

FACULTY OF ENGINEERING

Scheme of Instructions & Detailed Syllabus of I Year

For

Four Year Degree Programme of

Bachelor of Engineering (B.E)

in

Information Technology

(With effect from the academic year 2021-22)

(Approved by College Academic Council on 14th July, 2021)

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 Information Technology, for their success in life

Mission of the Department

- M1:** Providing quality education and excellent environments for students to learn and practice various latest hardware, software and firmware platforms.
- M2:** To establish industry oriented training integrated with opportunities for team work, leadership.
- M3:** To groom students with values, ethics and social activities

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In

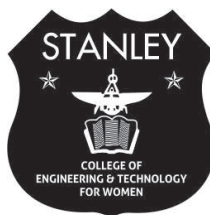
Information Technology

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Program Educational Objectives

- PEO1:** Graduates shall have enhanced skills and contemporary knowledge to adapt new software and hardware technologies for professional excellence, employment and Research.
- PEO 2:** Proficient in analyzing, developing and solving engineering problems to assist life-long learning and to develop team work.
- PEO 3:** To inculcate self-confidence, acquire professional and ethical attitude, infuse leadership qualities, impart proficiency in soft-skills, and the ability to relate engineering with social issues.

Program Specific Outcomes

- PSO1:** Acquire skills to design, analyze and implement algorithms using high-level programming languages.
- PSO2:** Contribute their engineering skills in information technology domains like operating systems, network design and web designing, database design and cloud computing.
- PSO3:** An ability to design and implement knowledge based discovery and machine learning by using the various concepts of digital system design, neural networks, internet of things.

BE - IT
(Full – Time)

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Scheme of Instructions

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 Courses
PE	Professional Elective Courses
OE	Open Elective Courses
PW	Project Work
MC	Mandatory Courses - Compulsory, Non credit Course
AC	Audit Courses - Non credit Course, Awareness Course
PY	Philosophy
EG	English
MT	Mathematics
PH	Physics
CH	Chemistry
ME	Mechanical Engineering
EC	Electronics and Communication Engineering.
CE	Civil Engineering,
IT	Information Technology
CS	Computer Science Engineering
EE	Electrical and Electronics Engineering
CM	Computer Engineering
AD	Artificial Intelligence and Data Science
L	Lecture - Each contact hour is a clock hour
T	Tutorial
P	Practical -The duration of the Practical class is two hours
G	Grade
D	Drawing
CIE	Continuous Internal Evaluation
SEE	Semester End Evaluation

INDUCTION PROGRAM

- ❖ Students come with diverse thoughts, backgrounds and preparations. It is important to assist them adjust in the new environment and inculcate in them the ethos of the institution with a sense of larger purpose. Keeping the above thought in mind AICTE proposes a 3-week induction program for the UG students entering the institution before the commencement of normal classes which will start only after the induction program is over.
- ❖ Its purpose is to make the students feel comfortable in their new environment, set a healthy daily routine, create bonding in the batch as well as between faculty, develop awareness, sensitivity and understanding of the self, society at large, and nature.
- ❖ The following are the activities under the induction program in which the student should be fully and actively engaged throughout the entire duration of the program.

BE (INFORMATION TECHNOLOGY)

SMC 900 IT Induction Program (Mandatory)	3 Weeks Duration
Induction program for students to be offered right at the start of the first year	<ul style="list-style-type: none">● Physical Activity● Creative Arts● Universal Human Values● Literary● Proficiency Modules● Lectures by Eminent People● Visits to local Areas● Familiarization to Dept Branch & Innovations

SEMESTER - I

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hours/Week	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SBS101MT	Mathematics-I	3	1	-	4	40	60	3	4
2	SBS904CH	Chemistry	3	-	-	3	40	60	3	3
3	SES 101CS	Programming for Problem Solving	3	-	-	3	40	60	3	3
4	SES901EC	Basic Electrical and Electronics Circuits	3	-	-	3	40	60	3	3
5	SMC903CE	Environmental Science	2	0	-	2	40	60	3	0
6	SAC902IT	Design Thinking	2	0	-	2	50	-	0	0
Practical / Laboratory Courses										
7	SBS913CH	Chemistry Lab			4	4	40	60	3	2
8	SES915ME	Engineering Graphics & Design	1	-	4	5	40	60	3	3
9	SES911EC	Basic Electrical and Electronics Circuits Lab	-	-	4	4	40	60	3	2
10	SES111CS	Programming for Problem Solving Lab	-	-	4	4	40	60	3	2
		Credits	17	0	16	34	410	540	-	22

SEMESTER - II

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hours/Week	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SHS901EG	English	2	-	-	2	40	60	3	2
2	SBS902PH	Applied Physics	3	-	-	3	40	60	3	3
3	SBS201MT	Mathematics-II	3	1	-	4	40	60	3	4
4	SPC201IT	Data Structures with C	3	-	-	3	40	60	3	3
5	SMC902PY	Essence of Indian Traditional Knowledge	2	-	-	2	40	60	-	-
6	SMC901PO	Indian Constitution	2	-	-	2	40	60	-	-
Practical / Laboratory Courses										
7	SHS911EG	English lab	-	-	2	2	40	60	3	1
8	SBS912PH	Applied Physics Lab			4	4	40	60	3	2
9	SES914ME	Workshop	-	-	6	6	40	60	3	3
10	SPC211IT	Data Structures with C Programming lab			2	2	40	60	3	1
11	SPW211IT	Field Work	The students have to undergo a Field work of 2 week duration after II- Semester SEE or during semester breaks.				50	-	-	1
		Total	15	0	14	30	450	600	24	20

SEMESTER - III

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hours/Week	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SBS302MT	Probability and statistics	3	-	-	3	40	60	3	3
2	SPC301IT	OOPS using JAVA	3	-	-	3	40	60	3	3
3	SES302EC	Digital Electronics & Logic Design	3	-	-	3	40	60	3	3
4	SPC301IT	Database Management Systems	3	-	-	3	40	60	3	3
5	SPC302IT	Discrete Mathematics	3	-	-	3	40	60	3	3
6	SAC903EE	Electrical Technology	2	-	-	2	50	-	-	-
Practical / Laboratory Courses										
6	SPC311IT	OOPS using JAVA Lab	-	-	3	3	40	60	3	1.5
7	SPC311IT	Database Management Systems Lab	-	-	3	3	40	60	3	1.5
8	SHS912EG	Soft Skills Lab	1	-	2	3	40	60	3	2
		Total	18	-	8	26	370	480	24	20

SEMESTER - IV

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hours/Week	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SES401EC	Techniques on Signals and Systems	3	-	-	3	40	60	3	3
2	SPC401IT	Theory of Automata	3	-	-	3	40	60	3	3
3	SPC402IT	Operating Systems	3		-	3	40	60	3	3
4	SES402EC	Fundamentals of Digital Image Processing	3	-	-	3	40	60	3	3
5	SPC404IT	Computer Organization and Microprocessor	3	-	-	3	40	60	3	3
Practical / Laboratory Courses										
6	SPC414IT	Python Lab	1		2	3	40	60	3	2
7	SPC412IT	Operating Systems Lab	-	-	3	3	40	60	3	1.5
8	SPC413IT	Microprocessor Lab	-	-	3	3	40	60	3	1.5
9	SPW511IT	Internship-1	The students have to undergo a Internship of 4 week duration after IV- Semester SEE				50	-		1
		Total	16	-	8	24	370	540	24	21

SEMESTER - V

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hours/Week	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SHS501BM	Finance & Accounting	3	-	-	3	40	60	3	3
2	SPC501IT	Compiler Construction	3	1	-	4	40	60	3	4
3	SPC502IT	Data Communications & Computer Networks	3	1	-	4	40	60	3	4
4	SPC503IT	Design and Analysis of Algorithms	3	-	-	3	40	60	3	3
5	SPE1501IT	PE-1	3	-	-	3	40	60	3	3
Practical / Laboratory Courses										
6	SPC511IT	Compiler Construction Lab	-	-	2	2	40	60	3	1
7	SPC512IT	Web Application Development Lab	1	-	3	4	40	60	3	2.5
8	SPC513 IT	Data Communications & Computer Networks Lab	-	-	3	3	40	60	3	1.5
		Total	16	2	8	26	320	480	24	22

SEMESTER - VI

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hours/Week	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SPC601IT	Embedded Systems	3	-	-	3	40	60	3	3
2	SPC602IT	Software Engineering	3	-	-	3	40	60	3	3
3	SPC603IT	Artificial Intelligence & Machine Learning	3	-	-	3	40	60	3	3
4	SPE-II	PE-II	3	-	-	3	40	60	3	3
5	SOE-I	OE-I	3	-	-	3	40	60	3	3
Practical / Laboratory Courses										
6	SPC611IT	Embedded Systems Lab	-	-	3	3	40	60	3	1.5
7	SPC612IT	Artificial Intelligence & Machine Learning Lab	-	-	3	3	40	60	3	1.5
8	SPW613IT	Mini Project Lab (Software Engineering)	-	-	4	4	40	60	3	2
9	SPW614IT	Technical Seminar	-	-	2	2	50	-	3	1
10	SPW611IT	Internship - 2 The students have to undergo a Internship of 4 week duration after VI- Semester SEE					50	-		1
		Total	15	-	12	27	420	480	24	22

SEMESTER - VII

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hours/Week	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SPC701IT	Internet of Things	3	-	-	3	40	60	3	3
2	SPE-III	PE-3	3	-	-	3	40	60	3	3
3	SPE-IV	PE-4	3	-	-	3	40	60	3	3
4	SPE-V	PE-5	3	-	-	3	40	60	3	3
5	SOE-II	OE-2	3	-	-	3	40	60	3	3
Practical / Laboratory Courses										
6	SPC711IT	Internet of Things LAB	-	-	4	4	40	60	3	2
7	SPE-III711IT	PE-III LAB	-	-	2	2	40	60	3	1
8	SPE-IV712IT	PE-IV LAB	-	-	2	2	40	60	3	1
9	SPW711IT	Project Work -1	-	-	6	6	50	-	-	3
		Total	15	-	14	29	370	480	24	22

SEMESTER - VIII

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hours/Week	CIE	SEE	SEE Duration in Hours	
Theory Courses										
1	SOE-III	Open Elective - III	3	-	-	3	40	60	3	3
Practical / Laboratory Courses										
2	SPW811IT	Project Work- 2	-	-	4	8	40	120	-	8
		Total	3	-	4	11	80	180	3	11

Professional Electives

Professional Elective - I	
SPE 521 IT	Network security & cryptography
SPE 522 IT	Computational Intelligence
SPE 523 IT	Advanced databases
SPE 524 IT	Wireless mobile communications
SPE 525 IT	Principles of Programming

Professional Elective - II	
SPE 621 IT	Information Security
SPE 623 IT	Natural Language Processing.
SPE 624 IT	Information retrieval systems
SPE 625 IT	Ad-hoc and Sensor Networks
SPE 626 IT	Parallel Algorithms

Professional Elective - III	
SPE 721 IT	Database Security
SPE 722 IT	Deep learning
SPE 723 IT	Data mining and Data ware housing
SPE 724 IT	Cloud computing
SPE 725 IT	PHP

Professional Elective - IV	
SPE 731 IT	IOT Security
SPE 732 IT	Big Data Analytics
SPE 733 IT	Data Science using R
SPE 734 IT	VLSI Design
SPE 735 IT	Agile Software Development

Professional Elective - V	
SPE 741 IT	Computer Forensics
SPE 742 IT	Semantic Web
SPE 743 IT	Data Science & Virtualization
SPE 744 IT	Block chain Technology
SPE 745 IT	Software Quality Assurance and Testing

Scheme of Instructions & Detailed Syllabus

S.No	Mandatory Course and Code	Mandatory Course -Subject Name
1	MC 904	Induction Program
2	MC 905 CE	Environmental Science
3	MC 906 PO	Indian Constitution
4	MC 907 PY	Essence of Indian Traditional Knowledge

S.No	Audit Course and Code	Audit Course -Subject Name
1	S AC901IT	Design Thinking
2	S AC902EE	Electrical Technology

List of Open Electives

Open Elective - I

S.No.	Course Code	Course Name	Course Offered By the Department
1.	SOE 901EE	Reliability Engineering	EEE
2.	SOE 901EC	Telecommunication Network Management	ECE
3.	SOE 901CS	Open Source Technologies	CSE/CME/AIDS
4.	SOE 901 HS	Industrial Safety & Disaster Management	H&S
5.	SOE 901 HS	Project and Proposal Writing	

Open Elective - II

S.No.	Course Code	Course Name	Course Offered By the Department
1	SOE902EE	Introduction to Renewable Energy Systems	EEE
2	SOE902EC	Medical Electronics	ECE
3	SOE 902CS	Quantum Computing	CSE / CME / AIDS
4	SOE902HS	Quantitative Analysis for Business Decisions [OR]	H & S
5	SOE902LW	Intellectual Property Rights	

Open Elective - III

S.No.	Course Code	Course Name	Course Offered By the Department
1	SOE 903EE	Energy Conservation and Management	EEE
2	SOE 903EC	Consumer Electronics	ECE
3	SOE903CS	Basics Of 3-D Printing	CSE / CME / AIDS
4	SOE903 HS	Basics of Entrepreneurship	H & S
5	SOE903CE	Industrial Pollution Prevention and Control	

List of open electives offered to other departments

S.No.	Course Code	Course Name	Course Offered By the Department
1	SOE901 IT	Database Management Systems	IT
2	SOE902IT	Software Engineering	IT
3	SOE903 IT	Python Programming	IT

First Year Syllabus

I Semester

MATHEMATICS - I

Course Code	Course Title						Core / Elective
SBS101MT	Mathematics - I (Differential Calculus and Numerical Methods)						Core
	Contact Hours per Week						
Pre Requisite	L	T	D	P	CIE	SEE	Credits
-	3	1	-	-	40	60	4

Course Objectives

1. To introduce the concepts of sequences, series, and their properties.
2. To introduce the concepts of functions of several variables and multiple integrals.
3. To study vector differential and integral calculus..

Course Outcomes

1. Find the nature of series and sequences.
2. Apply this knowledge to solve the curriculum problems.
3. Evaluate Multiple Integrals.
4. Solve the engineering problems using Numerical methods.

Unit - I

Sequence and series : Sequences - General properties of series, 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

Calculus of one variable : Rolle's theorem, Lagrange's, Cauchy's Mean value theorems, Taylor's series, Curvature, Radius of curvature, Circle of Curvature, Envelope of family of curves, Evolutes and Involutes.

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), Change of variables, Jacobian, Higher order partial derivatives, Taylor's series of functions of two variables, Maximum and minimum of values of functions of two variables, Lagrange's method of undetermined multipliers.

Unit - IV

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, polar and parametric co-ordinates, applications.

Unit - V

Numerical Methods : Solutions of Algebraic and transcendental equations-Bisection method, Regula falsi method, Newton Raphson method, Solutions of linear system of equations, Gauss- elimination method, Gauss-Seidel iteration method, Interpolation, Lagrange's Interpolation, Newton's Divided Difference interpolation, Newton's Forward and Back ward difference interpolations.

TEXT / REFERENCE / ADDITIONAL BOOKS :

1. Dr. B.S.Grewal, Higher. Engineering Mathematics, Khanna Publications, 43 Edition, 2014.
2. B.V.Ramana, Higher Engineering Mathematics, 23'dreprint, 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.
5. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley, 9 Edition, 2012.

CHEMISTRY

Course Code	Course Title					Core / Elective	
SBS904CH	Chemistry (AI & DS, CME, CSE, IT Branches)					Core	
	Contact Hours per Week				CIE	SEE	Credits
Pre Requisite	L	T	D	P			
-	3	-	-	-	40	60	3

Course Objectives

1. Acquire the knowledge of the materials and properties to understand the role of chemistry in engineering & technology.
2. Acquaint the students with water quality and treatment methods. Impart knowledge of corrosion and its significance
3. Know the conversion of chemical energy into electrical energy and its applications. Explore the knowledge of batteries and improvement.
4. Familiarizes with green fuels and various types of fuels, their industrial uses and effects on environment and importance of green fuels.
5. Importance of nano & composite materials in innovative of technologies.

Course Outcomes

1. Realises the importance of water quality and usefulness of knowledge of corrosion. (Knowledge)
2. Understands electrochemical process and their applications (Application)
3. Become aware of polymer science and conducting polymers, which create the tailor made conducting polymers (Knowledge)
4. Classify chemical fuels and grade them through qualitative analysis. (Knowledge, Analysis)
Acquire knowledge of important materials (Knowledge)

UNIT 1: Water Chemistry

Hardness of water, types of hardness, units of hardness, Determination of temporary & permanent hardness by EDTA method, Numericals. Alkalinity of water - its determination. Water softening by ion exchange and reverse osmosis methods, Boiler troubles-scale and sludge formation, effects and prevention. Specification of potable water. Sterilization by chlorination.

Corrosion and its Control

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, Surface coatings : Types of metallic coatings- anodic and cathodic coatings. Methods of application of metallic coatings- Hot dipping, galvanizing, tinning.

UNIT 2: Electrochemistry and Battery Chemistry

Electrochemistry: Electrochemical cells, Electrolytic and Galvanic cells-notation, cell reaction and cell potentials. Types of electrodes, Calomel Quinhydrone and Glass electrodes. Determination of pH of a solution by using Quinhydrone electrode. Thermodynamics of emf of cells, Nernst equation and its derivation. Applications of Nernst equation to electrode potential and emf of cells. Numerical problems.

Battery Chemistry :

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

Solar cells: Concept of Solar energy conversion, photovoltaic cells,

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

UNIT 3: Molecular Structure & Polymers

Molecular Structure: Linear Combination of atomic orbitals (LCAO), Molecular Orbital Theory, Molecular Orbital energy level diagrams of diatomic molecules- O_2 , N_2 , NO.

Polymer Chemistry: Fundamentals of Polymers, Nomenclature, types of Polymerization. Classification of polymers. Preparation, Properties and Applications of Plastics: PET and Bakelite, Elastomers: Buna-S and Silicone rubbers. Fibers: Kevlar

Biodegradable Polymers: Introduction preparation, properties and applications of polylactic acid

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

UNIT 4 : Chemical Fuels

Definition and classification of fuels, Requirements of good fuel,, Combustion : Ignition temperature of a fuel, calculation of air quantities by weight and volume required for the

combustion of the fuels. 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. Knocking, Fuel rating- Octane and Cetane numbers. Gaseous fuels-LPG, CNG composition and uses.

UNIT 5 : Engineering Materials

BioDiesel : Sources, concept of trans esterification, Applications of Biodiesels.

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

NanoMaterials : Introduction – Concept of Nonmaterials, types of Nanomaterials: Carbon nano tubes, Quantum dots, Nanowires, Nanocrystals.

Composite Materials : Introduction, Constituents of Composites, types and classification of composites, polymer matrix composite, metal matrix composite and ceramic matrix composites. Advantages and applications of composites.

Text Books :

1. P.C.Jain and M.Jain, Engineering Chemistry,Dhanapathi Rai publishing
2. Text Book of Engineering Chemistry bu 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. NewDelhi (Latest edition).
2. Engineering Chemistry by O G Palanna, TMH, and New Delhi.
3. Engineering Chemistry by Prasanta Rath, 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

PROGRAMMING FOR PROBLEM SOLVING

Course Code	Course Title					Core / Elective	
SES101CS	Programming for Problem Solving					Core	
	Contact Hours per Week				CIE	SEE	Credits
Pre Requisite	L	T	D	P			
-	3	-	-	-	40	60	3

Course Objectives

The course should enable the students to :

1. Learn adequate knowledge by problem solving techniques.
2. Understand programming skills using the fundamentals and basics of C Language.
3. Improve problem solving skills using arrays, strings, and functions.
4. Understand the dynamics of memory by pointers.
5. 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 and 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.

UNIT - II CONTROL STRUCTURES

Conditional Control structures: Decision statements; Simple if, if-else, else if ladder, Nested if and Case Statement-switch statement; Loop control statements: while, for and do while loops. jump statements, break, continue, goto statements

UNIT - III ARRAYS AND FUNCTIONS

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

UNIT - IV STRUCTURES, UNIONS AND POINTERS

Structures and unions: Structure definition, initialization, accessing structures, nested structures, arrays of structures, structures and functions, passing structures through pointers, self-referential structures, unions, bit fields, typedef, enumerations; Pointers: Pointer basics, pointer arithmetic, pointers to pointers, generic pointers, array of pointers, pointers and arrays, pointers as functions arguments, functions returning pointers. Dynamic memory allocation: Basic concepts, library functions.

UNIT - V FILE HANDLING AND BASIC ALGORITHMS

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, basic sorting algorithms (bubble, insertion, selection), algorithm complexity through example programs (no formal definitions required).

Text Books :

1. Byron Gottfried, “Programming with C”, Schaum’s Outlines Series, McGraw Hill Education, 3rd Edition, 2017.2. 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”, PHI Learning, 2nd Edition, 1988.
2. Yashavant Kanetkar, “Exploring C”, BPB Publishers, 2nd Edition, 2003.
3. Schildt Herbert, “C: The Complete Reference”, Tata McGraw Hill Education, 4th Edition, 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.

BASICS ELECTRICAL & ELECTRONIC CIRCUITS

Course Code	Course Title					Core / Elective	
SES901EC	Basics Electrical & Electronic Circuits					Core	
	Contact Hours per Week			CIE	SEE	Credits	
Pre Requisite	L	T	D	P			
-	3	-	-	-	40	60	3

Course Objectives :

The objectives of this course is to impart knowledge

1. To understand DC circuits and theorems.
2. To understand AC circuits with R,L and C elements.
3. To understand the characteristics of diodes and applications.
4. To understand the design concepts of biasing of BJT and FET
5. To understand the design concepts of feedback amplifiers and oscillators

Course Outcomes :

After completing this course, the student will be able to:

1. Study the DC circuits and theorems.
2. Study the AC circuits and RLC circuit analysis.
3. Study diode charecteristics and applications as rectifiers and Filters.
4. Study the characteristics of BJTand FET
5. Ability to analyse & design Feedback amplifiers and Oscillator circuits using OP-AMPs

Unit - I

DC Circuits : Electrical circuit elements (R, Land C), voltage and current sources, Kirchoff 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(seriesonly). Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT - III

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 - IV

Transistors : BJT construction and working, modes of operation, configurations of BJT (CB, CE, CC), small signal h-parameter model of CE, CE amplifier analysis. Construction and working of JFET, V-I characteristics of JFET.

UNIT - V

Feedback concepts : Types of negative feedback – modification of gain, bandwidth, input and output impedances.

OPAMP : Block diagram, specifications, Inverting & Non inverting amplifiers, Adder , Subtractor, Integrator, Differentiator, Comperator, RC Phase shift , Wein bridge and Crystal Oscillator (Qualitative Analysis only)

Suggested Reading :

1. Robert Boylestad L. and Louis Nashelsky, *Electronic Devices and Circuit Theory*, PHI, 2007
2. Helfrick D and David Cooper, *Modern Electronic Instrumentation and Measurements Techniques*, 1st edition, Prentice Hall of India, 2006.
3. Salivahanan, Suresh Kumar and Vallavaraj, *Electronic Devices and Circuits*, 2nd edition, Tata McGraw - Hill, 2010.
4. Ramakanth A. Gayakwad, *Op-amps and linear integrated circuits*, 4th edition, Pearson education, 2015.

ENVIRONMENTAL SCIENCE

Course Code	Course Title					Core / Elective	
SMC903CE	Environmental Science					Core	
	Contact Hours per Week				CIE	SEE	Credits
Pre Requisite	L	T	D	P			
-	2		-	-	40	60	0

Course Objectives

1. To create awareness and impart basic knowledge about the environment and its allied problems.
2. To know the functions of ecosystems.
3. To understand importance of biological diversity.
4. To study different pollutions and their impact on environment.
5. To know social and environment related issues, disasters and their preventive measures

Course Outcomes

At the end of the course, the students will be able to:

1. Explain the uses of natural resources and the problems and effects of their over exploitation
2. Define ecosystem and relate the various elements of its structure and their functions
3. Classify the different levels of biodiversity and infer its importance.
4. Explain the causes and effects of environmental pollution, and the environmental protection acts.
5. Describe the social issues and the relevant environmental ethics, and the disaster management principles.

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, flood, drought, conflicts over water, Dams: Benefits and Problems. Food Resources –World Food Problems, effects of modern agriculture, fertilizer-pesticides problems, water logging, salinity, Forest Resources – Use and over exploitation, deforestation & its effect on 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.

Unit - II

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.

Field Work : Visit to a local area to document environmental issues - agricultural area/pond/lake/terrestrial ecosystem. Visit to a local polluted area - market/slum area/Industrial area/traffic area.

TEXT / REFERENCE / ADDITIONAL BOOKS :

1. De Anil Kumar, “*Environmental Chemistry*”, New Age Publisher International Pvt Ltd, New Delhi , 2016
2. E.P. Odum, ‘*Fundamentals of Ecology*’, W.B. Saunders Co., USA.,1971
3. M.N. Rao and A.K. Datta, “*Waste Water Treatment*”, Oxford and IBK Publications, New Delhi, 2009.
4. Benny Joseph, “*Environmental Studies*”, Tata McGraw Hill, New Delhi, 2009
5. V.K. Sharma, “*Disaster Management*”, National Centre for Disaster Management, IPE, New Delhi, 1999

DESIGN THINKING

Course Code	Course Title						Core / Elective
SAC902IT	Design Thinking (Common to CSE, CME, IT and ADE)						Core Credits
	Contact Hours per Week						
Pre Requisite	L	T	D	P	CIE	SEE	
-	2	-	-	-	50	-	0

Course Objective :

The main objective of this course is to inculcate interdisciplinary engineering skills in students for taking real time engineering problem available in our society/industry and to come-up with the grass root innovation, can be helpful to all level of human beings.

Course Outcomes :

After completion of this course, student will be able to

1. Understand the importance of Design Thinking.
2. Evaluate the quality of your information and your emotions; keep thinking straight.
3. Identify skills and personality traits of successful problem solving.
4. Apply standard problem-solving heuristics to aid in problem solving.
5. Apply problem-solving techniques to programming activities.
6. Formulate and successfully communicate the solutions to problems.

Pre-requisite of course : Not Required.

Module 1 : Design Thinking Skills

Understand the critical design thinking skills needed to either improve an existing product or design a new product.

Module 2 : Identifying Customer Needs

Learn to identify customer needs and draft customer needs statements as your first step towards user innovations.

Module 3 : Product Specifications

Learn how to translate user needs into product specifications quantitatively, and how establishing product metrics can help to define those specifications.

Module 4 : Applied Creativity

Learn to apply creativity, brainstorming, and concept generation process in designing needs solutions.

Module 5 : Prototyping

Explore prototyping methods, strategies, and real-life examples where these have been applied to create a design that represents customer needs and product specifications.

Module 6 : Design for Services

Understand design of services, identify the potential for innovations within them, and learn how to apply product development frameworks to the service context

Module 7 : Product Architecture

Learn to use the modular and integral product architectures in determining the building blocks of a product

Module 8 : Financial Analysis

Learn to perform financial analysis of your project idea and decide if it is backed by a strong business rationale (Worth-It).

Module 9 : Design for Environment

Learn how to apply design for environment principles to a product life cycle.

Module 10 : Product Development Processes

Learn to select and implement a product development process (staged, spiral, and agile) that's aligned to your project needs.

References :

1. H. S. Fogler and S. E. LeBlanc, *Strategies for Creative Problem Solving*, 2nd edition, Pearson, Upper Saddle River, NJ, 2008.
2. A. Whimbey and J. Lochhead, *Problem Solving & Comprehension*, 6th edition, Lawrence Erlbaum, Mahwah, NJ, 1999.
3. M. Levine, *Effective Problem Solving*, 2nd edition, Prentice Hall, Upper Saddle River, NJ, 1994.

CHEMISTRY LAB

Course Code	Course Title					Core / Elective	
SBS913CH	Chemistry Lab (Common to all Branches)					Core	
Pre Requisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	-	4	40	60	2

Course Objective :

1. Apply the theoretical knowledge to experiments and acquire skills to handle.
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 :

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 and PH 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)

WATER ANALYSIS

1. Determination of hardness of water by EDTA method.
2. Determination of Carbonate and Bicarbonate Alkalinity.

CONDUCTANCE MEASUREMENTS

3. Determination of Cell constant
4. Estimation of Strong acid with strong base (HCl Vs NaOH)
5. Estimation of weak acid with strong base (CH₃COOH Vs NaOH)

POTENTIOMETRIC MEASUREMENTS

6. Estimation of HCl
7. Estimation of Ferrous ion

PH METRY

8. Determination of PH of solution using glass electrode

KINETIC STUDIES

9. Determination of rate constant of acid catalyzed hydrolysis of methyl acetate.

SYNTHESIS OF A DRUG MOLECULE

10. Synthesis of Aspirin

DISTRIBUTION STUDIES :

11. Determination of partition coefficient of acetic acid between Butanol and Water

PHYSICAL CONSTANTS :

12. Determination of Viscosity
13. Determination of Surface Tension

COLOROMETRY

14. Verification of Beer's Law and Estimation of the given potassium permanganate

Suggested Reading :

1. Senior Practical Physical 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 (Viaks Publishing, New Delhi)
3. Experiments in Applied chemistry, Sunita Rattan, S. K Kataria & Soms
4. Quantitative Inorganic chemistry by Vogel

ENGINEERING GRAPHICS AND DESIGN

Course Code	Course Title						Core / Elective
SES915ME	Engineering Graphics and Design						Core
Pre Requisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	1	-	4	-	40	60	3

Course Objectives

To prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

To prepare you to use the techniques, skills, modern engineering tools to use for Engineering practice.

Course Outcomes

1. Introduction to engineering design and its place in society
2. Exposure to the visual aspects of engineering design
3. Exposure to engineering graphics standards
4. Exposure to solid modelling
5. Exposure to computer-aided geometric design
6. Exposure to creating working drawings
7. Exposure to engineering communication

No	Discription	Lecture	Drawing
1.	Principles of Engineering Graphics and their significance, usage of drawing Instruments.	1	2
2	Conic Sections – I Construction of ellipse, parabola and hyperbola given focus and eccentricity.	1	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)	1	2

5	Involutes (involute of triangle, square & circle)		2
6	Scales (plain & diagonal scales)	1	2 + 2
7	Introduction to Auto CAD Basic commands and simple drawings.	1	2 + 2
8	Orthographic Projection Projections of points situated in different quadrants.	1	2
9	Projections of straight lines – I Line parallel to both the reference planes, line perpendicular or inclined to one reference plane.	1	2
10	Projections of straight lines – II Line inclined to both the reference planes.	1	2
11	Projections of planes – I Perpendicular planes	1	2
12	Projections of planes – II Oblique planes	1	2
13	Projections of solids – I Polyhedra and solids of revolution, Projections of solids in simple position.	1	2
14	Projection of solids – II Projections of solids when the axes inclined to one or both the reference planes.	1	2
15	Section of solids – I When the sectional plane is parallel or perpendicular to one reference plane.	1	2
16	Section of solids – II When the sectional plane is inclined to one reference plane.	1	2
17	Development of surfaces – I Prisms and Cylinders	1	2
18	Development of surfaces – II Pyramids and Cones	1	2
19	Intersection of surfaces – I Intersection of cylinder and cylinder	1	2
20	Intersection of surfaces – II Intersection of cylinder and cone	1	2
21	Isometric projection – I planes and simple solids	1	2
22	Isometric projection – II combination of two or three solids	1	2

TEXT / REFERENCE / ADDITIONAL BOOKS :

- T1** Elementary Engineering Drawing, ND Bhatt , Charotar publishers
- T2** Engineering Drawing KL Narayana & P Kannaya, Scitech publications
- R1** Engineering Drawing and Graphic Technology, T.E French et al, Mc Graw Hill International
- R2** Engineering Drawing Graphics & Auto cad, K Venugopal, New Age International
- R3** Engineering Drawing with a primer on Auto cad, AN Siddiquec et al, Prentice hall of India Ltd

BASICS ELECTRICAL & ELECTRONIC CIRCUITS LAB

Course Code	Course Title					Core / Elective	
SES901EC	Basics Electrical & Electronic Circuits Lab					Core	
	Contact Hours per Week			CIE	SEE	Credits	
Pre Requisite	L	T	D	P			
-	-	-	-	2	40	60	1

Course Objective :

The objectives of this course is to impart knowledge.

1. To understand and solve network theorems
2. To understand the characteristics of diodes and transistor configurations
3. To understand the design of an amplifier circuit.
4. To understand the design concepts of oscillators
5. To study the applications of OP- AMP

Course Outcomes :

After completing this course, the student will be able to:

1. Ability to solve and measure the network parameters
2. Ability to analyse characteristics of Diodes &BJTs.
3. Ability to design an amplifier circuits.
4. Ability to design the different oscillator circuits.
5. Ability to design OP-AMP applications.

List of Experiments :

1. State and prove Superposition Theorem.
2. State and prove Thevenin Theorem.
3. CRO-Measurements such as amplitude frequency and phase using function generator..
4. Characteristics of Semiconductors diode (Ge,Si and Zener)
5. Full-wave rectifier with and without filters
6. Static Characteristics of BJT-Common Emitter
7. Transistor as Switch
8. Common Emitter Amplifier
9. RC-Phase Shift Oscillator
10. Operational Amplifier Applications
11. OP_AMP zero crossing detector
12. Strain Gauge Measurement

Suggested Reading :

1. Maheshwari and Anand, *Laboratory Experiments and PSPICE Simulations in Analog Electronics*, 1st edition, Prentice Hall of India, 2006.
2. David Bell A., *Laboratory Manual for Electronic Devices and Circuits*, Prentice Hall of India, 2001.

PROGRAMMING FOR PROBLEM SOLVING LABORATORY

Course Code	Course Title					Core / Elective	
SES111CS	Programming for Problem Solving Laboratory					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 :

- I. Formulate problems and implement algorithms using C programming language.
- II. Develop programs using decision structures, loops and functions.
- III. Learn memory allocation techniques using pointers.
- IV. Use structured programming approach for solving of computing problems in 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, preprocessor directives, pointers and files.
5. Understand the concept of file handling functions, searching and sorting methods and real time applications of C.

LIST OF EXPERIMENTS

Week-1 OPERATORS AND EVALUATION OF EXPRESSIONS

- a. Write a C program to check whether a number is even or odd using ternary operator.
- b. Write a C program to perform the addition of two numbers without using + operator.
- c. Write a C program to evaluate the arithmetic expression $((a + b / c * d - e) * (f - g))$. Read the values a, b, c, d, e, f, g from the standard input device.
- d. Write a C program to find the sum of individual digits of a 3 digit number.
- e. Write a C program to read the values of x and y and print the results of the following expressions in one line:
 - i. $(x + y) / (x - y)$ ii. $(x + y)(x - y)$

Week-2 CONTROL STRUCTURES

- a. Write a C program to find the sum of individual digits of a positive integer.
- b. A Fibonacci sequence is defined as follows : The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- c. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
- d. A character is entered through keyboard. Write a C program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol using if-else and switch case. The following table shows the range of ASCII values for various characters.

Characters ASCII values

A – Z 65 – 90

a – z 97 – 122

0 – 9 48 – 57

Special symbols 0 – 47, 58 – 64, 91 – 96, 123 – 127

If cost price and selling price of an item is input through the keyboard, write a program to determine whether the seller has made profit or incurred loss. Write a C program to determine how much profit or loss incurred in percentage.

Week-3 CONTROL STRUCTURES

- a. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use switch statement).
- b. Write a C program to calculate the following sum: $sum = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$
- c. Write a C program to find the roots of a quadratic equation.
- d. Write a C program to check whether a given 3 digit number is Armstrong number or not.
- e. Write a C program to print the numbers in triangular form

1

1 2

1 2 3

1 2 3 4

Week-4 ARRAYS

- a. Write a C program to find the second largest integer in a list of integers.
- b. Write a C program to perform the following:
 - i. Addition of two matrices
 - ii. Multiplication of two matrices
- c. Write a C program to count and display positive, negative, odd and even numbers in an array.
- d. Write a C program to merge two sorted arrays into another array in a sorted order.
- e. Write a C program to find the frequency of a particular number in a list of integer.

Week-5 STRINGS

- a. Write a C program that uses functions to perform the following operations:
 - i. To insert a sub string into a given main string from a given position.
 - ii. To delete n characters from a given position in a given string.
- b. Write a C program to determine if the given string is a palindrome or not.
- c. Write a C program to find a string within a sentence and replace it with another string.
- d. Write a C program that reads a line of text and counts all occurrence of a particular word.
- e. Write a C program that displays the position or index in the string S where the string T begins, or 1 if S doesn't contain T.

Week-6 FUNCTIONS

- a. Write C programs that use both recursive and non-recursive functions
 - i. To find the factorial of a given integer.
 - ii. To find the greatest common divisor of two given integers.
- b. Write C programs that use both recursive and non-recursive functions
 - i. To print Fibonacci series.
 - ii. To solve towers of Hanoi problem.
- c. Write a C program to print the transpose of a given matrix using function.
- d. Write a C program that uses a function to reverse a given string.

Week-7 POINTERS

- a. Write a C program to concatenate two strings using pointers.
- b. Write a C program to find the length of string using pointers.
- c. Write a C program to compare two strings using pointers.

- d. Write a C program to copy a string from source to destination using pointers.
- e. Write a C program to reverse a string using pointers.

Week-8 STRUCTURES AND UNIONS

- a. Write a C program that uses functions to perform the following operations:
 - i. Reading a complex number
 - ii. Writing a complex number
 - iii. Addition and subtraction of two complex numbers
 - iv. Multiplication of two complex numbers. Note: represent complex number using a structure.
- b. Write a C program to compute the monthly pay of 100 employees using each employee's name, basic pay. The DA is computed as 52% of the basic pay. Gross-salary (basic pay + DA). Print the employees name and gross salary.
- c. Create a Book structure containing book_id, title, author name and price. Write a C program to pass a structure as a function argument and print the book details.
- d. Create a union containing 6 strings: name, home_address, hostel_address, city, state and zip. Write a C program to display your present address.
- e. Write a C program to define a structure named DOB, which contains name, day, month and year. Using the concept of nested structures display your name and date of birth.

Week-9 ADDITIONAL PROGRAMS

- a. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: $1+x+x^2+x^3+\dots+x^n$. For example: if n is 3 and x is 5, then the program computes $1+5+25+125$. Print x, n, the sum. Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if $n < 0$, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.
- b. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
- c. Write a C program to convert a Roman numeral to its decimal equivalent. E.g. Roman number CD is equivalent to 400.

Week-10 PREPROCESSOR DIRECTIVES

- a. Define a macro with one parameter to compute the volume of a sphere. Write a C program using this macro to compute the volume for spheres of radius 5, 10 and 15 meters.

- b. Define a macro that receives an array and the number of elements in the array as arguments. Write a C program for using this macro to print the elements of the array.
- c. Write symbolic constants for the binary arithmetic operators +, -, *, and /. Write a C program to illustrate the use of these symbolic constants.

Week-11 FILES

- a. Write a C program to display the contents of a file.
- b. Write a C program to copy the contents of one file to another.
- c. Write a C program to reverse the first n characters in a file, where n is given by the user.
- d. Two files DATA1 and DATA2 contain sorted lists of integers. Write a C program to merge the contents of two files into a third file DATA i.e., the contents of the first file followed by those of the second are put in the third file.
- e. Write a C program to count the no. of characters present in the file.

Text Books :

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

Reference Books :

1. B. A. Forouzan, R. F. Gillberg, "C Programming 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 McGraw 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, 2014.

Web References:

1. <https://www.bfoit.org/itp/Programming.html>
2. <https://www.khanacademy.org/computing/computer-programming>

3. <https://www.edx.org/course/programming-basics-iitbombayx-cs101-1x-0>
4. <https://www.edx.org/course/introduction-computer-science-harvardx-cs50x>

E-Text Books :

1. <http://www.freebookcentre.net/Language/Free-C-Programming-Books-Download.htm>
2. <http://www.imada.sdu.dk/~svalle/courses/dm14-2005/mirror/c/>
3. <http://www.enggnotebook.weebly.com/uploads/2/2/7/1/22718186/ge6151-notes.pdf>

II SEMESTER

ENGLISH

Course Code	Course Title					Core / Elective	
SES901EG	English (Common to all Branches)					Core	
	Contact Hours per Week				CIE	SEE	Credits
Pre Requisite	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 and exposing them to a variety of content-rich texts
2. strengthening their grammar and vocabulary
3. improving their reading and comprehension skills
4. honing their existing writing skills
5. 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, critical thinking skills and motivate themselves to understand their goals and dreams through reading (ANALYZE, EVALUATE)
3. Improve their writing skills for competitive exams by learning the different types of writings (UNDERSTAND)
4. Learn to write effectively for the social media and for their career advancement (UNDERSTAND, APPLY)
5. Use inclusive language and demonstrate empathy and treat all people with respect, dignity, and impartiality. (UNDERSTAND, APPLY)

UNIT	DETAILS
I	Reading: On the Conduct of Life - William Hazlitt Vocabulary: Word formation - part I - Prefixes, Suffixes, Root words Grammar: Articles, Prepositions, Degrees of comparison Writing: Guided Writing (Expanding the outline / Writing from verbal cues), Paragraph writing
II	Reading: If-by Rudyard Kipling Vocabulary: Word formation – part II Compounding, Blending, and Contractions Grammar: Transitions, Connectives, Tense Writing: Types of writing - I: Expository, Descriptive
III	Reading: Martin Luther King Jr., “I Have a dream” Vocabulary: Synonyms, Antonyms, One-word substitutes Grammar: Narration (Direct - Indirect speech) Writing: Types of writing - II: Persuasive, Narrative
IV	Reading: Road Not Taken – Robert Frost Vocabulary: Words often confused Grammar: Voice Writing: Argumentative Writing
V	Reading: Blog Vocabulary: Inclusive Language, Euphemisms Grammar: Common errors Writing: Writing for social media (Blog, Vlog, Instagram, Twitter)

Suggested Reading

1. Board of Editors. Language and Life: A Skills Approach. Orient Black Swan, 2018.
2. Sudharshana, NP and C Savitha. English for Engineers. Cambridge University Press, 2018.
3. Kumar, Sanjay and Pushp Lata. English Language and Communication Skills for Engineers. Oxford University Press, 2018.
4. Practical English Usage by Michael Swan, Oxford University Press 4th edition 2017

APPLIED PHYSICS

Course Code	Course Title					Core / Elective	
SBS902PH	Applied Physics (Common to CSE, IT, AI & DS and CME)					Core	
	Contact Hours per Week				CIE	SEE	Credits
Pre Requisite	L	T	D	P			
-	3	-	-	-	40	60	3

Course Objectives :

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

Course Outcomes :

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

Unit - I :

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 :

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, Ferroelectricity - 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 - III :

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 - IV :

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.

Semiconductors : Introduction, Intrinsic and extrinsic semiconductors, carrier concentration and conductivity in intrinsic semiconductors, formation of P-N junction diode and its I-V characteristics, Photo cell, Thermistor, Hall effect and its applications.

Unit - V :

Thin Films : Distinction between bulk and thin films - Thin films preparation Techniques- Thermal evaporation methods & Electron beam evaporation method, Construction and working of solar cell - Applications.

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 and their health hazards.

Text Books :

1. B. K. Pandey and S. Chaturvedi, Engineering physics, Cengage Publications.
2. D. K Bhattacharya and Poonam Tandon, Engineering Physics, First Edition, Oxford University Press. Online
3. M. Arumugam Materials Science, Anuradha Publications.
4. G. Aruldas, Quantum Mechanics, 2nd Edition, Eastern Economy Edition.
5. S.O.Pillai, Solid State Physics, 4th Edition, New Age International Publishers.
6. A. Goswami, Thin Film Fundamentals, New Age International Publishers.
7. Charles P Poole, Jr., Frank J. Owens, Introduction to NanoTechnology, Student Edition, Wiley-India.

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. K. L. Chopra, Thin film Phenomena, Mc Graw Hill, Newyork.
5. Nano materials and their Applications, Book series, Springer.

MATHEMATICS - II

Course Code	Course Title					Core / Elective	
SBS201MT	Mathematics - II (Differential Equations, Matrices and Laplace Transforms)					Core	
	Contact Hours per Week				CIE	SEE	Core Credits
Pre Requisite	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.
3. To study special functions like Legendre, Beta and Gamma functions.
4. To learn Laplace transforms and its properties.

Course Outcomes :

1. Solve system of equations and eigen value problems.
2. Solve certain first order and higher order differential equations.
3. Solve basic problems of Beta, Gamma and Legendre's Function.
4. Apply Laplace transforms, solve ordinary differential equations by using it.

Unit - I

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, Applications of differential equations-L-C, L-R circuit.

Unit - II

Differential Equations of Higher Order : Solutions of second and higher order linear Homogenous Equations with Constant Coefficients, Method of reduction of order for the linear homogeneous second order differential equations with variable coefficients, Solutions of non-homogeneous linear differential equations, Method of Variation of Parameters, solution of Euler-Cauchy Equation, Applications of differential equations-L-CR circuit.

Unit - III

Special functions : Gamma Function, Beta Function, Relation between Gamma and Beta Functions, Error Function, Power Series Method, Legendre's Differential Equations and Legendre's Polynomial $P_n(x)$, Orthogonal property of Legendre's Polynomial Rodrigue's Formula (with proof).

Unit - IV

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

Unit - V

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.

TEXT / REFERENCE / ADDITIONAL BOOKS :

1. Dr. B. S. Grewal, Higher Engineering Mathematics, Khanna Publications, 43rd Edition, 2014.
2. B.V. Ramana, Higher Engineering Mathematics, 23rd 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

DATA STRUCTURES USING C

Course Code	Course Title					Core / Elective	
SES202IT	Data Structures using C					Core	
	Contact Hours per Week			CIE	SEE	Credits	
Pre Requisite	L	T	D	P			
-	3	-	-	-	40	60	3

Course Objectives :

The students will try to learn :

1. To provide students with skills needed to understand and analyze performance trade-offs of different algorithms / implementations and asymptotic analysis of their running time and memory usage.
2. To provide knowledge of basic abstract data types (ADT) and associated algorithms: stacks, queues, lists, tree, graphs, hashing and sorting, selection and searching.
3. The fundamentals of how to store, retrieve, and process data efficiently.
4. To provide practice by specifying and implementing these data structures and algorithms in C.
5. Understand essential for future programming and software engineering courses.

Course Outcomes :

After successful completion of the course, students will be able to:

1. **Carryout** the analysis of a range of algorithms in terms of algorithm analysis and express algorithm complex it using the O notation (**Understand**).
2. **Make use** of recursive algorithm design technique in appropriate contexts (**Apply**).
3. **Represent** standard ADTs by means of appropriate data structures (**Understand**).
4. **Select** appropriate sorting technique for given problem (**Understand**).
5. **Select** appropriate searching technique for given problem (**Understand**).
6. **Implement** standard searching and sorting algorithms; including binary search; merge sort and quick sort; and their complexities (**Apply**).
7. Design and **implement** linked lists, stacks and queues in C (**Apply**).
8. **Explain** the use of basic data structures such as arrays, stacks, queues and linked lists in program design (**Understand**).
9. **Extend** their knowledge of data structures to more sophisticated data structures to solve problems involving balanced binary search trees, AVL Trees, B-trees and B+ trees, hashing, and basic graphs.

10. **Design** and implement tree structures in C (**Apply**).
11. **Compare** and contrast the benefits of dynamic and static data structures implementations and choose appropriate data structure for specified problem domain (**Understand**).
12. Quickly **determine and explain** how efficient an algorithm or data structure will be, apply appropriate data structures for solving computing problems with respect to performance (**Analyze**).

UNIT - I

INTRODUCTION TO DATA STRUCTURES, SEARCHING AND SORTING

Basic Concepts : Introduction to data structures, classification of data structures, operations on datastructures; Algorithm Specification, Recursive algorithms, Data Abstraction, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega, and Theta notations. Introduction to Linear and Non Linear data structures, Searching techniques: Linear and Binary search; Sorting Techniques: Bubble, Selection, Insertion, Quick and Heap Sort and comparison of sorting algorithms.

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 endedqueue (dqueue).

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, Graphtraversals – BFS, DFS, Application of graphs, Minimum spanning trees – Prims and Kruskal algorithms.

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

Reference Books :

1. S. Lipschutz, “Data Structures”, Tata McGraw Hill Education, 1st Edition, 2008.
2. D. Samanta, “Classic Data Structures”, PHI Learning, 2nd Edition, 2004.

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

Course Code	Course Title					Core / Elective	
SMC902PY	Essence of Indian Traditional Knowledge					Core	
	Contact Hours per Week				CIE	SEE	Credits
Pre Requisite	L	T	D	P			
-	2	-	-	-	40	60	0

Course Objectives

1. To get a knowledge in Indian Culture
2. To Know Indian Languages and Literature and the fine arts in India.
3. To explore the Science and Scientists of Medieval and Modern India

Course Outcomes

1. Understand philosophy of Indian culture.
2. Distinguish the Indian languages and literature.
3. Learn the philosophy of ancient, medieval and modern India.
4. Acquire the information about the fine arts in India.
5. Know the contribution of scientists of different eras.

UNIT – I

Introduction to Culture: Culture, civilization, culture and heritage, general characteristics of culture, importance of culture in human literature, Indian Culture, Ancient India, Medieval India, Modern India.

UNIT – II

Indian Languages, Culture and Literature: Indian Languages and Literature-I: the role of Sanskrit, significance of scriptures to current society, Indian philosophies, other Sanskrit literature, literature of south India.

Indian Languages and Literature-II: Northern Indian languages & literature

UNIT – III

Religion and Philosophy: Religion and Philosophy in ancient India, Religion and Philosophy in Medieval India, Religious Reform Movements in Modern India (selected movements only)

UNIT – IV

Fine Arts in India (Art, Technology & Engineering): Indian Painting, Indian handicrafts, Music, divisions of Indian classic music, modern Indian music, Dance and Drama, Indian Architecture (ancient, medieval and modern), Science and Technology in India, development of science in ancient, medieval and modern India.

UNIT – V

Education System in India: Education in ancient, medieval and modern India, aims of education, subjects, languages, Science and Scientists of Ancient India, Science and Scientists of Medieval India, Scientists of Modern India

Suggested Reading :

1. Kapil Kapoor, “Text and Interpretation: The India Tradition”, D. K. Print world, 2005
2. Gopala Krishnan, “Science in Samskrit”, Samskrita Bharti Publisher, New Delhi, 2017.
3. NCERT, “Position paper on Arts, Music, Dance and Theatre” NCERT, New Delhi, 2010.
4. S. Narain, “Examinations in Ancient India”, Arya Book Depot, New Delhi, 1993
5. Satya Prakash, “Founders of Sciences in Ancient India”, Vijay Kumar Publisher, New Delhi, 1989
6. M. Hiriyanna, “Essentials of Indian Philosophy”, Motilal Banarsidass Publishers, New Delhi, 2005

INDIAN CONSTITUTION

Course Code	Course Title					Core / Elective	
SMC901PO	Indian Constitution					Core	
	Contact Hours per Week				CIE	SEE	Credits
Pre Requisite	L	T	D	P			
-	2	-	-	-	40	60	0

Course Objectives :

1. To create awareness among students about the Indian Constitution.
2. To acquaint the working conditions of union, state, local levels, their powers and functions.
3. To create consciousness in the students on democratic values and principles articulated in the constitution.
4. To expose the students on the relations between federal and provincial units.
5. To divulge the students about the statutory institutions.

Course Outcomes :

6. Know the background of the present constitution of India.
7. Understand the working of the union, state and local levels.
8. Gain consciousness on the fundamental rights and duties.
9. Be able to understand the functioning and distribution of financial resources between the centre and states.
10. Be exposed to the reality of hierarchical Indian social structure and the ways the grievances of the deprived. Sections can be addressed to raise human dignity in a democratic way.

UNIT – I

Evolution of the Indian Constitution: 1909 Act, 1919 Act and 1935 Act. Constituent Assembly:

Composition and Functions; Fundamental features of the Indian Constitution

UNIT – II

Union Government: Executive-President, Prime Minister, Council of Minister

State Government: Executive: Governor, Chief Minister, Council of Minister

Local Government: Panchayat Raj Institutions, Urban Government

UNIT – III

Rights and Duties: Fundamental Rights, Directive principles, Fundamental Duties

UNIT – IV

Relation between Federal and Provincial units: Union-State relations, Administrative, legislative and Financial, Inter State council, NITI Ayog, Finance Commission of India.

UNIT – V

Statutory Institutions: Elections-Election Commission of India, National Human Rights Commission, National Commission for Women

Suggested Reading :

1. Durga Das Basu, “Introduction to the Constitution of India”, Lexis Nexis Butterworths Wadhwa Nagpur, 2008.
2. Subhash Kashyap, “Our Parliament”, National Book Trust, India, 2004.
3. Peu Ghosh, “Indian Government and Politics”, Prentice Hall of India, New Delhi, 2012.

ENGLISH LAB

Course Code	Course Title					Core / Elective	
SHS911EG	ENGLISH LAB (Common to all Branches)					Core	
	Contact Hours per Week				CIE	SEE	Credits
Pre Requisite	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
2. Training them in the use of correct pronunciation, stress, and intonation
3. Sensitizing them to the use of verbal and non-verbal communication.
4. Encouraging them to learn the art of conversation to suit formal and informal situations.
5. Preparing them to make formal presentations and face mock interviews 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, 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. Improve 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. Improve participation skills and be able to explain and defend their opinions by participating in Group Discussions and Debates (UNDERSTAND, APPLY, CREATE)

SYLLABUS :

UNIT DETAILS

- I**
- Icebreaking Activity - Jam
 - Picture Perception
 - Listening For Comprehension (Competitive Exams – Ielts, Toefl, Pte)
- II**
- Phonetics (Vowels, Diphthongs And Consonant Sounds)
 - Stress And Intonation
- 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
 - Making Formal Announcements And Emceeing
- IV Group Activity :**
- Group Discussion
 - Debate
 - Role Play
- V**
- Interview Skills
 - Formal Presentations

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.

APPLIED PHYSICS LAB

Course Code	Course Title					Core / Elective	
SBS912PH	Applied Physics Lab (Common to CSE, IT, AI & DS and CME)					Core	
	Contact Hours per Week				CIE	SEE	Core Credits
Pre Requisite	L	T	D	P			
-	-	-	-	4	40	60	2

Course Objectives :

The objective of this course is to make the student

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 and thermistor.
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.

WORKSHOP

Course Code	Course Title					Core / Elective	
SES914ME	Workshop (Common to all Branches)					Core	
Pre Requisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	-	6	40	60	3

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, equipments and processes those are common in the engineering field.
3. To gain good basic working knowledge required for the production of various engineering products.
4. To study different hand operated power tools, uses and their demonstration.
5. Adopt safety practices while working with various tools.

Course Outcomes :

1. Demonstrate and understanding of and comply with workshop safety regulations.
2. Identify and apply suitable tools to for different trades of engineering processes including drilling, material removing, measuring, chiseling..
3. Study practice on machine tools and their operations.
4. Undertake jobs connected with engineering workshop trades including fitting, carpentry, sheet metal, house wiring, welding, smithy and foundry.
5. Apply basic electrical engineering knowledge for house wiring practice.

LIST OF EXPERIMENTS :

A. TRADE FOR EXERCISES :

1. **CARPENTRY**: Half-lap dove-tail joint, mortise and tension joint, bridle 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** : Rectangle tray and a cone.
5. **SMITHY**: Hook and round to square.
6. **WELDING**: lap joint, single V-butt joint, T-joint, L-joint, corner joint.

7. **PLUMBING:** preparation of nipple and fitting to elbow, tee, union and coupling tap connection and shower connection.

B. TRADES FOR DEMONSTRATION AND EXPOSURE:

1. Machine (lathe and drilling)
2. Injection moulding.
3. Mould making and casting.
4. Basic electronicslab instruments.

C. PRESENTATIONS AND VIDEOS LECTURES:

1. Manufacturing methods.
2. Rapid prototyping.
3. Glass cutting.
4. 3D printing.
5. CNC lathe.

Note: At least two exercises from each trade.

TEXT / REFERENCE / ADDITIONAL BOOKS :

1. Venugopal,K, "Workshop Manual", Anuradha Publications, Kumbakonam, TN, 2012.
2. K.C.John, "Mechanical Workshop" 2ndEdn., PHI, 2010.
3. HajraChoudary, "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.

D. IT WORKSHOP : Computer hardware, identification of parts, disassembly, assembly of computer to working condition, operating system installation.

Course Objectives :

1. The Workshop is a training lab course to get training on PC Hardware, Internet & World Wide Web, and Productivity tools for documentation, Spreadsheet computations, and Presentation.
2. To introduce to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers, hardware and software level troubleshooting process.
3. To introduce connecting the PC on to the internet from home and workplace and effectively usage of the internet, Usage of web browsers, email, newsgroups and discussion forums.

4. To introduce the usage of Productivity tools in crafting professional word documents, excel spreadsheets and powerpoint presentations using open office tools and LaTeX.

Course Outcomes :

After completion of the course the student will be

1. Able to assemble and disassemble the hardware components of computer.
2. Able to install the Operating systems
3. Able to learn the documentation and report writing using Productivity tools
4. Able to examine database concepts and explore the Microsoft Office Access environment.
5. Able to understand about internet and designing web pages
6. Able to learn the documentation using latex

Experiment - 1

(3 hours)

PC Hardware

Identify the peripherals of a computer. (Processor, Memory chips, Mother board, Disk drives, and Controller card such as AGP board, Network cards, Sound card, as well as Parallel and Serial ports etc.,)

Experiment - 2

(3 hours)

Disassembling and Assembling PC in working condition. Load the Operating Systems with partitions for Windows and Linux, configure for Network

Experiment - 3

(3 hours)

Documentation Using MS-Word: Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, and Bookmarks.

Experiment - 4

(3 hours)

Presentation using MS-PowerPoint: Creating presentation slides and Enhancing Slides with features like Organizational charts, Excel Charts, Word Art, Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object

Experiment - 5

(3 hours)

MS Excel : Introduction to MS-Excel, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions- like sum, average, standard deviation, and charts.

Experiment - 6

(3 hours)

MS-Access :

Access Basics, Design a Database, Build a Database, Work with Forms, Sort, Retrieve, Analyze Data, Work With Reports, Access with Other Applications, Manage an Access Database

Experiment - 7

(3 hours)

Internet

- a) Telnet/Secure Shell (Remote login to university computers)
- b) Electronic Mail (Communicating with email software)
- c) File Transfer Protocols (transferring files between networked computers)
- d) World Wide Web (Interface, Navigation, Search Tools)

Experiment - 8

(3 hours)

HTML

- a) Publishing Web Pages (Using HTML editors to create personal web sites)
- b) Create the web-page (With title, text, frames, hyperlinks to some sites, pictures, lists, tables, fonts and colors) without using any web authoring tools.

Experiment - 9

(3 hours)

Documentation Using LaTeX. : Introduction to Linux Commands, Introduction to LaTeX, Creating & Editing Document, Formatting Document

Experiment - 10

(3 hours)

LaTeX.

Page Layout –Titles, Abstract Chapters, Sections, References, Equation references, citation. List making environments Table of contents, Generating new commands, Figure handling numbering, List of figures, List of tables, Generating index.

Suggested Reading :

- 1) Peter Norton, Introduction to Computers, McGraw Hill Publishers, 6th Edition, 2010
- 2) Leslie Lamport, Latex: A Document Preparation System, Pearson Education India, 2nd Edition, 1994.
- 3) Stefan Kottwitz, LaTeX Beginner's Guide, Shroff/Packt Publishers, 1st Edition, 2012.

DATA STRUCTURES USING C LABORATORY

Course Code	Course Title					Core / Elective	
SES212IT	Data Structures using C Lab					Core	
	Contact Hours per Week				CIE	SEE	Credits
Pre Requisite	L	T	D	P			
-	-	-	-	2	40	60	1

Course Objectives :

1. Understand various data representation techniques in the real world.
2. Implement linear and non-linear data structures.
3. Analyze various algorithms based on their time and space complexity.
4. Develop real-time applications using suitable data structure.
5. Identify suitable data structure to solve various computing problems.

Course Outcomes :

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, circular linked list and doubly linked list.
4. Explore the concept of non linear data structures such as trees and graphs.
5. Understand the binary search trees, hash function, and concepts of collision and its resolution methods.

LIST OF EXPERIMENTS

Week - 1 LINKED LISTS

Write a C program that uses functions to perform the following:

- a. Create a singly linked list of integers.
- b. Delete a given integer from the above linked list.
- c. Display the contents of the above list after deletion.
- d. Check whether two given lists are containing the same data.

Week - 2 LINKED LISTS

Write a C program that uses functions to perform the following:

- a. Create a double linked list of integers.
- b. Delete a given integer from the above double linked list.
- c. Display the contents of the above list after deletion.
- d. Find the largest element in a given doubly linked list.

Week - 3 STACK

- a) Write a C program to implement stack using linked list.
- b) Write a C program that uses stack operations to convert a given infix expression into its postfix equivalent, implement the stack using an array.
- c) Write a C program to reverse the elements of the stack using recursion.

Week - 4 QUEUE

Write C programs to implement a double ended queue ADT using

- a. Array
- b. Double linked list

Week - 5 BINARY SEARCH TREE

Write a C program that uses functions to perform the following:

- a. Create a binary search tree of characters.
- b. Traverse the above binary search tree recursively in post order.
- c. *Count the number of nodes in the binary search tree.

Week - 6 BINARY SEARCH TREE

Write a C program that uses functions to perform the following:

- a. Create a binary search tree of integers
- b. Traverse the above binary search tree non recursively in inorder

Week - 7 SORTING

Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order.

- a. Insertion sort
- b. Merge sort

Week - 8 SORTING

Week - 8 Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order.

- a. Quick sort
- b. Selection sort

Week - 9 SORTING

Write a C program to perform the following operation:

- a. Insertion into a B-Tree.
- b. Heap Sort.

Week - 10 HASHING

Write a C program to implement all the functions of a dictionary (ADT) using hashing.

Week - 11 HASHING

- a) Write a C program for implementing Knuth-Morris-Pratt pattern matching algorithm.
- b) Write a C program to sort a given list of strings.

Week - 12 GRAPH TRAVERSAL

Write C programs for implementing the following graph traversal algorithms:

- a. Depth first traversal
- b. Breadth first traversal

REFERENCE BOOKS :

1. Gilberg and Forouzan, Data Structure- A Pseudo code approach with C, Thomson publication
2. Data structure in C, Tanenbaum, PHI publication / Pearson publication
3. Pai, Data Structures & Algorithms; Concepts, Techniques & Algorithms, Tata McGraw Hill.

Field Work

Course Code	Course Title					Core / Elective	
SPW211 IT	Field Work					Core	
	Contact Hours per Week				CIE	SEE	Credits
Pre Requisite	L	T	D	P			
-	-	-	-	-	50	-	1

The students have to undergo a Field work of 2-week duration after II Semester SEE or during semester breaks.

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
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