Double and Triple integrals (Cartesian), Change of order of integration (Cartesian coordinates), Change of variables in double and triple integrals, Jacobian. Beta and Gamma Functions, Relation between Gamma and Beta Functions

UNIT-V

Vector Calculus: Scalar and vector fields, Gradient of a scalar field, Directional derivative, Divergence and Curl of a vector field, Line, Surface and Volume integrals, Green's theorem in a plane, Gauss's divergence theorem, Stoke's theorem (without proofs) and their verification with respect to Cartesian, applications.

TEXT / REFERENCE / ADDITIONAL BOOKS:

1. Dr. B.S. Grewal, Higher Engineering Mathematics, Khanna Publications, 43rd Edition, 2014.
2. B.V. Ramana, Higher Engineering Mathematics, 23 reprint, 2015.
3. N. Bali, M. Goyal, A text book of Engineering Mathematics, Laxmi Publications,2010.
4. G.B. Thomas, Maurice Weir and Joel Hass, Thomas' Calculus, Peterson, 12 Edition, 2010.

Course Code	Course Title						Core / Elective
SBS0901CH	APPLIED CHEMISTRY (AI & DS, CME, CSE, IT Branches)						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	3	1	–	–	40	60	4

Course Objectives:

1. Apply the principles of electrochemistry in storage of electrical energy in Batteries.
2. Gains knowledge about the causes of Corrosion and its prevention and attains Knowledge about the hard water and treatment of water for drinking purpose.
3. Correlate the properties of polymeric materials with their internal structure and use for engineering applications.
4. Exposed to qualitative and quantitative parameters of chemical fuels.
5. Explore the knowledge of Bio informatics on Drug design. Familiarizes with green chemistry and Engineering Materials.

Course Outcomes:

Student will be able to:

1. Apply the concept of electrode potential in identifying feasibility of electrochemical reaction: illustrate electro analytical techniques and working of batteries. (Application).
2. Identify the mechanism of corrosion of materials on basis o f electrochemical approach and devise corrosion control methods. Water Chemistry enables understanding the causes effects of hardness (Knowledge).
3. Analyse the preparation, properties and applications of polymeric materials. (Analysis)
4. Classify chemical fuels and grade them through qualitative analysis. (Knowledge, Analysis).
5. Understanding the Software technologies on Drug design and examples of clean technology. (Knowledge, Application)

UNIT-I: (10 Hrs) ELECTROCHEMISTRY & BATTERIES

Electrochemistry: Electrochemical cells: Electrolytic cells and Galvanic cells, Cell representation. Types of electrodes: Calomel electrode, Quinhydrone Electrode. Determination of pH of a solution by using Quinhydrone electrode. Nernst equation and its derivation. Applications of Nernst equation. Numerical problems.

Battery chemistry: Types of Batteries: Primary batteries: Zinc - Carbon Battery, Secodary Batteries: Lead – acid battery,Lithium ion batteries, and their application,

Fuel cells: Concept of fuel cells and their advantages, $H_2 – O_2$ fuel cell and, $CH_3OH – O_2$ fuel cell

UNIT 2: (10 Hrs) WATER CHEMISTRY & CORROSION

Water Chemistry: Hardness of water, types of hardness, units of hardness, Determination of temporary, permanent &Total hardness by EDTA method, Numericals. Alkalinity of water - its determination. Alkaline water – its uses. Water softening by ion exchange and reverse osmosis methods. Specification of potable water. Sterilization by chlorination.Basic concepts of BOD,COD.

Corrosion: Causes and effects of corrosion, chemical (dry) corrosion, Electrochemical(wet) corrosion-Mechanisms. Types of electrochemical corrosion, Factors affecting the rate of corrosion – Corrosion control methods- cathodic protection: sacrificial anode method and impressed current method.

UNIT 3: (10 Hrs) POLYMER CHEMISTRY

Polymers: Basic terms of polymers: Monomer, Polymer, Functionality, Degree of polymerization. Nomenclature of Polymers- Types of Polymerization(Addition, Condensation, Co Polymeration).Preparation, Properties and Applications- Plastics: PET and Bakelite, Elastomers: Buna-S Rubber. Fibers: Kevlar

Biodegradable polymers: Introduction- Preparation, Properties and Applications of Polylacticacid.

Conducting polymers: Introduction, classification. Mechanism of conduction in Polyacetylene. Applications of conducting polymers

UNIT 4: (10 Hrs) CHEMICAL FUELS

Chemical fuels: Introduction, Definition and classification of Chemical fuels-Primary and Secondary fuels. Requirements of good fuel. Calorific value — HCV, LCV. Theoretical calculation of calorific value by Dulong's formula - Numerical.

Solid fuels: Coal and its chemical composition, Proximate analysis, Ultimate analysis and significance.

Liquid fuels: Source – Fractional distillation of petroleum, important fractions, and their uses.

Gaseous fuels: LPG, CNG composition and uses. Green Hydrogen – Sourcing of Green Hydrogen.

Combustion : Ignition temperature of a fuel, calculation of air quantities by weight and volume required for the combustion of the fuels-Numericals.

UNIT 5 (10 Hrs) COMPUTATIONAL CEHMISTRY, NANO MATERIALS, GREEN CHEMISTRY & BIODIESEL

Computational Chemistry: Introduction Bioinformatics - Protein Structure - structure based Classification. Protein structure databases and tools.

Nano Materials: Introduction – chemical synthesis by sol gel method and Precipitation method – Industrial Applications of Nano materals.

Green Chemistry: Concept and principles of green chemistry, examples of clean technology.

Bio diesel: Sources of Biodiesel, Synthesis of Biodiesel (Trans esterification) - Applications of Biodiesel.

Text Books:

1. P.C.Jain and M.Jain, Engineering Chemistry, DhanapathiRai publishing
2. Text Book of Engineering Chemistry by Shashi Chawla
3. Chemistry in Engineering and Technology by Kuriacose & Rajaram.
4. Engineering chemistry by B Shivashankar
5. Text Book of Engineering Chemistry by Dr. S.S. Dara, Dr. K. Mukkanti, S.CHAND

Reference Books:

1. Principles of Physical Chemistry by Puri, Sharma and Pathania S.N. Chand & Co. New Delhi (Latest edition).
2. Engineering Chemistry by O G Palanna, TMH, and New Delhi.
3. Engineering Chemistry by PrasantaRath, Cengage Learning India Pvt. Ltd.
4. Engineering Chemistry (NPTEL – web book), by B.L. Tembe, Kamaluddin and M.S. Krishna
5. Concise Inorganic Chemistry by J.D. Lee, Blackwell publications V Edition
6. Organic chemistry by T.W. Graham Solomons & Craig B.Fryhle, 7th Edition, Wiley Publications.
7. Engineering Physics by Prof. Battacharya, Oxford press
8. Engineering Physics by Gupta & Gupta
9. SC Rastogi, N.Mendiratta, P.Rastogi, Bioinformatics: Methods & Applications: Genomics, Proteomics & Drug Discovery, PHI Publications, 2013.

Course Code	Course Title						Core / Elective
SES0101CS	PROGRAMMING FOR PROBLEM SOLVING						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	3	–	–	–	40	60	3

Course Objectives: The course should enable the students to:

1. Understand programming skills using the fundamentals and basics of C Language.
2. Improve problem solving kills using arrays, strings, and functions.
3. Understand the dynamics of memory by pointers and study files creation process with access permissions.

Course Outcomes:

1. Describe the concept of computer system, analyze a given problem, develop an algorithm, fundamental programming constructs, identify data representation formats and describe operators and their precedence, associativity.
2. Understand branching and loop statements
3. Describe the concept of homogeneous derives data types, strings and functions.
4. Understand pointers, heterogeneous data types.
5. Describe the concept of file system.

UNIT-I INTRODUCTION

Introduction to Programming : Computer system, components of a computer system, computing environments, computer languages, creating and running programs, algorithms, flowcharts; Introduction to C language: Computer languages, History of C, basic structure of C programs, process of compiling and running a C program, C tokens, keywords, identifiers, constants, strings, special symbols, variables, data types; Operators and expressions.

Conditional Control structures: Decision statements; Simple if, if-else, else if ladder, Nested if and Case Statement-switch statement;

UNIT-II ITERATIVE CONTROL STRUCTURES AND ARRAYS

Iterative Control structures: Loop control statements: while, for and do while loops. Jump statements, break, and continue, go to statements.

Arrays: Concepts, one dimensional arrays, declaration and initialization of one dimensional arrays, two dimensional arrays, initialization and accessing, multi-dimensional arrays; Strings (character arrays): Arrays of characters, variable length character strings, inputting character strings, character library functions, string handling functions.

UNIT-III FUNCTIONS, STRUCTURES AND UNIONS

Functions: Need for user defined functions, function declaration, function prototype, category of functions, inter function communication, function calls, parameter passing mechanisms, recursion, passing arrays to functions, passing strings to functions, storage classes, preprocessor directive.

Structures: Structure definition, initialization, accessing structures, nested structures, arrays of structures, structures and functions, unions, bit fields, typedef, enumerations.

UNIT-V POINTERS AND DYNAMIC MEMORY ALLOCATION

Pointers: Pointer basics, pointer arithmetic, pointers to pointers, generic pointers, array of pointers, pointers and arrays, pointers as functions arguments, functions returning pointers, passing structures through pointers, self-referential structures.

Dynamic memory allocation: Basic concepts, library functions.

UNIT-V FILE HANDLING, SESARCHING AND SORTING

Files: Streams, basic file operations, file types, file opening modes, input and output operations with files, special functions for working with files, file positioning functions, command line arguments.

Searching and Sorting: linear search, binary search, bubble sort.

Text Books:

1. Somasekhara, "Problem Solving with C", PHI.
2. Byron Gottfried, "Programming with C", Schaum's Outlines Series, McGraw Hill Education, 3rd Edition, 2017.
3. E. Balagurusamy, "Programming in ANSI C", McGraw Hill Education, 6th Edition, 2012.

Reference Books:

1. W. Kernighan Brian, Dennis M. Ritchie, "The C Programming Language", PHILearning, 2nd Edition, 1988.
2. YashavantKanetkar, "Exploring C", BPB Publishers, 2nd Edition, 2003.
3. Schildt Herbert, "C: The Complete Reference", Tata McGraw Hill Education, 4thEdition, 2014.
4. R. S. Bichkar, "Programming with C", Universities Press, 2nd Edition, 2012.
5. Dey Pradeep, Manas Ghosh, "Computer Fundamentals and Programming in C", Oxford University Press, 2nd Edition, 2006.
6. Stephen G. Kochan, "Programming in C", Addison-Wesley Professional, 4th Edition, 2014.

Course Code	Course Title						Core / Elective
SHS0901EG	ENGLISH (Common to all Branches)						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	2	–	–	–	40	60	2

Course Objectives: To enhance the English language abilities of Engineering students, especially in reading and writing, by

1. Using authentic material for language learning, exposing them to a variety of content-rich texts and strengthening their grammar and vocabulary.
2. Improving their reading comprehension skills and honing their existing writing skills.
3. Encouraging them to think creatively and critically.

Course Outcomes: On successful completion of the course, the student will be able to:

1. Demonstrate competence in language by using appropriate vocabulary and grammar (REMEMBER, APPLY)
2. Evaluate themselves for their decision making and critical thinking skills and motivate to understand their goals and dreams through reading fiction and non-fiction (EVALUATE, ANALYZE, APPLY)
3. Improve their technical and creative writing skills by learning the different types of writings. (UNDERSTAND, CREATE)
4. Learn to read effectively to comprehend the nuances of simple and complex texts (UNDERSTAND, APPLY)
5. Use inclusive language and demonstrate empathy and treat all people with respect, dignity, and impartiality. (UNDERSTAND, APPLY)

UNIT-I:

Reading : The Kitemaker – Ruskin Bond

Vocabulary: Word formation - part I - Prefixes, Suffixes, Root words

Grammar : Articles, Prepositions, Punctuations.

Writing : Guided Writing (Expanding the outline / Writing from verbal cues), Paragraph writing

UNIT-II:

Reading : Punishment in Kindergarten-Kamala Das

Vocabulary: Word formation – part II Compounding and Blending,

Grammar : Connectives, Tense and Concord

Writing : Formal Letter Writing, Basics of E-mail

UNIT-III:

Reading : Grammar of Anarchy (Excerpt)- BR Ambedkar

Vocabulary: Synonyms, Antonyms, One-word substitutes

Grammar : Narration (Direct - Indirect speech)

Writing : Precis Writing

UNIT-IV:

Reading : The Flower-Alfred Tennyson

Vocabulary: Words often confused, Phrasal Verbs, Prepositional Phrases

Grammar : Voice

Writing : Information Transfer-Verbal to Non-verbal & Non-verbal to Verbal

UNIT-V:

Reading : Reading Comprehension

Vocabulary: Inclusive Language, Euphemisms

Grammar : Degrees of Comparison

Writing : Types of Writing: Persuasive Writing, Argumentative Writing

Suggested Reading

- Board of Editors. Language and Life: A Skills Approach. Orient BlackSwan, 2018.
- Sudharshana, NP and C Savitha. English for Engineers. Cambridge University Press, 2018.
- Kumar, Sanjay and Pushp Lata. English Language and Communication Skills for Engineers. Oxford University Press, 2018.
- Practical English Usage by Michael Swan, Oxford University Press 4th Edition 2017.
- Kumar, T Vijay, K Durga Bhavani and YL Srinivas. English in Use: A Textbook for College Students. 2nd Edition. Macmillan Education India Private Limited.

Course Code	Course Title						Core / Elective
SHS0902EG	UNIVERSAL HUMAN VALUES (Common to all Branches)						Mandatory
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	2	–	–	–	40	60	2

Course Objectives:

1. To develop a critical ability to distinguish between essence and form, or between what is of value and what is superficial to life.
2. To move from discrimination to commitment. It is to create an ability to act on any discrimination in a given situation.
3. It encourage students to discover what they consider valuable, after learning the course, they should be able to discriminate between valuable and superficial in real situation in their life.

Course Outcomes: On successful completion of the course, students will be able to:

1. Identify the essentials of human values and skills. (Knowledge) (Comprehension)
2. Understand between profession and happiness (Knowledge) (Comprehension)
3. Understand practically the importance of trust, mutually satisfying human behaviour. (Knowledge) (Synthesis)
4. Develop and enrich interaction with nature.(Application)
5. Develop appropriate technologies and management patterns to create harmony in professional and personal life. (Synthesis)

UNIT-I:

Course introduction-need, basic guidelines, content and process for value education: understanding the need, basic guidelines, content and process for value education. Self-exploration. what is it?-its content and process; 'natural acceptance' and experiential validation as the mechanism for self-exploration. Continuous happiness and prosperity- a look at basic human aspirations. Right understanding, relationship and physical facilities- the basic requirements for fulfilment of aspirations of every human being with their correct priority. Understanding happiness and prosperity correctly, a critical appraisal of current scenario. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

UNIT-II:

Understanding harmony in the human being. harmony in myself understanding human being as a coexistence of the sentiment I and the material body. Understanding the needs of self and body Sukh and Suvidha. Understanding the body as an instrument of I (being the doer, seer enjoyer) understanding the harmony of I with the body Sanyam and Swasthya. Correct appraisal of physical needs meaning of prosperity in detail programs to ensure Sanyam and Swasthya.

UNIT-III:

Understanding harmony in the family and society -how many in human, human relationship understanding harmony in the family, the basic unit of human interaction. Understanding values in human-human relationship; meaning of justice and program for its fulfilment. Trust and respect essay foundational values of relationship. Difference between intention and competence. difference between respect and differentiation. The other salient values in relationship. Understanding the harmony in the society (society being an extension of family).

UNIT-IV:

Understanding harmony the nature of existence: whole existence as coexistence: understanding the harmony in the nature, interconnectedness and mutual fulfilment among the four orders of nature -recyclability and self-regulation in nature.

UNIT-V:

Understanding existence as coexistence of mutually interacting units in all pervasive space. Holistic perception of harmony at all levels of existence implications of the above holistic understanding of harmony on professional ethics; natural acceptance of human values, definition Ness of ethical human conduct, basic for humanistic education, humanistic constitution and humanistic universal order.

Suggested Reading:

- R.R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
- Prof. K.V. Subba Raju, 2013, Success Secrets for Engineering Students, SmartStudent Publications, 3rd Edition.Ivan IIlich, 1974, Energy & Equity, The Trinity Press, Worcester, and Harper Collins, USA
- E.F. Schumancher, 1973, Small is Beautiful: a study of economics as if peoplemattered. Blond & Briggs, Britain
- A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986
- Smriti Shristava, "Human Values and Professional Ethics", Katson Publications, 2007

Course Code	Course Title						Core / Elective
SBS0911CH	CHEMISTRY LAB (Common to all Branches)						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	–	–	–	2	40	60	1

Course Objectives:

1. Apply the theoretical knowledge to experiments and acquire skills to hand on.
2. Impart fundamental knowledge in handling the equipment / glassware and chemicals in chemistry laboratory.
3. Apply various instrumental methods to correlation to theory and to improve understanding of theoretical concepts.
4. Estimate the water quality analysis.
5. Estimation of purity of materials.

Course Outcomes: Students will be able to

1. Knowing of the hardness and alkalinity of sample water. (Analysis)
2. Measure the amount of a substance in a given solution by conductometry, potentiometry snd P^H metry (Application)
3. Analysis of physical properties like surface tension and viscosity. (Analysis)
4. Analysis of about rate of reactions and rate constant information (Knowledge)
5. Importance of absorption of light by substance in analysis. (Knowledge, Analysis)

PERMANGANOMETRY

1. Estimation of Ferrous ion

DICHROMETRY

2. Estimation of Ferrous ion

WATER ANALYSIS

3. Determination of Total hardness of water by EDTA method.
4. Determination of Carbonate and Bicarbonate Alkalinity.

CONDUCTANCE MEASUREMENTS

5. Estimation of Strong acid with strong base (HCl Vs NaOH)
6. Estimation of weak acid with strong base (CH3COOH Vs NaOH)
7. Estimation of Mixture of Acids with Strong base (Hcl+CH_3COOH) Vs NaOH

POTENTIOMETRIC MEASUREMNETS

8. Estimation of HCl
9. Estimation of Ferrous ion

P^H METRY

10. Determination of P^H of solution using glass electrode

SYNTHESIS OF A DRUG MOLECULE

11. Synthesis of Paracetamal.

COLOROMETRY

12. Verification of Beer's Law and Estimation of the given Copper Sulphate.

Reference Books:

1. Senior Practical Physicla Chemistry, B.D.Khosla, A.Gjulati, V.C.Garg., (R.Chand and company, New Delhi 10th Edition)
2. An Introduction to Practical Chemistry, K.K.Sharma and D.S. Sharma (Vikas Publishing, New Delhi)
3. Experiments in Applied chemistry, Sunita Rattan, S. K Kataria & Soms
4. Quantitative Inorganic chemistry by Vogel

Course Code	Course Title						Core / Elective
SES0111CS	PROGRAMMING FOR PROBLEM SOLVING LAB						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	–	–	–	4	40	60	2

Course Objectives:

The course should enable the students to:

1. Formulate problems and implemental gorithms using C programming language.
2. Develop programs using decision structures, loops and functions.
3. Learn memory allocation techniques using pointers and use structured programming approaches for solving computing problems in the real world.

Course Outcomes:

1. Understand the concept of basics of C, data types and variables.
2. Understand the concept of operators, precedence of operators, conditional statements and looping statements.
3. Explore the concept of strings, functions, recursive functions and differences between call by value and call by reference.
4. Explore the concept of storage classes, preprocess or directives, pointes and files.
5. Understand the concept of file handling functions, searching and sorting methods and real time applications of C.

LIST OF EXPERIMENTS

Concept: Basic I/O, Operators

1. Write a C program to check and print a given number is even or odd using ternary operator.
2. Write a C program to calculate area and circumference of a circle.
3. Write a C program to solve given expression

Concept: Basic I/O, conditional execution, loops, Jump Statement

4. Write a C program to accept student roll, marks, calculate total, average and print grade of student.
5. Write a C program to print Fibonacci series
6. Write a C program to check and print Armstrong Number
7. Write a C program to check and print Prime No.
8. Write a C program to add sum of only positive integers using continue statement.

Concept: Basic I/O, Conditional execution, loops, Arrays (integer1D, 2D)

9. Write a C program to print sum of integers of a 1D array.
10. Write a C program to perform matrix addition for a 2Darray.
11. Write a C program to perform matrix multiplication of a 2Darray.

Concept: Sub Programs: User Defined Functions, Recursion

12. Write a C program to perform different prototypes of user defined function.
13. Write a C program to perform factorial of given number using functions.
14. Write a C program to perform factorial of given number using recursive functions.

Concept: Strings

15. Write a C program to determine if the given string is a palindrome or not
16. Write a C program to apply in built string functions

Concept: Structures and Unions:

17. Write a C program to apply Nested structures and array of structures.
18. Write a program to demonstrate structure and union.

Concept: Pointers

19. Write a C program to access1D Array and 2D array using Pointers
20. Write a C program to concatenate two strings using pointers.
21. Write a C program to find the length of string using pointers.

Concept: Files, Searching, Sorting

22. Write a C program to display the contents of a file.
23. Write a C program to copy the contents of one file to another.
24. Write a C program apply binary search.
25. Write a C program apply bubble sorting.

Text Books:

1. Soma sekhara,"ProblemSolvingwithC", PHI.
2. Byron Gottfried, "Programming with C", Schaum's Outlines Series, Mc Graw Hill Education, 3rd Edition, 2017.
3. E.Balaguru swamy, "Programming in ANSIC", Mc Graw Hill Education, 6th Edition, 2012.

Reference Books:

1. B.A.Forouzan, R.F.Gillberg, ”CProgramming and Data Structures”, Cengage Learning, India, 3rd Edition, 2014.
2. W.Kernighan Brian, Dennis M.Ritchie, ”The C Programming Language”, PHI Learning, 2nd Edition, 1988.
3. Yashavant Kanetkar, ”Exploring C”, BPB Publishers, 2nd Edition, 2003.
4. Schildt Herbert, ”C: The Complete Reference”, Tata Mc Graw Hill Education, 4th Edition, 2014.
5. R.S.Bichkar, ”Programming with C”, Universities Press, 2nd Edition, 2012.
6. Dey Pradeep, Manas Ghosh, ”Computer Fundamentals and Programming in C”, Oxford University Press, 2nd Edition, 2006.
7. Stephen G. Kochan, ”Programming in C”, Addison-Wesley Professional, 4th Edition, 201

Course Code	Course Title						Core / Elective
SES0911ME	ENGINEERING GRAPHICS LAB						Elective
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	–	–	4	–	40	60	2

Course Objectives:

1. To inculcate a good understanding of engineering drawing conventions & their significance.
2. To impart skills to make technical drawings.
3. To impart capability to identify and draw engineering curves to scale.
4. To develop skills of drafting projections of standard geometric entities. (points, lines, planes, solids with section).
5. To develop 3D visualization skills to understand 2D drawings in 3D space & vice versa.

Course Outcomes: By the end of this course, the students will be able to

1. Use appropriate instruments and apply the engineering conventions to draw engineering objects to scale on a drawing sheet.
2. Make use of AutoCAD software to draft engineering curves like conics, involutes & cycloids.
3. Make use of AutoCAD software to draft projections of lines & determine unknown lengths & angles.
4. Make use of AutoCAD software to draft projection of planes & solids in various positions.
5. Convert isometric views to orthographic & vice versa.

Sheet No.	Description of the Topic	Contact Hours
1.	Principles of Engineering Graphics and their significance, Usage of drawing instruments.	2
2.	Conic Sections – I Construction of ellipse, parabola and hyperbola given focus and eccentricity.	2
3.	Conic Sections – II Construction of ellipse (given major and minor axis), parabola (given base and height), rectangular hyperbola.	2
4.	Cycloids (cycloid & epicycloid) and Involutes (involute of triangle, square & circle)	2
5.	Scales (plain & diagonal scales)	2
6.	Introduction to AutoCADBasic commands and simple drawings.	2 + 2

7.	Orthographic Projections - Projections of points situated in different quadrants.	2
8.	Introduction to straight lines and projections of straight lines. Line parallel to both the planes, line perpendicular to or inclined to one reference plane, Line inclined to both the reference planes.	2+2
9.	Projections of planes – I: Perpendicular planes	2
10.	Projections of planes – II: Oblique planes	2
11.	Projections of solids – I: Polyhedra and solids of revolution, Projections of solids in simple position.	2
12.	Projection of solids – II: Projections of solids when the axes inclined to one or both the reference planes.	2
13.	Isometric projection – I: planes and simple solids	2
14.	Isometric projection – II: combination of two or three solids	2
15.	Orthographic Views	2

Text / Reference / Additional Books:

1. Elementary Engineering Drawing, ND Bhatt, Charotar publishers
2. Engineering Drawing, KL Narayana & P Kannaya, Scitech publications
3. Engineering Drawing and Graphic Technology, T.E French et al, Mc Graw Hill International
4. Engineering Drawing Graphics & Auto cad, K Venugopal, New Age International
5. Engineering Drawing with a primer on Auto cad, AN Siddique et al, Prentice Hall of India Ltd.

Course Code	Course Title						Core / Elective
	DESIGN THINKING						–
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	–	–	–	2	–	–	1

Course Objectives:

The objective of this Course is to provide the new ways of creative thinking and Learn the innovation cycle of Design Thinking process for developing innovative products which useful for a student in preparing for an engineering career.

Course Outcomes : Student will able to

1. Compare and classify the various learning styles and memory techniques and Apply them in their engineering education
2. Analyze emotional experience and Inspect emotional expressions to better understand users while designing innovative products
3. Develop new ways of creative thinking and Learn the innovation cycle of Design Thinking process for developing innovative products
4. Propose real-time innovative engineering product designs and Choose appropriate frameworks, strategies, techniques during prototype development
5. Perceive individual differences and its impact on everyday decisions and further Create a better customer experience.

Unit 1: Components of Decision Making System

Understanding the Learning Process, Kolb's Learning Styles, Assessing and Interpreting.

Remembering Memory: Understanding the Memory process, Problems in retention, Memory enhancement techniques.

Emotions: Experience & Expression: Understanding Emotions: Experience & Expression, Assessing Empathy, Application with Peers.

Activity: Create Charts for learning process, learning styles, interpretation.

Unit 2: Basics of Design Thinking (HCD- Human Centric Design)

Definition of Design Thinking, Need for Design Thinking, Objective of Design Thinking, Concepts & Brainstorming, Stages of Design Thinking Process (explain with examples) – **Empathize, Define, Ideate, Prototype, Test.**

Design Thinking & Customer Centricity: Practical Examples of Customer Challenges, Use of Design Thinking to Enhance Customer Experience, Parameters of Product experience, Alignment of Customer Expectations with Product Design.

Activity: Steps in chart creation

1) Empathize.
2) Group Discussion.
3) Taking Real Time Example (Washing Machine, Refrigerator etc.)
4) Specify parameters for design.

Unit 3: Creativity and Bug Fixing, Prototyping and Testing

Understanding Creative thinking process, Understanding Problem Solving, Testing Creative Problem Solving.

Prototyping & Testing : What is Prototype? Why Prototype? Rapid Prototype Development process, Testing, Sample Example, Test Group Marketing.

Activity: Block Diagram and Flow Chart for each Module. Simulation

Unit 4: Tools of Design thinking

Real-Time design interaction capture and analysis – Enabling efficient collaboration in digital space - Empathy for design – Collaboration in distributed Design.

Activity: Tools and Testing

Unit 5: Future Emerging Trends

Artificial Intelligence, Augmented Reality and Virtual Reality, Quantum Computing and IoT & Consumer Appliances

Activity: Draw Charts in any one application domain (Health care, Defence etc.)

Text / Reference Books:

1. E.Balaguruswamy (2022), Developing Thinking Skills (The way to success), Khanna Book Publishing Company.
2. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design", Cengage learning (International edition) Second Edition, 2013.
3. Book - Solving Problems with Design Thinking - Ten Stories of What Works (Columbia Business School Publishing) Hardcover – 20 Sep 2013 by Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett (Author).

CSE
SEMESTER - II

Course Code	Course Title						Core / Elective
SBS0201MT	MATHEMATICS - II (Common to all)						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	3	1	–	–	40	60	4

Course Objectives:

1. To study matrix algebra and its use in solving system of linear equations and solving eigen value problems.
2. To provide the over view of ordinary differential equations and higher order differential equations.
3. To explain and predict how individuals behave in a specific strategic situation, and therefore help improve decision making.

Course Outcomes:

1. Apply the concept of rank of matrices and Solve system of equations.
2. Solve certain first order differential equations.
3. Solve certain second and higher order differential equations.
4. Apply Laplace transforms, solve ordinary differential equations by using it.

UNIT-I

Matrices: Rank of a matrix, Echelon form, Normal form, System of linear equations, Linear dependence, independence of vectors. Eigen values, Eigen vectors, Properties of Eigen values, Cayley-Hamilton theorem, Quadratic forms, Reduction of quadratic form to canonical form by orthogonal transformation, Nature of quadratic form.

UNIT-II

Differential Equations of First Order: Exact Differential Equations, Integrating Factors, Linear differential Equations, Bernoulli's Equation, Riccati's and Clairaut's differential equations, Orthogonal Trajectories of a Given Family of Curves, Newton's Law of Cooling.

UNIT-III

Differential Equations of Second and Higher Order: Solutions of second and higher order linear Homogenous Equations with Constant Coefficients, Solutions of non-homogeneous linear differential equations, Method of Variation of Parameters, solution of Euler-Cauchy Equation.

UNIT-IV

Laplace Transforms: Laplace Transforms, Inverse Laplace Transforms, Properties of Laplace Transforms and inverse Laplace Transforms, Convolution Theorem (without proof). Solution of ordinary differential Equations using Laplace Transforms.

UNIT-V

Complex Analysis:

Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate**;** Taylor's series, Laurent's series, zeros of analytic function, singularities**;** Residues, Cauchy Residue theorem (without proof).

Ext / Reference / Additional Books:

1. Dr. B. S. Grewal, Higher Engineering Mathematics, Khanna Publications, 43 Edition, 2014.
2. B.V. Ramana, Higher Engineering Mathematics, 23reprint, 2015.
3. N. Bali, M. Goyal, A text book of Engineering Mathematics, Laxmi Publications,2010.
4. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley, 9* Edition 2012.

Course Code	Course Title						Core / Elective
SBS0902PH	APPLIED PHYSICS						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	3	1	–	–	40	60	4

Course Objectives: The objective of this course is to make the student

1. Know the construction of lasers and optical fibers and apply their basic principles to various laser systems and optical fibers.
2. To explain various types of semiconductors and their applications
3. Understand the properties of dielectric, magnetic and superconducting materials.
4. Learn the difference between classical and quantum mechanics and identify the role of quantum mechanics.
5. Familiarize with classical and quantum electron theories and use band theory to classify solids and acquire knowledge about preparation and applications of nano materials.

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

1. Explain the lasing action in lasers, propagation of light in optical fibers and compile their applications in different fields.
2. Identify semiconductors for engineering applications and to show their understanding in current applications like solar cell, Photo cell and Thermistor.
3. Select the materials for various applications in different fields.
4. Apply and solve various engineering problems from concepts of dual nature of particles.
5. Classify solids based on their energy band structures and explain the importance of nano materials in our daily life.

UNIT-I: (10 periods)

Lasers: Characteristics of Lasers, Basic concepts of transitions - absorption, spontaneous and stimulated emissions, Einstein's theory for matter and radiation interaction (A & B coefficients), Concepts of meta stable states, population inversion and pumping, Components of lasers, Types of lasers, Ruby laser, He-Ne laser, Semiconductor laser, Applications of laser.

Fiber optics: Optical fiber as a wave guide, Parts of an optical fibre, Basic principle – total internal reflection, Concept of Numerical Aperture (NA) and acceptance angle, Types of optical

fibres – Step Index and Graded Index fibres, Fibre drawing process (Double crucible method), Applications of optical fibres.

UNIT-II: (10 periods)

Semiconductor Physics: Introduction, Intrinsic and extrinsic semiconductors, Concept of a hole, formation of valency band and conduction band, carrier concentration and conductivity in intrinsic semiconductors, Fermi energy level in pure and impure semiconductors, formation of P-N junction diode, Diode Equation and its I-V characteristics, Photo cell, Solar cell, Thermistor and their applications

UNIT-III: (10 periods)

Dielectric materials: Introduction, Polar and non-polar dielectrics, Types of dielectric polarizations – Expressions for electronic polarizability and ionic polarizability, Frequency and temperature dependence of dielectric polarizations, Ferro electricity – Barium Titanate – Applications of ferroelectrics, Determination of dielectric constant by Capacitance bridge method.

Magnetic materials: Introduction, Classification of magnetic materials – Dia, para, ferro, antiferro and ferri magnetic materials their properties and ferrites applications, Weiss molecular field theory of ferro magnetism, Domain theory, Hysteresis curve, Soft and hard magnetic materials and their applications.

UNIT-IV: (10 periods)

Superconductivity: Introduction, General properties of superconductors, Meissner effect, Josephson effect, BCS theory (qualitative), Type I and Type II superconductors, Applications of superconductors.

Introduction to Quantum Mechanics: Introduction, de-Broglie's concept – wave nature of particles (Debroglie wavelength), properties of wave function and its physical significance, Time independent and Time dependent schrodinger wave equations, Particle in a 1D box.

UNIT-V: (10 periods)

Band theory of solids: Classical free electron theory and its limitations, Band theory – Kronig penny model(qualitative treatment), Energy bands in solids, Classification of materials as conductors, semiconductors and insulators.

Nano materials: Introduction, Properties of materials at reduced size, Surface to volume ratio at nano scale, Classification of nano materials, Preparation of nano materials – Bottom up methods (sol-gel & CVD) and Top down method (ball milling), Basic ideas of carbon nanotubes, Applications of nano materials.

Text Books:

1. B.K. Pandey and S. Chaturvedi, Engineering physics, Cengage Publications.
2. D.K Bhatacharya and Poonam Tandon, Engineering Physics, Oxford University Press.
3. M. Armugam Materials Science, Anuradha Publications.
4. G. Aruldhas, Quantum Mechanics, 2nd Edition, Eastern Economy Edition.
5. S.O.Pillai, Solid State Physics, 4th Edition, New Age International Publishers.
6. Charles P Poole, Jr., Frank J. Owens, Introduction to NanoTechnology, Wiley-India.
7. S. Salivahanan, Basic Electronics, Mc. Graw Hill publications.

Recommended Books:

1. A.J. Dekkar, Solid State Physics, Mac Millan India Ltd.
2. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition.
3. Feynman P Richard,The Feynman Lectures on Physics, 2nd Edition, Addison-Wesley..
4. Nano materials and their Applications, Book series, Springer.

Web links:

1. www.bietdvg.edu/media/department/PHY/data/learningmaterials/Module_III__IV_Lasers Optical_fibers-1.pdf
2. hyperphysics.phy-astr.gsu.edu/hbase/electric/dielec.html
3. scholar.harvard.edu/files/david-morin/files/waves_quantum.pdf
4. www.nhcue.edu.tw/~jinnliu/proj/Device/Lecture01.pdf
5. www.sathyabamauniversity.ac.in/uploads/notes/note_1437661719.pdf

Course Code	Course Title						Core / Elective
SES0201CM	DATA STRUCTURES						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
Programming in C	3	–	–	–	40	60	3

Course Objectives:

1. To impart the basic concepts of data structures and algorithms.
2. To understand writing algorithms and making step by step approach in solving problems with the help of fundamental data structures.
3. To understand the applications of linear and nonlinear data structures.

Course Outcomes: At the end of this course, the student will be able to

1. Implement sorting and searching algorithms.
2. Understand the concept of ADT, identify data structures suitable to solve problems.
3. Develop and analyze algorithms for stacks, queues using arrays and linked list.
4. Develop algorithm for Binary trees, Balanced Trees, and Graphs.
5. Implement various Hashing and Collision Resolution Technique.

UNIT –I: INTRODUCTION TO DATA STRUCTURES, SEARCHING AND SORTING

Basic concepts: Introduction to data structures, classification of data structures - Linear and Non-Linear data structures, operations on data structures;

Searching techniques: Linear Search, Binary search, and Fibonacci Search;

Sorting Techniques: Quick Sort, Merge Sort and Heap Sort.

UNIT –II: LINEAR DATA STRUCTURES

Stacks: Stack ADT, definition and operations, Implementations of stacks using array, applications of stacks, Arithmetic expression conversion and evaluation;

Queues: Primitive operations; Implementation of queues using Arrays, applications of linear queue, circular queue, and double ended queue (deque).

UNIT –III: LINKED LISTS

Linked lists: Introduction, singly linked list, representation of a linked list in memory, operations on a single linked list; Applications of linked lists: Polynomial representation and sparse matrix manipulation.

Types of linked lists: Circular linked lists, doubly linked lists; Linked list representation and operations of Stack, linked list representation and operations of queue.

UNIT–IV: NON-LINEAR DATA STRUCTURES

Trees: Basic concept, binary tree, binary tree representation, array and linked representations, binary tree traversal, binary tree variants, threaded binary trees, application of trees.

Graphs: Basic concept, graph terminology, Graph Representations - Adjacency matrix, Adjacency lists, graph implementation, Graph traversals – BFS, DFS.

UNIT-V: BINARY TREES AND HASHING

Binary search trees: Binary search trees, properties, and operations; **balanced search trees**: AVL trees; Introduction to M-Way search trees, B trees;

Hashing and collision: Introduction, hash tables, hash functions, collisions, applications of hashing.

Text Books:

1. Aaron M. Tenenbaum, Yedidyah Langsam, and Moshe J. Augenstein, Data Structures Using C, Pearson Education India
2. Reema Thareja, Data Structures Using C, Oxford, Second Edition, 2014

References:

1. S. Lipschutz, "Data Structures", Tata McGraw Hill Education, 1st Edition, 2008. D.Samanta,"Classic DataStructures", PHILea

Course Code	Course Title						Core / Elective
SES0204EE	BASIC ELECTRICAL & ELECTRONICS ENGINEERING						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	3	–	–	–	40	60	3

Course Objectives:

1. To provide an understanding of basics in Electrical Circuits.
2. To understand the characteristics of diode and its applications.
3. To understand the design concepts of biasing of BJT.

Course Outcomes :

1. To analyze the electrical circuits using different theorems.
2. To analyze the AC circuits in terms of different parameters.
3. To understand the basic principles of Electrical Machines.
4. To Study Diode characteristics and applications as rectifiers and filters.
5. To analyze the characteristics of BJT and its applications.

Unit I – DC Circuits

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems

Unit II – AC Circuits

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

Unit III – Qualitative Analysis of Electrical Machines

Faradays laws, Fleming's right-hand and left hand rules, define transformer, motor, generator, principle of operation of transformer, motor and generator, types of motors and generators & their practical applications.

Unit IV – PN Junction Diode

Characteristics, Half wave rectifier, Full wave rectifier, filters, ripple, regulation, TIF and efficiency, Zener diode and Zener diode regulators, CRO block diagram and applications.

Unit V – Transistors

BJT construction and working, BJT voltages and currents, modes of operation, configurations and characteristics of BJT (CB, CE, CC), transistor acts as switch, applications of transistors.

Text Books:

1. J.B. Gupta, "Fundamentals of Electrical Engineering and Electronics" S.K. Kataria & Sons Publications, 2002.
2. Abhijit Chakrabarti, Sudipta Nath, Chandan Kumar Chanda, "Basic Electrical Engineering" Tata McGraw Hill, Publications, 2009.
3. Robert Boylestad L. and Louis Nashelsky, "Electronic Devices and Circuit Theory" PHI, 2007.

Reference Books:

1. A Sudhakar, Shyammohan S Palli, "Circuits and Networks", Tata McGraw-Hill, 4th Edition, 2010.
2. I J Nagrath, DP Kothari, "Electrical Machines", Tata McGraw-Hill publication, 3rd Edition, 2010.
3. Salivahanan, Suresh Kumar and Vallavaraj, Electronic Devices and Circuits, 2nd edition, Tata McGraw – Hill, 2010.

Course Code	Course Title						Core / Elective
SBS0912PH	APPLIED PHYSICS LAB						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	–	–	–	2	40	60	1

Course Objectives:

1. Apply the theoretical knowledge in doing practical experiments and acquire skills to handle instruments.
2. Understand the behavior of semiconductors and opto-electronic devices.
3. Analyze errors in experimental data.
4. Plot graphs between different physical parameters.

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

1. Relate theoretical knowledge to practical concepts by conducting experiments and can take measurements independently.
2. Know the working of different devices like solar cell, photocell, thermistor and learn their applications in day to day life.
3. Summarize the experimental findings appropriately in laboratory records.
4. Compute and compare experimental results, draw graphs, estimate and interpret results.

List of Experiments:

1. Determination of wavelength of laser using diffraction grating.
2. Determination of Numerical Aperture (NA) and Acceptance angle of an optical fiber and also to determine the power loss per meter of the cable.
3. To draw the I-V characteristics of P-N junction diode and to evaluate series resistance in forward and reverse bias conditions.
4. To draw the I-V characteristics of solar cell and to calculate fill factor.
5. To determine the constants A and B using Thermistor characteristics.
6. To find the value of energy gap of a given semiconductor.
7. To find the value of Plank's constant using photo cell.
8. To draw the curve between the magnetic field and Intensity of magnetization for a given specimen and to find out Coercivity and Retentivity of the specimen.
9. To determine the Phase transition temperature of the given dielectric.
10. Determination of carrier concentration, mobility and Hall co-efficient in a semiconductor using Hall Effect experiment.

Note: A minimum of eight experiments to be done in one semester.

Course Code	Course Title						Core / Elective
SHS0911EG	ENGLISH LAB (Common to all Branches)						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	–	–	–	2	40	60	1

Course Objectives: To enhance the listening and speaking skills of students by

1. Giving them sufficient practice in listening with comprehension and training them in the use of correct pronunciation, stress, and intonation
2. Sensitizing them to the use of verbal and non-verbal communication and encouraging them to learn the art of conversation to suit formal and informal situations.
3. Preparing them to make presentations and facilitating them to speak without inhibitions in order to improve their speaking skills.

Course Outcomes: On successful completion of the course, students will be able to:

1. Improve pronunciation skills by learning the phonemic system, word stress, rhythm and intonation of English phonetics (UNDERSTAND, REMEMBER APPLY)
2. Communicate effectively and appropriately using appropriate verbal and non verbal communication by participating in a situational context like role plays (ANALYZE, CREATE)
3. Develop their listening comprehension skills and perform effectively in competitive exams (CREATE, APPLY)
4. Face mock interviews confidently and demonstrate their verbal and soft skills (APPLY, CREATE)
5. Enhance participation skills and be able to explain and defend their opinions by participating in Group Discussions and Debates (UNDERSTAND, APPLY, CREATE)

UNIT-I

- Icebreaking activity - JAM
- Picture Perception
- Listening for Comprehension (Competitive exams – IELTS, TOEFL, PTE)

UNIT-II

- Phonetics (Vowels, Diphthongs and Consonant Sounds)
- Stress and Intonation
- British and American English: Vocabulary and Pronunciation

UNIT-II

- Phonetics (Vowels, Diphthongs and Consonant Sounds)
- Stress and Intonation
- British and American English: Vocabulary and Pronunciation

UNIT-III: Conversation Skills

- Introducing oneself to others
- Asking for and giving information
- Making requests and responding to them appropriately
- Giving instructions and responding to them appropriately

UNIT-IV: Group Activity:

- Group Discussion- Features and parts of a good GD
- Debate
- Role play

UNIT-V: Presentation Skills:

- Planning
- Preparing
- Practicing
- Presenting

Suggested Reading:

1. Board of Editors. Language and Life: A Skills Approach. Orient Black Swan, 2018.
2. Balasubramanian, T.A Textbook of English Phonetics for Indian Students. Macmillan, 1981.
3. CIEFL. Exercises in Spoken English. Parts. I-III. Oxford University Press.
4. Pillai, Radhakrishna G. Spoken English For You - Level II. 8th Edition. Emerald Publishers, 2014.
5. Sethi, J and PV Dhamija. A Course in Phonetics and Spoken English. 2nd Edition.
6. Prentice Hall India Learning Private Limited, 1999.
7. Kumar, T Vijay, K Durga Bhavani and YL Srinivas. English in Use: A Textbook for College Students. 2nd Edition. Macmillan Education India Private Limited, 2020

Course Code	Course Title						Core / Elective
SES0211CS	DATA STRUCTURES LAB						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
C Programming in C	–	–	–	4	40	60	2

Course Objectives:

1. Develop programs for various searching and sorting techniques.
2. Differentiate Linear and Non Linear Data Structures.
3. Implement various operations on trees and graphs.

Course Outcomes: At the end of the course student will be able to

1. Understand the concept of data structures, C Programming and apply algorithm for solving problems like Sorting, searching, insertion and deletion of data.
2. Understand linear data structures for processing of ordered or unordered data.
3. Explore various operations on dynamic data structures like single linked list and doubly linked list.
4. Explore the concept of nonlinear datastructures such as trees and graphs.
5. Understand the binary search trees, hash function, and concepts of collision and its resolution methods.

List of Experiments:

1. Write C programs for implementing the following searching techniques: Linear, Binary and Fibonacci search.
2. Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order: Merge, Quick and Heap Sort.
3. Write a C program to implement stack: using arrays and linked list.
4. Write a C program to implement queue: using arrays and linked list.
5. Write a C program that uses stack operations to convert a given infix expression into its post fix equivalent, implement the stack using an array.
6. Write a C program that uses stack operations to evaluate postfix expression, implement the stack using an array.
7. Write a C program to implement single linked list.
8. Write a C program to implement double linked list.
9. Write a C program for implementing Graph Traversal Techniques: Depth First Traversal and Breadth First Traversal.
10. Write a C program to create Binary Search Tree, perform insertion and traversal (in order, preorder, post order)
11. Write a C program to implement hashing.

Course Code	Course Title						Core / Elective
SES0912ME	ENGINEERING WORKSHOP						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	–	–	–	4	40	60	2

Course Objectives:

1. Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.
2. To provide hands on experience about use of different engineering materials, tools, equipment and processes those are common in the engineering field.
3. To gain basic knowledge on various manufacturing processes used for the production of various engineering products.
4. To gain hands on exposure on computer hardware and working knowledge on computers and software.
5. Adopt safety practices while working with various tools.

Course Outcomes:

1. Identify and demonstrate the usage of different tools to be used in various manufacturing trades with safety measures.
2. Apply the skills developed to undertake the jobs connected to various engineering workshop trades including fitting, carpentry, sheet metal, house wiring, welding, and foundry.
3. Demonstrate the knowledge of various machine tools and their operations such as machining, injection moulding, casing and 3D printing and basic electronics lab instruments.
4. Illustrate the advanced machining processes like CNC, rapid prototyping.
5. Apply the basic knowledge of computers to assemble and dissemble various components of computer and able to install various operating systems such as windows or Linux.

LIST OF EXPERIMENTS:

A. TRADE FOR EXERCISES:

1. Carpentry: Sawing and Grooving, T-lap joint and dove-tail joint.

2. Fitting: Square fitting, half round fitting, V-fitting.

3. House Wiring: Series wiring and parallel wiring by one way switch, two way switching for stair case light, tube light connections.

4. **Sheet Metal Working:** Open Scoop, Funnel, Rectangle tray and a cone.
5. **Welding:** Lap joint, single V-butt joint, T-joint, L-joint, corner joint.
6. **Plumbing: P**reparation of nipple and fitting to elbow, tee, union and coupling tap connection and shower connection.
7. **3D printing:** To print Square, Pyramid, Cube shapes.

B. TRADES FOR DEMONSTRATION AND EXPOSURE:

1. Machines (lathe and drilling)
2. Injection Moulding.
3. Mould making and casting.
4. Basic electronics lab instruments.

C. PRESENTATIONS AND VIDEOS LECTURES:

1. Manufacturing methods.
2. Glass cutting.
3. CNC lathe.

Note: Atleast two exercises from each trade.

Text / Reference / Additional Books:

1. Venugopal. K, "Workshop Manual", Anuradha Publicstions, Kumbakonam, TN, 2012.
2. K.C.John, "Mechanical Workshop" 2nd Edn., PHI, 2010.
3. Hajra Choudary, "Elements of Workshop Technology" Vol.1, Asian Publishers, Edu., 1993.
4. G.S.Sawhney, "Mechanical Experiments and Workshop Practice", I.K.International Publishing house, New Delhi, 2009.

Course Code	Course Title						Core / Elective
SES0214EE	BASIC ELECTRICAL & ELECTRONICS ENGINEERING (for CSE)						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
–	–	–	–	4	40	60	1

Course Objectives:

1. To impart the practical knowledge and analysis of on electrical circuits and theorems.\
2. To impart the practical knowledge on testing of diodes and transistors.

Course Outcomes :

1. Get an exposure to common electrical components and their ratings.
2. Analyze the performance of DC and AC Circuits.
3. To learn about the constructional features of different electrical machines.
4. Ability to analyze characteristics of Diodes.
5. To analyze the characteristics of BJT.

Suggested List of Laboratory Experiments/Demonstrations:

Demonstration of Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.

1. Verification of Mesh and Nodal analysis.
2. Verification of KVL and KCL,
3. Verification of superposition theorem.
4. Verification of Thevenin's and Norton's theorems.
5. Sinusoidal steady state response of R-L, and R-C circuits – impedance calculation and verification of phase differences between current and voltage and Power factor calculation.
6. Measurement of phase voltage/current, line voltage/current and power in a balanced three-phase circuit connected in star/delta.
7. CRO – Measurements such as amplitude, frequency and phase using function generator.
8. Characteristics of Semiconductors diode (Ge, Si and Zener).
9. Half-wave rectifier with and without filters.
10. Full-wave rectifier with and without filters.

11. Static characteristics of BJT – Common Emitter.
12. Transistor as a Switch.

Note: Minimum eight experiments should be conducted in the semester

Contents beyond the Syllabus:

1. Speed control of DC Shunt Motor using Armature and Field control methods.
2. Measurement of 3-phase power using Two-wattmeter method.

Suggested Reading:

1. J.B. Gupta, "Fundamentals of Electrical Engineering and Electronics" S.K. Kataria & Sons Publications, 2002.
2. J.B. Gupta, "Utilization of Electric Power and Electric Traction" S.K. Kataria & Sons Publications, 2010.
3. Satish Kumar Peddapelli, G. Sridhar, "Electrical Machines – A Practical Approach", De Gruyter Publications, 2020.
4. Hughes, "Electrical Technology", VII Edition, International Student - on, Addison Welsey Longman Inc., 1995.

Program Outcomes

1. **Engineering knowledge :** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem Analysis :** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions :** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems :** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern Tool Usage :** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The Engineer and Society :** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment & Sustainability :** Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics :** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and Team work :** Function effectively as an individual, and as a member or leader in diverse teams, and in multi disciplinary settings.
10. **Communication :** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project Management and Finance :** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.
12. **Life-long Learning :** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Strive for perfection in everything you do. Take the best that exists and make it better. When it does not exist, design it.

- Sir Henry Royce, English Engineer

Have courage to think differently, courage to invent, to travel the unexplored path, courage to discover the impossible to conquer the problems and succeed.

- APJ Abdul Kalam

STANLEY COLLEGE OF ENGINEERING AND TECHNOLOGY FOR WOMEN (AUTONOMOUS)

(Affiliated to Osmania University) (Accredited by NAAC with "A" Grade)

ABIDS, HYDERABAD - 500 001, Telangana.

CSE: Semester - III

Sl. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SBS0301MT	Mathematics III	4	-	-	4	40	60	3	4
2	SPC0301CS	OOPs using Java	3	1	-	4	40	60	3	4
3	SES0301EC	Logic Switching Theory	3	-	-	3	40	60	3	3
4	SPC0302CS	Computer Organization & Microprocessor	3	-	-	3	40	60	3	3
5	**SES0302EC**	Integrated Electronics	3	-	-	3	40	60	3	3
Practical/ Laboratory Courses										
6	SPC0311CS	OOPs using Java Lab	-	-	2	2	40	60	3	1
7	SPC0312CS	IT Workshop (SCI Lab/MATLAB Lab)	-	-	2	2	40	60	3	1
8	SES0312EC	Integrated Electronics Lab	-	-	2	2	40	60	3	1
9	SHS0912EG	Advanced Communication skills Lab	-	-	2	2	40	60	3	1
		Total	**16**	**1**	**8**	**25**	**360**	**540**	**27**	**21**

Course Code	Course Title						Core / Elective
SPC301CS	OOPS Using JAVA (Common to AI & DS, CSE & IT, CME III Sem)						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
SES101CS	3	–	–	–	40	60	4

Course Objectives:

1. To understand fundamentals of object-oriented programming in Java and create Java application programs using core concepts of OOP like interfaces, exception handling, multithreading, polymorphism, packages.
2. Use I/O streams for Input output operations in various streams and also perform serialization.
3. Explore Collection framework and also design GUI application with different layout managers with event handling.

Course Outcomes: At the end of this course, the student will be able to

1. Understand the concepts of classes, objects, and polymorphism.
2. Apply concepts of interfaces, user-defined packages during application development.
3. Develop Java Applications using Exception Handling and Multithreading concepts.
4. Compose programs using the Java Collection API.
5. Design GUI Application with Event Handling & Layout Designing concepts

UNIT-I

Introduction: OOP concepts, benefits of OOP, history of Java, data types,variables, scope and life time of variables, operators, expressions, control statements, type conversion and casting.

Classes and Objects: Concept of classes, objects, constructors, methods, this keyword, super keyword, garbage collection, overloading methods and constructors, parameter passing, Arrays String handling: String, StringBuffer, String Builder

2.

UNIT -II

Inheritance: Base class object, subclass, member access rules, super uses, using final with inheritance, method overriding, abstract classes.

Interfaces: Defining and implementing an interface, differences between classes and interfaces and extending interfaces Polymorphism.

Packages: Defining, creating and accessing a package, importing packages, exploring packages

UNIT -III

Exception handling: Concepts and benefits of exception handling, exception hierarchy, checked and unchecked exceptions, usage of-try, catch, throw, throws and finally, built in exceptions, creating User defined exceptions.

Multithreading: Difference between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNIT -IV

Basic I/O Streams: Java I/O classes and interfaces, Files, Stream and Byte classes, Character streams, Serialization Exploring java.lang: Object class, Wrapper classes Exploring java.util: Scanner, StringTokenizer.

Collections: Overview of Java Collection frame work, commonly used Collection classes – Array List, Linked List, Hash Set, Tree Set, Collection Interfaces – Collection, List, Set. Accessing Collection via iterator, working with Map.

UNIT -V

GUI Programming with Java: The AWT class hierarchy, MVC architecture.

Exploring Swing: JLabel, ImageIcon, JTextField, the Swing buttons, JTabbedpane, JScrollPane, JList, JComboBox.

Layout manager: Border, Grid, Flow, Card and Grid Bag Layouts.

Event Handling: Delegation Event Model, Event Classes, Source of Events, Event Listener Interfaces, Handling mouse and keyboard events, Adapter classes.

New Features in Java: Major enhancement made in Java5, Java6, Java7 and Java8 like auto-boxing, generics, var-args, java annotations, enum, lambda expressions, functional interface, method references.

Text Books:

1. Schildt and Herbert, Java The complete reference, McGraw, 9th edition, TMH.
2. E. Balagurusamy, Programming with Java, seventh edition, TataMcGraw Hill.
3. H. M. Dietel and P. J. Dietel, Java How to Program, Sixth Edition, Pearson Education
4. James M Slack, Programming and Problem Solving with JAVA, Thomson Learning, 2002.

References Books:

1. Dr R. Nageswara Rao, Core Java: An Integrated Approach, Dreamtech.
2. Prem Kumar, Getting Inside Java - Beginners Guide : Programming with Jav by,Notion Press.
3. Bert Bates, Kathy, Head First Java, Sierra Publisher: O'Reilly Media, Inc, 2nd Edition.
4. T. Budd, An Introduction to OOP, Pearson Education, second edition.

Course Code	Course Title						Core/Elective
SPC302CS	Computer Organization and Microprocessor						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
	3	-	–	–	40	60	3

Course Objectives:

The students will be able to

1. To impart the basic concepts of computer organization and design.
2. To understand the difference between microprocessor and microcontroller.
3. To understand 8085, 8051 architectures.

Course Outcomes:

After completion of this course, students will be able to

1. To understand various ways of representing data and data transfer through bus and register
2. To explore basic organization of computer components, various computer instructions and memory hierarchy.
3. To understand Micro programmed Control unit, Central processing unit and Pipelining Process.
4. To differentiate Micro Processor and Micro Controller.
5. To analyze 8085 and 8051 architectures, with their addressing modes and programming techniques.

UNIT-I

Data Representation: Fixed-and Floating-Point representations .Overview of Computer Function and Interconnections: Computer components, Interconnection structures, Bus interconnection, Bus structure, and Data transfer. Register Transfer Micro operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic, Logic and Shift micro operations, Arithmetic Logic Shift Unit.

UNIT-II

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory reference instruction, Input Output, and Interrupt.

2.

Microprogrammed Control: Control memory, Address Sequencing, Micro program example, Design of Control Unit.

UNIT-III

Central Processing Unit: General Register Organization, Stack Organization, Instruction formats, Addressing modes, Data Transfer and Manipulation, and Program control. Pipeline Processing: Arithmetic, Instruction and RISC Pipelines.

Memory Organization: Cache memory, Virtual memory, Memory Management hardware.

UNIT-IV

Assembly Language Programming: Introduction of microprocessors and microcontrollers, 8085 Processor Architecture, Internal operations, Instructions, and timings, 8085 instructions, Addressing modes. Assembly Language Programming in8085. 8086 Processor Architecture and Pin diagram.

Basic Interfacing concepts with 8085, Programmable Interrupt Controller (8259A).Direct Memory Access (DMA) –DMA Controller (Intel 8257)

UNIT-V

Introduction to Microcontrollers, 8051 – Architecture, Instruction set, Addressing modes and Programming techniques. Comparison of various families of 8-bit microcontrollers. Parallel Communication Interface (8255), Keyboard/ Display Controller (8279).

Text Books:

1. M Morris Mano, Computer System Architecture - Third Edition, PearsonEducationLimited
2. Ramesh S Gaonkar, Micro Processor and Peripherals - Sixth Edition, PenramPublications
3. A Kay Ray, K M Bhurchandi, Advanced Microprocessors and Peripherals – Second Edition, Mcgraw Hill Education.
4. Mohammed Ali Mazidi, Janice GillispeMazidi, Rolin D. McKinlay, The 8051 Micro Controller and Embedded Systems- Second Edition, Pearson

Reference Books:

1. William Stallings, Computer Organization and Architecture – Sixth Edition, Pearson/PHI.
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Computer Organization, Fifth Edition,

2- Ifad

McGraw Hill, 2002

3. P. Pal Chaudhuri, Computer Organization and Design - Third edition, PHI Publications

Course Code	Course Title						Core / Elective
SPC311CS	OOPS Using JAVA Lab (Common to AI & DS, CSE, IT & CME Sem III)						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
SPC301CS	–	–	–	3	40	60	1

Course Objectives:

1. To understand fundamentals of object-oriented programming in Java and Create Java application programs using core concepts of OOP like interfaces, exception handling, multithreading, polymorphism, packages.
2. Use I/O streams for Input output operations in various streams and also perform serialization.
3. Explore Collection framework and also design GUI application with different layout managers with event handling.

Course Outcomes: At the end of this course, the student will be able to

1. Understand the concepts of classes, objects, and polymorphism.
2. Apply concepts of interfaces, user-defined packages during application development.
3. Develop Java Applications using Exception Handling and Multithreading concepts.
4. Compose programs using the Java Collection API.
5. Design GUI Application with Event Handling & Layout Designing concepts

List of Experiments: Write Programs using Java Language

1. To implement the concept of class with method overloading
2. To implement the concept of Single level and Multi level Inheritance.
3. To create an interface Shape with the getArea() method. Create three classes Rectangle, Circle, and Triangle that implement the Shape interface. Implement the getArea() method for each of the three classes. (Using the concept of Interfaces).
4. To create an abstract class Shape with abstract methods calculateArea() and calculatePerimeter(). Create subclasses Circle and Triangle that extend the Shape class and implement the respective methods to calculate the area and perimeter of each shape. (Using the Abstract Class concept).
5. To implement Checked Exception (IOException).
6. To implement Unchecked Exceptions. (ArithmeticException, Null Pointer Exception, Array IndexOut Of Bounds Exception).

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7. To implement User defined exception handling. (ex: when user enters marks for a subject beyond the minimum and maximum range).
8. To create and start multiple threads that increment a shared counter variable concurrently. (Using the Multithreading Concept)
9. To implement the concept of Thread synchronization.
10. To create an Array List for adding, removing, printing, searching employee names.
11. To create a Linked List for adding, removing, printing, searching student names that are ordered by index position.
(addFirst(),addLast(),add(),remove(),removeLast(),peekLast()).
12. To create TreeMap of employee name and their age, print sorted employee data by employee name.
13. To create a Hash map that maps employee names to employee salary.
14. To execute iteration over Collection using Iterator interface and List Iterator Interface.
15. To read a file name from the user, and display information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
16. To copy contents of one file into another file using command line arguments. (Simulation of copy command).
17. To create an (Employee) object, serializes it, and then deserializes (serialization concept).
18. To implement event handler concept using mouse and key board events. (Optional program)
19. To design a simple application using swings, layout, event handling (basic calculator or sign-in screen or billing screen etc.) Optional program)

Text Books:

1. Schildt and Herbert, Java The complete reference, McGraw, 9th edition, TMH.
2. E. Balagurusamy, Programming with Java, seventh edition, TataMcGraw Hill.
3. H. M. Dietel and P. J. Dietel, Java How to Program, Sixth Edition, Pearson Education
4. James M Slack, Programming and Problem Solving with JAVA, Thomson Learning,2002.

References Books:

1. Dr R. Nageswara Rao, Core Java: An Integrated Approach, dreamtech.
2. Prem Kumar, Getting Inside Java - Beginners Guide : Programming with Java by,Notion Press.
3. Bert Bates, Kathy, Head First Java, Sierra Publisher: O'Reilly Media, Inc, 2nd Edition.
4. T. Budd, An Introduction to OOP, Pearson Education, second edition.

Software Required: Java 8

Text Books:

1. Schildt and Herbert, Java The complete reference, McGraw, 9th edition, TMH.
2. E. Balagurusamy, Programming with Java, seventh edition, TataMcGraw Hill.
3. H. M. Dietel and P. J. Dietel, Java How to Program, Sixth Edition, Pearson Education
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References Books:

1. Dr R. Nageswara Rao, Core Java: An Integrated Approach, Dreamtech.
2. Prem Kumar, Getting Inside Java - Beginners Guide : Programming with Jav by,Notion Press.
3. Bert Bates, Kathy, Head First Java, Sierra Publisher: O'Reilly Media, Inc, 2nd Edition.
4. T. Budd, An Introduction to OOP, Pearson Education, second edition.

Course Code	Course Title				Core/Elective
SPC312CS	ITWORKSHOP - SCI Lab				Core
Prerequisite	Contact Hours per Week			CIE	SEE	Credits
	L	T	D	P			
Basic Programming	3	-	-	-	40	60	1

Course Objectives:

1. To understand Practicing SCI Lab environment
2. To familiarize Command Window, History, Workspace, Current Directory, Figure window, Edit window, Shortcuts, Help files.
3. To know Plotting in Scientific Lab environment

Course Outcomes:

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

1. Work with Scientific Laboratory Environment.
2. Able to draw 2-D Plots
3. Apply programming skills to real time scenarios.
4. To develop real time applications
5. To implement different control structures.

List of experiments to be done:

1. Study of Basic Scilab Commands
2. Build Matrix Constructors and Operations
3. Implement Matrix Bitwise, Relational & Logical Operations
4. Write and execute programs that demonstrate on Control Structures (if-else, if elseif – else, select) using SCI Notes.
5. Write and execute programs that demonstrate on Control Structures (for, while, break and continue) using SCI Notes.
6. Determine Eigen Values and Eigen Vectors in SCI Lab.
7. Determine the roots of a polynomial in SCI Lab.
8. Plotting a plot on the graph - 2d Plots

2.

9. Civil Application Program: Develop a program that finds out whether a tank is over flowing or not with respect to the shape of the tank, its dimensions and rate of flow.

10. Civil Application Program: Write a program to find the structural stability of the given truss.

Software Requirement: Scilab Software – Version 5.5.2

SES0301EC	Logic Switching Theory (for III Sem. CSE)				Core		
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
	3	-	-	-	40	60	3

Course Objectives:

1. To describe the principles of digital hardware and support given by it to the software.
2. To explain the operation and design of combinational and arithmetic logic circuits.
3. To illustrate design of combinational circuits using PLDS.
4. To describe the sequential circuits using flip-flops.
5. To give insights of the hardware design for real world problems.

Course Outcome: On successful completion of the course, the students will be able to

1. Understand Boolean algebra to minimize the logical expressions and optimize the implementation of logical functions.
2. Understand the number representation and design combinational circuits like adders, MUX etc.
3. Design Combinational circuits using PLDS and write Verilog HDL code for basic gates and combinational circuits.
4. Analyze sequential circuits using flip-flops and design registers, counters.
5. Represent a sequential circuit using Finite State machine and apply state minimization techniques to design a FSM

UNIT – I

Design Concepts: Digital Hardware, Design process, Design of digital hardware. Introduction to logic circuits – Variables and functions, Logic gates and networks. Boolean algebra, Synthesis using gates, Design examples. Optimized implementation of logic functions using K-Map up to 5 Variable maps and Quine-McCluskey Tabular method

UNIT – II

Number representation: Addition and Subtraction of signed and unsigned numbers.

Combinational circuit building blocks: Adders and Subtractors, Multiplexers. De multiplexers, Parity Checkers and Generators, Decoders. Encoders. Code converters, BCD to 7-segment converter, Arithmetic comparator circuits. Design of combination logic using Verilog HDL

UNIT – III

Design of combinational circuits using Programmable Logic Devices (PLDs): General structure of aProgrammable Array Logic (PAL), Programmable Logic Arrays (PLAs), Structure of CPLDs and FPGAs, 2-input and 3-input Lookup Tables (LUTs)

UNIT – IV

Sequential Circuits: Basic Latch, Gated SR Latch, gated D Latch, Master-Slave edge triggered flip-flops, TFlip-flop, JK Flip-flop, Excitation tables. Registers and Counters. Design of FFs using Verilog

UNIT – V

Synchronous Sequential Circuits: Basic Design Steps, Finite State Machine (FSM) representation usingMoore and Mealy state models, State minimization, Design of FSM for Sequence Generation and Detection, Algorithmic State Machine charts.

Reference Books:

1. Moris Mano and Michael D CIletti, Digital Design, Pearson, fourth edition, 2008.
2. Zvi Kohavi, Switching and Finite Automata Theory, 3rd ed., Cambridge University Delhi, 2011

Course Code	Course Title						Core/Elective
SES0302EC	INTEGRATED ELECTRONICS (for III Sem. CSE)						Elective
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	-	-	-	40	60	3

Course Objectives:

1. To give insights of V-I characteristics of BJT configurations and feedback amplifiers
2. To comprehend the applications of Oscillators.
3. To Illustrate the working of multivibrators.
4. To illustrate V-I characteristics of FETs, MOSFETs and CMOS logics.
5. To familiarize with different types of Op amps and their characteristics

Course Outcomes: On successful completion of the course, the students will be able to

1. Analyze the CE amplifier and examine the effect of Negative Feedback amplifiers.
2. Illustrate the working principle of Oscillators.
3. Explain the working principles of Multi vibrators
4. Distinguish the operations of FETs, MOSFETs and CMOS.
5. Draw different models of Op-Amp according to desired needs.

UNIT-I:

Transistors: Working principle using h model in CE amplifier, Transistor as a Switch.

Feedback Amplifiers: The feedback concept, General characteristics of negative feedback amplifier, Effect of negative feedback on input and output impedances,

UNIT-II

Oscillators: Positive feedback and conditions for sinusoidal oscillations, RC oscillators, LC oscillators, Crystal oscillator, Amplitude and frequency stability of oscillator.

UNIT-III

Multi-vibrators: Working of Bistable Multivibrators and Schmitt trigger using transistors. Working of Monostable, Astable Multivibrators using transistors. (Qualitative analysis only)

UNIT-IV

Junction Field Effect Transistors (JFET): JFET formation, V-I characteristics of JFET.

MOSFETs: Enhancement & Depletion mode MOSFETs, Current equation, V-I characteristics.

CMOS: NAND and NOR Logic.

UNIT-V

Operational Amplifier: OPAMP Block diagram, ideal and practical OPAMP, DC and AC characteristics of OPAMP

OPAMP Applications (μA741): Inverting and Non-Inverting Amplifiers, Integrator and Differentiator, Summing amplifier, Precision rectifier.

Reference Books:

1. Linear Integrated Circuits , D.Roy Choudhury and Shail B. Jain 3rd Edition New Age International Publishers.
2. D. Neamen, D. Biswas , Semiconductor physics and Devices, McGraw –Hill education
3. S.M. Sze and K.N. Kwok, Physics of semiconductor devices , 3rd edition, John Wiley 7 sons,2006

Suggested Readings:

1. Robert Boylestad L. and Louis Nashelsky, Electronic Devices and Circuit Theory, PHI, 2015
2. Salivahanan, Suresh Kumar and Vallavaraj, Electronic Devices and Circuits, 2nd edition, Tata McGraw-Hill, 2010.
3. Ramakanth A. Gayakwad ,Op-amps and linear integrated circuits,4th edition,Pearson education,2015.

Course Code	Course Title						Core/Elective
SES0312EC	INTEGRATED ELCTRONICS LAB (for III Sem. CSE)						Elective
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	-	2	40	60	1

Course Objectives

1. To evaluate the performance of CE amplifier
2. To define the performance characteristics of multi-vibrators
3. To classify various oscillator circuits
4. To illustrate for FET characteristics.
5. To Describe the Characteristics of OP-AMPS and its applications

Course Outcomes: On successful completion of the course, the students will be able to

1. Examine the frequency response of the singe stage RC coupled amplifier using BJT
2. Interpret the application of Multivibrators
3. Explain the performance of oscillators
4. Understand the characteristics of FET in CS Configuration
5. Handle the Trainer kit and design the OP amp for different applications

List of Experiments

1. Single Stage RC Coupled CE BJT Amplifier
2. Design Transistor as a Switch
3. Collector Coupled Monostable Multivibrators
4. Collector Coupled Astable Multivibrators
5. Schmitt Trigger Circuit
6. RC Phase-Shift Oscillator
7. Hartley and Colpitts Oscillator.
8. V-I characteristics of FET in CS configuration
9. OPAMP Applications- I: Inverting, Non-inverting and Voltage Follower
10. OPAMP Applications- II: Integrator and Differentiator

Note: All Experiments are compulsory and minimum of three experiments should be performed on Multisim.

Suggested Readings:

1. Paul B. Zbar, Albert P. Malvino, *Michael A. Miller, Basic Electronics, A Text - Lab Manual,* 7th Edition, TMH 2001.
2. Electronic Devices Laboratory Manual of Stanley College of Engineering and Technology for Women.
3. Datasheets of Devices.
4. OP - AMPs and Linear Integrated Circuits, Ramakant A. Gayakwad, Prentice Hall of India, 1994.

ode	Course Title						Core / Elective
SBS301MT	**M-III (Probability and Statistics) (CSE,EEE,CME,AI&DS and IT)**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	3	1	-	-	**40**	**60**	4

Course Objectives

1. To familiarize the fundamentals of probability, random variables and distributions.
2. To comprehend the concepts of statistics and linear regression.
3. To make an inference about the population of interest on the basis of a random sample taken from that population.

Course Outcomes

1. Apply probability theory to solve practical problems.
2. Apply various probability distributions to solve practical problems.
3. Perform regression analysis and to compute and interpret the coefficient of correlation.
4. Able to formulate and testing a hypothesis using critical values to draw conclusions and determining probability of making errors in hypothesis tests.
5. Knowledge about large sample tests and its applications and get an idea of order statistics with its applications.

Unit I

Introduction of Probability: Conditional Probability, Theorem of total probability, Baye's theorem and its applications, Random variables, Types of Random Variables, Probability mass function and Probability density function, mathematical expectations, moments, skewness and Kurtosis.

Unit II

Discrete and Continuous probability distributions: Binomial, Poisson, Uniform, Normal and exponential. Mean, Variance, Moment generating function.

Unit III

Curve fitting by the method of least squares: Straight line, second degree polynomial and more general curves, Correlation, regression and Rank correlation.

Unit IV

Testing (Large sample):

Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

Unit V

Testing (Small sample):

Test for single mean, difference of means and correlation coefficient, test for ratio of variances, Chi-square test for goodness of fit and independence of attributes.

TEXT/REFERENCE/ADDITIONALBOOKS:

1. R.K.Jain and S.R.K.Iyengar "Advanced Engineering Mathematics", Narosa Publications
2. Dr.B.S, Grewal "Higher Engineering Mathematics", Khanna Publications
3. P. Sivaramakrishna Das & C.Vijaya Kumar, "Engineering Mathematics",Pearson India Education Services Pvt. Ltd.
4. N.P.Bali & M.Goyal, "A text Book of Engineering Mathematics", Laxmi Publications, 2010
5. S.C.Gupta & V.K.Kapoor, "Fundamentals of Mathematical Statistics", S.Chand Pub.

Chairperson
Board of Studies
Department of Mathematics
SCETW(A), Hyderabad.

Prof. N. Kishan (OU Nominee)

CSE: Semester - IV

Sl. No	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SPC0401CS	Mathematical Foundations for Computer Science	3	-	-	3	40	60	3	3
2	SPC0402CS	Theory of Computation	3	-	-	3	40	60	3	3
3	SPC0403CS	Database Management Systems	3	1	-	4	40	60	3	4
4	SHS0901BM	Managerial Economics & Financial Accountancy	3	-	-	3	40	60	3	3
5	SPC0404CS	Operating Systems	3	-	-	3	40	60	3	3
6	SHS0901CH	Environmental Sciences	2	-	-	2	50	-	-	0
Practical / Laboratory Course										
7	SPC0415CS	Python Programming Lab	3	-	2	2	40	60	3	4
8	SPC 0413CS	Database Management Systems Lab	-	-	2	2	40	60	3	1
9	SPC0414CS	Operating Systems Lab	-	-	2	2	40	60	3	1
10	SPW0421CS	Internship-1	The students have to undergo an Internship of 4-week duration after IV-Semester SEE				-	-	-	-
		Total	**20**	**1**	**06**	**23**	**370**	**480**	**24**	**22**

Course Code	Course Title						Core/Elective
SPC401CS	**Mathematical Foundations for Computer Science**						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
	3	-	-	-	40	60	3

Course Objectives: The course should enable the students to:

1. Solve the practical examples of sets, functions and relations.
2. Describe the logical and mathematical foundations, and study abstract models of computation.
3. Illustrate the limitations of predicate logic.
4. Define modern algebra for constructing and writing mathematical proofs.
5. Recognize the patterns that arise in graph problems and use this knowledge for constructing the trees and spanning trees.

Course Out comes: At the end of this course, the student will be able to

1. To understand the concepts associated with Mathematical Logic and Predicate calculus
2. Ability to learn the basic concepts about relations, functions and to draw different diagrams like Lattice, Hasse diagrams.
3. To understand the concepts of Algebraic Structures and Combinatorics.
4. To describe various types of recurrence relations and the methods to find out their solutions
5. To understand the basic concepts associated with Graphs and Trees.

UNIT I

Sets, Relation and Function: Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, lattices, Hasse diagram, Image of a Set, Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets

UNIT II

Mathematical logic: Statements and notations, connectives, well-formed formulas, truth tables, tautology, equivalence implication; Normal forms: Disjunctive normal forms, conjunctive normal forms, principle disjunctive normal forms, principle conjunctive normal forms.

UNIT II

Predicate calculus: Predicative logic, statement functions, variables and quantifiers, free and bound variables, rules of inference, consistency, proof of contradiction, automatic theorem proving.

UNIT IV

Algebraic structures: Algebraic systems, examples and general properties, semi groups and monoids, groups, sub groups, homomorphism, isomorphism, rings.

Combinatory: The fundamental counting principles, permutations, disarrangements, combinations, permutations and combinations with repetitions, the binomial theorem, multinomial theorem, Principle of inclusion exclusion, pigeon hole principle.

UNIT V

Graphs: Basic concepts of graphs, isomorphic graphs, Euler graphs, Hamiltonian graphs, planar graphs, graph coloring, digraphs, directed acyclic graphs, weighted digraphs, region graph, chromatic numbers

Trees: Trees, spanning trees, minimal spanning trees.

Text Books:

1. J. P. Tremblay, R. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill, India, 1st Edition, 1997.
2. Kenneth H. Rosen, "Discrete Mathematics and Its Applications", Tata Mcgraw-Hill, New Delhi, India, 6th Edition, 2012.

Reference Books:

1. Joe L. Mott, Abraham Kandel, Theodore P. Baker, "Discrete Mathematics for Computer Scientists and Mathematics", Prentice Hall of India Learning Private Limited, New Delhi, India, 2nd Edition, 2010.
2. D S Chandra shekaraiah," Mathematical Foundations of Computer Science", Prism Books Pvt. Ltd., 2nd Reprint, 2007.
3. C.L.Liu, D.P.Mohapatra, "Elements of Discrete Mathematics", Tata Mcgraw-Hill, India, 3rd Edition, 2008.
4. Ralph P.Grimaldi, B.V.Ramana,"Discrete and Combinatorial Mathematics-An Applied Introduction", Pearson Education, India, 5th Edition,2011.
5. D. S. Malik, M. K. Sen, "Discrete Mathematical Structures: Theory and Applications",Thomson Course Technology, India, 1st Edition,2004.

Course Code	Course Title						Core/Elective
S PC 402 CS	Theory of Computation						CORE
Prerequisite	**Contact Hours per Week**				**CIE**	**SEE**	**CREDITS**
	L	T	D	P			
Discrete Mathematics	3	1	-	-	40	60	3

Course Objectives: The students will be able to

1. To give an overview of the theoretical foundations of computer science from the perspective offormal languages
2. To illustrate finite state machines and push down automata to solve problems in computing
3. To familiarize Regular grammars, context frees grammar and context sensitive grammar

Course Outcomes:

After completion of this course, students will be able to

1. Gain the knowledge of basic kinds of finite automata and their capabilities.
2. Understand regular and context-free languages
3. Gain the knowledge to analyze regular expressions and grammars
4. Design finite automata, push down automata.
5. Constructing the Turing machine for Recursive languages.

UNIT-I

Automata: Introduction to Finite Automata, Central Concepts of Automata Theory. **Finite Automata**: An informal picture of Finite Automata, Deterministic Finite Automata, Nondeterministic Finite Automata, An Application, Finite Automata with Epsilon Transitions.

UNIT-II

Regular Expression And languages: Regular Expressions, Finite Automata and Regular Expression, Applications of Regular Expressions, Algebraic Laws for Regular Expression. **Properties of Regular Languages**: Proving Languages not to be Regular, Closure Properties of Regular Languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata. Finite Automata with outputs: Construction of Mealey and Moore machine

UNIT-III

Context Free Grammars and Languages: Context-Free Grammars, Parse Trees, Applications, Ambiguity in Grammars and Languages

Properties of Context Free Languages: Normal Forms for Context-Free Grammars, Pumping Lemma, Closure Properties, Decision Properties of CFL 's.

UNIT-IV

Pushdown automata: Definition, Model, Acceptance of CFL, Acceptance by Final State and acceptance by Empty stack and its Equivalence, Equivalence of CFG and PDA. **TURING MACHINES (TM)**: Formal definition and behaviour, Languages of a TM, TM as accepters, and TM as a computer of integer functions, Types of TMs.

UNIT-V

Recursive and recursively enumerable languages (rel): Properties of recursive and recursively enumerable languages, Universal Turing machine, The Halting problem,

Undecidable problems about TMs. Context sensitive language and linear bounded automata (LBA),Chomsky hierarchy, Decidability, Post's correspondence problem (PCP), undecidability of PCP.

Text Books:

1. John Hopcroft, Rajeev Motwani, Jeffery D Ulman. Introduction to Automata Theory Languages and Computation, third edition, Pearson Education, 2009.
2. John C. Martin, Introduction to Languages and the Theory of computation, third Edition, Tata McGrawHill,2003.
3. Thomas Sudkamp, *Languages and Machines: An Introduction to the Theory of Computer Science*. (Third Edition)

Reference Books:

1. K. L. P Mishra, N. Chandrashekaran (2003), Theory of Computer Science-Automata Languages andComputation, 4th edition, Prentice Hall of India, India.
2. kavi Mahesh, Theory of Computation A Problem solving approach, Wiley India Pvt. Ltd
3. Daniel I.A. Cohen, —Introduction to Computer Theory, John Wiley & Sons, 2nd Edition, 2004

Course Code	Course Title						Core / Elective
SPC403CS	**Database Management Systems**						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
SES101CS SES202CS	3	–	–	–	40	60	3

Course Objectives:

1. To get familiar with fundamental concepts of database managements and with database designing.
2. To master hands on SQL and PL/SQL concepts.
3. To impart knowledge in Indexing, hashing, transaction Management, concurrencycontrol techniques and recovery techniques.

Course Outcomes: At the end of this course, the student will be able to:

1. Understand the role of database management system in an organization and learnthe database concepts.
2. Construct database queries using relational algebra and SQL
3. Design databases using data modeling and Logical database design techniques.
4. Evaluating the indexing, hashing techniques and transaction management.

Understand the concept of a database transaction and related concurrent, recoveryfacilities.

UNIT – I

Introduction: Database-System Applications, Purpose of Database Systems,View of Data, Database Languages, E.F. Codd rules.

Relational Databases: Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Database Users and Administrators, History of Database Systems.

UNIT – II

Relational model: Structure of relational databases, fundamental relational-algebra operations.

Introduction to SQL: Overview of the SQL, SQL Data Definition, Basic Structure of SQLQueries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub queries, Modification of the Database.

Advanced SQL: Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Indexes and types of indexes. Functions, Procedures, Triggers, Cursors, Exceptions, and Packages.

UNIT – III

Database Design and the E-R Model: Overview of the Design Process, E-R Diagrams, Reduction to Relational Schemas, E-R Design Issues, Extended E-R Features.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Algorithms for Decomposition, 2NF, 3NF, BCNF and 4NF, **Denormalization, Overview and History of NoSQL Databases. Definition of the Four Types of NoSQL Database, NoSQL databases**.

UNIT – IV

Indexing and Hashing: Sparse index and dense index, static and dynamic hashing.

Transactions: Transaction Concept, A Simple Transaction Model, Storage Structure, Properties of a transaction, Serializability, Implementation of Isolation Levels, Transactions as SQL Statements.

UNIT – V

Concurrency Control: Lock-Based Protocols, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Weak Levels of Consistency in Practice.

Backup and Recovery System: Failure Classification, Storage structure, Recovery and Atomicity, log based recovery with concurrent transactions, Buffer Management, Failure withLoss of Nonvolatile Storage, advanced recovery techniques, Remote Backup Systems.

Text Books:

1. Abraham Silberchatz, Henry F Korth and Sudarshan S, "Database System Concepts",Tata McGraw- Hill, 7th Edition.
2. Raghu Ramakrishnan and Johannes Gehrke, "Database Management Systems", TataMcGraw-Hill, 3rd Edition.
3. RamezElmasri and Shamkant B Navathe, "Fundamentals of Database Systems", AddisonWesley, USA, 6th Edition
4. C J Date , "AN introduction to database systems", 8th Edition, Pearson.
5. Gupta G K, "Database Management System", Tata McGraw-Hill, New Delhi, 2011.

Reference Books:

1. The MySQL Workshop: A practical guide to working with data and managing databases with MySQL 1st Edition, Kindle Edition by Thomas Pettit (Author), Scott Cosentino (Author)

2. Learn SQL (using MySQL) in One Day and Learn It Well. SQL for Beginners with Hands-on Project. (Learn Coding Fast with Hands-On Project) by LCF Publishing (Author), Jamie Chan (Author)

3. MySQL: The Complete Reference (Osborne Complete Reference Series) Part of: Osborne Complete Reference by Vikram Vaswani

Course Code	Course Title						Core / Elective
SPC413CS	DATABASE MANAGEMENT SYSTEMS LAB						Core
	Contact Hours per Week				CIE	SEE	Credits
Pre Requisite	L	T	D	P			
-	-	-	-	4	40	60	2

Course Objectives:

The course should enable the students to :

1. To give a good formal foundation on the relational model ofdata.
2. To present SQL and procedural interfaces to SQLcomprehensively.
3. To give an introduction to systematic database designapproaches covering conceptual design, logical design and anoverview of physical design.

Course Outcomes:

1. Explain the underlying concepts of database technologies.Design and Implement a database schema for a givenproblem-domain
2. Understand, apply to normalize a database.
3. Populate and query a database using SQL DML / DDLcommands.
4. Declare and enforce integrity constraints on a database.
5. Understand to create triggers, cursor, procedures,

LIST OF EXPERIMENTS (Week Wise Plan):

Database Description: This lab enables the students to practice theconcepts learnt in the subject DBMS by developing a database for anexample company named ABC SHOPPINGwhosedescription is as given below. The student is expected to practice thedesigning, developing and querying a database in the context ofexample database "ABC SHOPPING". Students are expectedto use MySql database.

XYZ ONLINE SHOPPING is in business since 2010 with severalitems selling online across India. Its main office is located inHyderabad. The sellers has to register their products/items in orderto sell. The customer has to register before buying theproducts/items. The Provider will provide an environment to view theitems and provision to pay online or cash on delivery based upon the selling item.

Week 1: E-R Model

Analyze the problem carefully and come up with the entities in it.Identify what data has to be persisted in the database. This contains the entities, attributes etc. Identify the primary keys for all theentities. Identify the other keys like candidate keys, partial keys, ifany.

Example: Entities:

1. CUSTOMER
2. SELLER
3. ITEM
4. PROVIDER

PRIMARY KEY ATTRIBUTES:

1. ItemID (ITEM Entity)

2. CustID (CUSTOMER Entity)

Apart from the above mentioned entities you can identify more.

The above mentioned are only few.

Week 2: Concept design with E-R Model:Relate the entities appropriately. Apply cardinalities for eachrelationship. Identify strong entities and weak entities (if any).Indicate the type of relationships (total / partial). Try to incorporategeneralization, aggregation, specialization etc wherever required.

Week 3: Relational Model

Represent all the entities (Strong, Weak) in tabular fashion.Represent relationships in a tabular fashion. There are different ways

of representing relationships as tables based on the cardinality.Represent attributes as columns in tables or as tables based on the

requirement. Different types of attributes (Composite, Multi valued,and Derived) have different way of representation.

CustomerCustID Name Mail_ID Phone No.

Week 4: Normalization

Database normalization is a technique for designing relationaldatabase tables to minimize duplication of information and, in so

doing, to safeguard the database against certain types of logical orstructural problems, namely data anomalies. For example, when

multiple instances of a given piece of information occur in a table,the possibility exists that these instances will not be keptconsistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is lessvulnerable to problems of this kind, because its structure reflectsthe basic assumptions for when multiple instances of the sameinformation should be represented by a single instance only.You can do the second and third normal forms if required.

Week 5: Installation of Mysql and practicing DDLcommands

Installation of MySql. In this week you will learn Creatingdatabases, How to create tables, altering the database, droppingtables and databases If not required. You will also try truncate,rename commands etc.

Week 6: Practicing DML commands :DML commands are used to for managing data withinschema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for the recordsremain

Week 7: Querying

Practice queries (along withsub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION,

INTERSECT, Constraints etc.

Week8 & week 9: Querying (continued…)

Practice queries using Aggregate functions(COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING andCreation and dropping of Views.

Week 10: PL\SQL :Triggers

Triggers. Creation ofinsert trigger, delete trigger, update trigger. Practice triggers usingthe above database.

Week 11: PL\SQL:Procedures

Creation of stored procedure,Execution of procedure and modification of procedure. Practiceprocedures using the above database.

Week 12: PL\SQL:Cursors

In this week you will learn Declare a cursor that defines aresult set. Open the cursor to establish the result set. Fetch the datainto local variables as needed from the cursor, one row at a time.Close the cursor when done.

Week 13,14,15: Front End and Back End Communication.

Design a small front end Application and communicate with back end.Insert ,update, delete, query data from front end.Can use any suitable front end technologies (JDBC or ODBC etc) ,(java with mysql or python with mysqletc)

Text Books :

1. Abraham Silberchatz, Henry F Korth and Sudarshan S, "Database System Concepts", TataMcGraw-Hill, 7th Edition.
2. Raghu Ramakrishnan and Johannes Gehrke, "Database Management Systems", TataMcGraw-Hill, 3rd Edition.
3. RamezElmasri and Shamkant B Navathe, "Fundamentals of Database Systems", Addison Wesley,USA, 6th Edition
4. C J Date , "AN introduction to database systems", 8th Edition, Pearson.
5. Gupta G K, "Database Management System", Tata McGraw-Hill, New Delhi, 2011.

Reference Books:

4. The MySQL Workshop: A practical guide to working with data and managing databases with MySQL 1st Edition, Kindle Edition by Thomas Pettit (Author), Scott Cosentino (Author)

5. Learn SQL (using MySQL) in One Day and Learn It Well. SQL for Beginners with Hands-on Project. (Learn Coding Fast with Hands-On Project)by LCF Publishing (Author), Jamie Chan (Author)

6. MySQL: The Complete Reference (Osborne Complete Reference Series) Part of: Osborne Complete Reference by VikramVaswani

Course Code	Course Title						Core / Elective
SPC406CS	Operating Systems						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
	3	–	–	–	40	60	3

Course objectives: Students will be able:

1. To learn fundamentals of Operating Systems.
2. To understand the functions of Operating Systems.
3. To learn memory management.

Course Outcomes: After completion of this course, students will be able to:

1. Understand System calls and evaluate process scheduling.
2. Apply procedures for process synchronization.
3. Understand the concepts of deadlock
4. Implement the concepts of memory management
5. Understand file system interface and I/O systems

UNIT – I

Introduction: Batch, iterative, time sharing, multiprocessor, distributed, cluster and real- time systems, UNIX system introduction and commands.

Operating system structures: Computer system structure, Network structure, I/O Structure, Storage Structure, Dual mode operation, System components, Operating-System Services, System Calls, System Programs, System structure, Virtual Machines, System Design and Implementation, System Generation.

UNIT – II

Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching.

Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads.

Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling Criteria, Schedulingalgorithms, multiprocessor scheduling.

UNIT-III

Process Synchronization: Inter-process Communication: Critical Section, Race Conditions,Mutual Exclusion, Peterson‘s Solution, classical problems of synchronization: The Bounded buffer problem, Producer\Consumer Problem, reader‘s & writer problem, Dinning philosopher‘s problem. Semaphores, Event Counters, Monitors, Message Passing.

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Methods for Handling deadlocks: Deadlock prevention, Deadlock Avoidance: Banker‘s algorithm, Deadlock detection and Recovery.

UNIT – IV

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation, fragmentation, and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, structure of page table, Protection and sharing,Disadvantages of paging.

Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality ofreference, Page fault, Working Set, Dirty page/Dirty bit – Demand paging, Page Replacement algorithms, Trashing.

UNIT – V

File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods, Free-space management, directory implementation, efficiency, and performance.
Secondary-Storage Structure: Disk structure,Disk scheduling algorithms, Disk Management, RAID structure.

Text books:

1. Avi Silberschatz, Peter Galvin, Greg Gagne, Operating System Concepts Essentials,9th Edition, Wiley Asia Student Edition, 2017.
2. William Stallings, Operating Systems: Internals and Design Principles, 5th Edition, Prentice Hall of India, 2016.
3. Maurice Bach, Design of the Unix Operating Systems, 8th Edition, Prentice-Hall of India,2009.
4. Daniel P. Bovet, Marco Cesati, Understanding the Linux Kernel, 3rd Edition, O'ReillyandAssociates.
5. Naresh Chauhan, Principles of Operating Systems,Oxford University Press, 2014.

Reference Books:

1. Dhananjay Dhamdhere, Operating Systems A Concept approach, 3rd Edition, Mc GrawHill Education.
2. Deitel & Deitel (2008), Operating systems, 3rd edition, Pearson Education, India.

Course Code	Course Title						Core / Elective
SPC412CS	Operating System Lab						Core
Prerequisite	Contact hours per week				CIE	SEE	Credits
	L	T	D	P			
	–	–	–	3	40	60	1.5

Course Objectives: Students will be able:

1. Understand Unix commands.
2. Implement Process management related techniques.
3. Implement memory management techniques

Course Outcomes: After completion of this course, students will be able to:

1. Execute the Unix commands.
2. Implement CPU scheduling algorithms.
3. Implement producer-consumer problem reader-writers problem, dinning philosophers' problem.
4. Apply the Banker's algorithm for deadlock avoidance.
5. Implement page replacement and disk scheduling techniques.

1. Program to implement Unix system calls (fork(), wait(), exec(), sleep()) and filemanagement.
2. Program to implement multithread concepts.
3. Program to implement CPU scheduling algorithms: (i) FCFS (ii) SJF (iii) Round Robin
4. Program to implement Shared memory and Inter Process Communication (IPC)techniques.
5. Program to implement Process Synchronization for Dining Philosopher problem
6. Program to implement Process Synchronization for Producer-Consumer problem.
7. Program to implement Process Synchronization for Readers-Writers problem.
8. Program to implement deadlock detection.
9. Program to implement Bankers Algorithm for Deadlock Avoidance.
10. Program to implement the following Page Replacement Algorithms using FIFO
11. Program to implement the following Page Replacement Algorithms using LRU andLFU.
12. Program to implement FCFS Disk Scheduling Algorithm.
13. Program to implementSSTFDisk Scheduling Algorithms

Text Books:

1. Avi Silberschatz, Peter Galvin, Greg Gagne, Operating System Concepts Essentials, 9th Edition, Wiley Asia Student Edition, 2017.
2. Naresh Chauhan, Principles of Operating Systems,Oxford University Press,2014

Software required: C programming

Course Code	Course Title						Core/Elective
SPC411CS	**PYTHON PROGRAMMING**						Elective
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
Object-Oriented Programming	3	-	-	-	40	60	

Course Objectives:

1. Comprehend about Various Input, Output and Control flow statements of Python.
2. Handle Strings and Files, Understand Lists, Tuples in Python.
3. Understand Sets, Dictionaries, Functions, Modules and Regular Expressions in Python

Course Outcomes:

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

6. Examine Python syntax and semantics and be fluent in the use of various Operators of Python.
7. Make use of flow control statements and Input / Output functions of Python.
8. Demonstrate proficiency in handling Strings and File Systems.
9. Create, run and manipulate Python Programs using core data structures like Lists and Tuples.
10. Apply the core data structures like Sets and Dictionaries in Python Programming.

UNIT-I

Introduction: History of Python, Need of Python Programming, Applications.

data types: Numbers,Strings, Lists, Set, Tuple and Dictionaries.

Operators in Python: Arithmetic Operators, Comparison (Relational) Operators,Assignment Operators, Logical Operators, Bitwise Operators, Shift Operators, Ternaryoperator, Membership Operators, Identity Operators, Expressions and order of evaluations.**Input and Output statements**: input() function, reading multiple values from the keyboard in a single line, print() function, 'sep' and 'end' attributes, Printing formatted string, replacement operator ({}).

UNIT-II

Control flow statements: Conditional statements – if, if-else and if-elif-else statements. Iterative statements – for, while. Transfer statements – break, continue and pass. **Strings:** Introduction to strings, Defining and Accessing strings, **Operations on string** - String slicing, Mathematical Operators for String, Membership operators on string, Removing spaces from the string, Finding Substrings, Counting substring in the given String, Replacing a string with another string, Splitting of Strings, Joining of Strings, Changing case of a String, Checking starting and ending part of the string, checking type of characters present in a string

UNIT-III

Files: Opening files, Text files and lines, reading files, searching through a file, using try, except and open, Writing files, debugging.

Lists: Creation of list objects, Accessing and traversing the elements of list. **functions of list** – len(), count(), index(), append(), insert(), extend(), remove(), pop(), reverse() and sort(). **Operations on list:** Aliasing and

Cloning of List objects, Mathematical Operators for list objects, Comparing list objects, Membership operators on list, Nested Lists, List Comprehensions.

UNIT-IV

Tuples: Creation of Tuple objects, Accessing elements of tuple, Mathematical operators for tuple. **functions of Tuple** – len(), count(),index(), sorted(), min(), max(), cmp().Tuple Packing and Unpacking.

Sets: Creation of set objects, Accessing the elements of set. **functions of set** – add(), update(), copy(), pop(),remove(),discard(),clear().**Operations on set** - Mathematical Operators for set objects, Membership operators on list, Set Comprehensions.

Dictionaries: Creation of Dictionary objects, accessing elements of dictionary, **operations on Dictionary** - Updating the Dictionary, Deleting the elements from Dictionary. **functions of Dictionary** – dict(), len(), clear(), get(), pop(), popitem(), keys(), values(), items(), copy(), setdefault().

UNIT-V

Functions - Defining Functions, Calling Functions, Types of Arguments – KeywordArguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful functions (Function Returning Values), Scope of the Variables in a Function - Global andLocal Variables. Recursive functions, Illustrative examples on all the above topics.

Modules: Creating modules, import statement, from Import statement.

Regular Expressions: Character matching in regular expressions, Extracting data using regular expressions, Combining searching and extracting, Escape character.

Text Books:

1. Python for Everybody: Exploring Data Using Python 3, 2017 Dr. Charles R.Severance
2. Think Python, 2 Edition, 2017 Allen Downey, Green Tea Press.
3. Core Python Programming, 2016 W.Chun, Pearson.
4. Introduction to Python, 2015 Kenneth A. Lambert, Cengages.

Reference Books:

1. Core Python Programming.R. NageswaraRao, dreamtech.
2. Python Programming: A Modern Approach, VamsiKurama, Pearson.
3. Think Python: How to Think Like a Computer Scientist, Allen B. Downey, 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016.

Course Code	Course Title						Core/Elective
SPC411CS	**PYTHON PROGRAMMING LAB**						Elective
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
Object-Oriented Programming	3	-	-	-	40	60	3

Course Objectives:

4. Develop the skill of designing graphical-user interfaces (GUI) in Python.
5. Develop the ability to write database applications in Python.
6. Acquire Python programming skills to move into specific branches - Internet of Things (IoT), Data Science, Machine Learning (ML), Artificial Intelligence (AI) etc.

Course Outcomes:

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

1. Demonstrate the basic concepts of python programming with the help of data types, operators and expressions, console input/output.
2. Make use of control statements for altering the sequential execution of programs in solving problems.
3. Demonstrate operations on built-in container data types (list, tuple,set, dictionary) and strings
4. Solve the problems by using modular programming concepts through functions.
5. Identify object-oriented programming constructs for developing large, modular and reusable real-time programs.

Exercise 1

a) Installation and Environment setup of python.
b) Write a program to demonstrate the use of basic Data Types
c) Write a program to demonstrate the Operators and Expressions
d) Write a program to demonstrate the Functions and parameter passing Techniques.

Exercise 2

a) Write a Program to implement
i. Packages **ii**. Modules **iii**. Built-in Functions
b) Write a Program to implement
i. List **ii**. Tuple **iii**. Dictionaries
c) Programs on Stings, String Operations and Regular Expressions

Exercise 3

a) Write a Program to implement Class and Object
b) Write a Program to implement Static and Instance methods, Abstract Classes and Interfaces.

Exercise 4

a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)
b) Write a program to convert a given decimal number to other base systems

Exercise 5

a) Write a program to implement Inheritance
b) Write a program to implement Polymorphism

Exercise 6

a) Write a program to implement Files
b) Write a program to Exception Handling**.**

Exercise 7

Write a program to create a BankAccount class. Your class should support the following methods for

i) Deposit
ii) Withdraw
iii) GetBalanace
iv) PinChange.

UNIT - I

The Multidisciplinary Nature of Environmental Studies: Definition, Scope, and Importance, need for Public Awareness.
Natural Resources: Water resources: Use and over- utilization of surface and ground water, floods, drought, conflicts over water, dams: benefits and problems.
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer and pesticide problems, water logging, salinity.
Forest resources: Use and over – exploitation, deforestation, timber extraction, mining, dams and other effects on forest and tribal people.
Land resources: Land degradation, environmental effect of mining, man induced landslides, soil erosion and desertification.
Energy resources: Growing energy needs, renewable and non-renewable energy resources. Renewable and non-renewable energy sources.

UNIT - II
Ecosystem: Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in ecosystem, food chains, ecological pyramids, ecological succession, types of ecosystems (marine, pond, river, forest, grassland, desert).

UNIT - III
Biodiversity: Levels of Biodiversity, Bio-geographical classification of India, Value of biodiversity, Threats to biodiversity, endangered and endemic species of India, Conservation of biodiversity, global and national efforts.

UNIT - IV
Environmental Pollution: Definition, Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, thermal pollution, solid waste management.
Environment Protection Act: Air, water, forest and wildlife Acts, issues in the enforcement of environmental legislation.

UNIT - V
Social Issues and the Environment: Watershed management and environmental ethics. Climate change, global warming, acid rain, ozone layer depletion.
Environmental Disaster Management. Types of disasters, impact of disasters on environment, infrastructure, and development. Basic principles of disaster mitigation, disaster management, and methodology. Disaster management cycle and disaster management in India.