

DRAFT

FACULTY OF ENGINEERING
Scheme of Instructions & Examination

For
Four Year Degree Programme of
Bachelor of Engineering (B.E)
in
Computer Engineering
(With effect from the academic year 2023-24)



Estd. 2008

STANLEY COLLEGE OF ENGINEERING
AND TECHNOLOGY FOR WOMEN
(AUTONOMOUS)

(Affiliated to Osmania University)
(Accredited by NAAC with "A" Grade)
ABIDS, HYDERABAD-500001, Telangana.

Stanley College of Engineering and Technology for Women (Autonomous)
Proposed for the academic batch 2023-2027

Dr. Vardhini
Bos - chairperson

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


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SMC901CM (Mandatory) Three Week Induction Program	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

CME: SEMESTER -I

S.No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	D/P	Contact Hrs./W	CIE	SEE	SEE Duration in Hrs	
	SMC901CM	Induction Program	-	-	-	-	-	-	-	0
Theory Courses										
1	SBS101MT	Mathematics-I	3	1	-	4	40	60	3	4
2	SBS904CH	Applied Chemistry	3	1	-	4	40	60	3	4
3	SES101CM	Programming for Problem Solving	3	-	-	3	40	60	3	3
4	SHS901EG	English	2	-	-	2	40	60	3	2
5	SHS902EG	Universal Human Values	2	-	-	2	40	60	3	2
Practical and Laboratory Courses										
6	SBS914CH	Chemistry Lab	-	-	2	2	40	60	3	1
7	SES111CM	Programming for Problem Solving Lab	-	-	4	4	40	60	3	2
8	SES915ME	Engineering Graphics Lab	-	-	4	4	40	60	3	2
9	SHS916CM	Design Thinking	-	-	2	2	40	60	3	1
Total			13	02	12	27	360	540	-	21

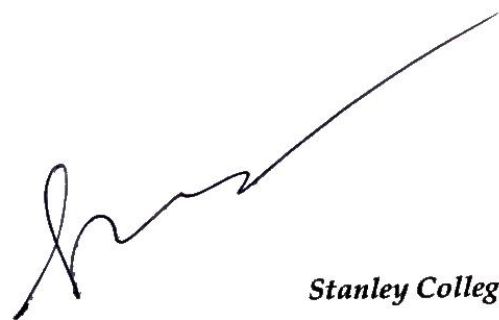

Dr. K. Vaideli
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 Proposed for the academic batch 2023-2027


Prof. S. Srinivasa Rao
 [OU Nominee]
 Dept. of CSE, UCE, OU.

CME: SEMESTER-II

S.No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	D/P	Contact Hrs/W	CIE	SEE	SEE Duration in Hrs.	
Theory Courses										
1	SBS202MT	Mathematics-II	3	1	-	4	40	60	3	4
2	SBS902PH	Applied Physics	3	1	-	4	40	60	3	4
3	SES201CM	Data Structures	3	-	-	3	40	60	3	3
4	SESX03EE	Fundamentals of Electrical & Electronics Engineering	3	1	-	4	40	60	3	4
Practical and Laboratory Courses										
5	SBS912PH	Applied Physics Lab	-	-	2	2	40	60	3	1
6	SHS911EG	English Lab	-	-	2	2	40	60	3	1
7	SES211CM	Data Structures Lab	-	-	4	4	40	60	3	2
8	SESX13EE	Fundamentals of Electrical & Electronics Engineering Lab	-	-	2	2	40	60	3	1
9	SES914ME	Engineering Workshop	-	-	4	4	40	60	3	2
10	SPW211CM	IDEA Lab	-	-	2	2	40	60	3	1
Total			12	03	16	31	400	600	-	23

NOTE: IDEA Lab to be evaluated in the subsequent semester




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CME: SEMESTER - III

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Cont act Hrs/	CIE	SEE	SEE Duration in	
Theory Courses										
1	SBSX01MT	Mathematics-III	3	1	-	4	40	60	3	4
2	SESX01EC	Digital Electronics	3	-	-	3	40	60	3	3
3	SPC301CM	Discrete Mathematics	3	-	-	3	40	60	3	3
4	SPC302CM	OOPs Using Java	3	1	-	4	40	60	3	4
5	SPC303CM	Concepts in Computer Organization & Microprocessor	3	1	-	4	40	60	3	4
6	SMC901HS	Indian Constitution	2	-	-	2	40	60	3	0
Practical/ Laboratory Courses										
7	SHS912EG	Advanced Communication Skills Lab	-	-	2	2	40	60	3	1
8	SPC312CM	OOPs using Java Lab	-	-	2	2	40	60	3	1
9	SPC313CM	Concepts in Computer Organization & Microprocessor Lab	-	-	2	2	40	60	3	1
10	SPC314CM	Python Programming Lab	-	-	2	2	40	60	3	1
Total			15	03	08	26	360	540	-	22


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CME: SEMESTER - IV

CME: SEMESTER - IV

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/ D	Contact Hrs/Wk	CIE	SEE	SEE Duration	
Theory Courses										
1	SHS901BM	Managerial Economics & Financial Accountancy	3	-	-	3	40	60	3	3
2	SPC401CM	Automata Language and Computation	3	-	-	3	40	60	3	3
3	SPC402CM	Data Communication & Computer Networks	3	1	-	4	40	60	3	4
4	SPC403CM	Operating Systems	3	1	-	4	40	60	3	4
5	SPC404CM	Database Management Systems	3	1	-	4	40	60	3	4
6	SAC903CH	Environmental Science	2	-	-	2	50	-	-	0
Practical/ Laboratory Courses										
7	SPC412CM	Data Communication & Computer Networks Lab	-	-	2	2	40	60	3	1
8	SPC413CM	Operating Systems Lab	-	-	2	2	40	60	3	1
9	SPC414CM	Database Management Systems Lab	-	-	2	2	40	60	3	1
Internship-1(SPW411CM)			The students must undergo Internship for 4 week duration summer vacation which will be assessed in the forthcoming V semester							
Total			17	03	06	26	370	480		21


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Prof.


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CME SEMESTER - V

No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/ D	Contact Hrs/Wk	CIE	SEE	SEE Duration	
Theory Courses										
	SPC501CM	Design and Analysis of Algorithms	3	1	-	4	40	60	3	4
	SPC502CM	Internet of Things	3	-	-	3	40	60	3	3
	SPC503CM	Compiler Design	3	-	-	3	40	60	3	3
	PE-I	PE-I	3	-	-	3	40	60	3	3
	OE-I	OE-I	3	-	-	3	40	60	3	3
Practical/ Laboratory Courses										
	SPC512CM	Internet of Things Lab	-	-	2	2	40	60	3	1
	SPC513CM	Compiler Design Lab	-	-	2	2	40	60	3	1
	SPC514CM	Web Technology Applications Lab	-	-	2	2	40	60	3	1
	SPW511CM	Technical Seminar	-	-	2	2	50	-	-	1
0	SPW411CM	Internship-1	-				50	-	-	1
Total			17	01	08	26	460	540		21

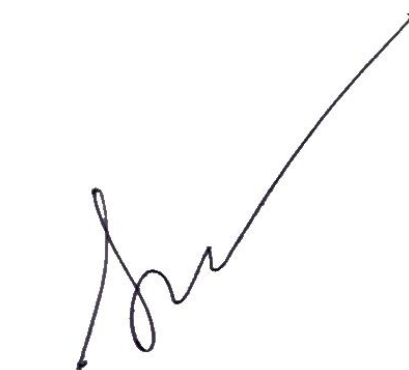

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Dr. K. Vaidelhi

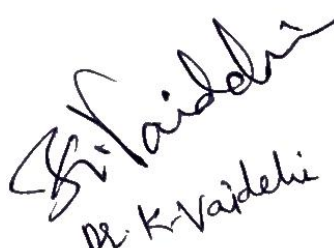
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CME SEMESTER - VI

No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/ D	Contact Hrs/Wk	CIE	SEE	SEE Duration	
Theory Courses										
1	SHS902BM	Entrepreneurship and Startups	3	-	-	3	40	60	3	3
2	SPC601CM	Software Engineering	3	-	-	3	40	60	3	3
3	SPC602CM	Machine Learning	3	1	-	4	40	60	3	4
4	SPC603CM	Introduction to AI	3	-	-	3	40	60	3	3
5	PE-II	Professional Elective-II	3	-	-	3	40	60	3	3
Practical/Laboratory Courses										
6	SPC612CM	Machine Learning Lab	-	-	2	2	40	60	3	1
7	SPC613CM	Artificial Intelligence Lab	-	-	2	2	40	60	3	1
8	SPW611CM	Mini Project Lab (Independent Project)	-	-	4	4	50	-	-	2
Internship-II(SPW612CM)			The students must undergo Internship for 4 week duration summer vacation which will be assessed in the forthcoming VII semester							
Total			15	01	08	24	330	420	-	20



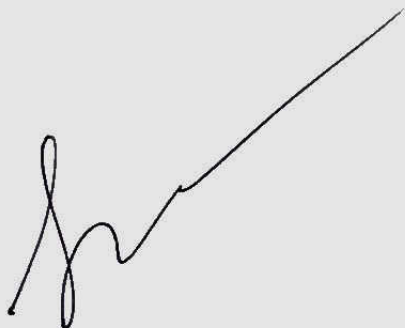
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Rao



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CME: SEMESTER - VII

No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/ D	Contact Hrs/Wk	CIE	SEE	SEE Duration	
Theory Courses										
1	SPC701CM	Deep Learning	3	-	-	3	40	60	3	3
2	PE-III	Professional Elective-III	3	-	-	3	40	60	3	3
3	PE-IV	Professional Elective-IV	3	-	-	3	40	60	3	3
4	PE-V	Professional Elective-V	3	-	-	3	40	60	3	3
5	OE-II	Open Elective-II	3	-	-	3	40	60	3	3
Practical/Laboratory Courses										
6	SPC711CM	Deep Learning Lab	-	-	2	2	40	60	3	1
7	SPE71XCM	Professional Elective Lab	-	-	2	2	40	60	3	1
8	SPW711CM	Project Work-I	-	-	6	6	50	-	3	3
9	SPW612CM	Internship-II	-				50	-	-	1
Total			15	00	10	25	380	420	-	21



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CME: SEMESTER - VIII

No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs/Wk	CIE	SEE	SEE Duration	
Theory Courses										
1	OE-III	Open Elective-III	3	-	-	3	40	60	3	3
Practical/Laboratory Courses										
2	SPW811CM	Project Work-II	-	-	16	16	40	120	-	8
Total			03	-	16	19	80	180	-	11




Dr. K. Vaidhyanathan

Prof. S. Srinivasa Rao

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LIST OF PROFESSION ELECTIVES

PE-I	PE-II	PE-III	PE-IV	PE-V
Expert systems	Applications of AI	Augmented reality & virtual reality	Speech Processing	Video Processing
Natural language processing	Computer Vision	Soft Computing	Deep learning	GPU Computing
Data Warehouse & Data Mining	Data Science	Data visualization	Big Data Analytics	NOSQL Database
Distributed Systems	Cloud Computing	Scalable Architecture for Large Applications	Mining Massive Datasets	Programming with SPARK
Cyber security	Embedded Systems	Block chain technology	Web Security	Cloud application development

OPEN ELECTIVE OFFERED TO OTHER BRANCHES

S. No	Subject Code	Subject Name
1.	OEXXXCM	Machine Learning
2.	OEXXXCM	Web Application Development

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COMPARISON BETWEEN GATE & CME SYLLABUS

GATE SUBJECT	CME Subject Names and Semester
Discrete Mathematics	Discrete Mathematics(Sem-III)
Digital Logic	Logic and Switching Theory(Sem-III)
Computer Organization and Architecture	Concepts in Computer Organization & Microprocessor (Sem-III)
Programming and Data Structures	Data Structures (Sem-II)
Algorithms	Design and Analysis of Algorithms(Sem-V)
Theory of Computation & Compiler Design	Automata Language and Computation (Sem-IV) Compiler Design(Sem-V)
Operating Systems	Operating Systems(Sem-IV)
Databases	Database Management Systems (Sem-IV)
Computer Networks	Data Communication & Computer Networks (Sem-IV)




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Sem-1	Sem-2	Sem-3	Sem-4	Sem-5	Sem-6	Sem-7	Sem-8
Mathematics -I	Mathematics -II	Mathematics -III	Managerial Economics & Financial Accountancy	Design and Analysis of Algorithms	Entrepreneurship and Startups	Deep Learning	Open Elective-III
Applied Chemistry	Applied Physics	Logic & Switching Theory	Automata Languages and Computation	Internet of Things	Software Engineering	Professional Elective-III	
English	Data Structures	Discrete Mathematics	Data Communication & Computer Networks	Compiler Design	Machine Learning	Professional Elective-IV	
Programming for Problem Solving	Fundamentals of Electrical & Electronics Engineering	OOPs using JAVA	Operating Systems	PE-I	Introduction to AI	Professional Elective-V	
Universal Human Values		Concepts in Computer Organization & Microprocessor	Database Management Systems	OE-I	PE-II	Open Elective-II	
Chemistry Lab	Applied Physics Lab	Advanced Communication Skills Lab	Environmental Science	Indian Constitution	Machine Learning Lab	Deep Learning Lab	
Programming for Problem Solving Lab	English Lab	OOPs using JAVA Lab	Data Communication & Computer Networks Lab	Internet of Things Lab	Artificial Intelligence Lab	PE Lab	
Engineering Graphics Lab	Data Structures Lab	Concepts in Computer Organization & Microprocessor Lab	Operating Systems Lab	Compiler Design Lab			
Design Thinking	Fundamentals of Electrical & Electronics Engineering Lab	Python Programming Lab	Database Management Systems Lab	Web Technology Applications Lab			
	Engineering Workshop				Mini Project Lab		
	Idea Lab		Internship-I	Technical Seminar	Internship-II	Project Work-I	Project Work-II

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Stanley College of Engineering & Technology for Women (Autonomous)
CREDIT DISTRIBUTION- SEMESTER WISE
B.E Computer Engineering (CME)

Category	Sem-1	Sem-2	Sem-3	Sem-4	Sem-5	Sem-6	Sem-7	Sem-8	Total
HS	5	1	1	3		3			13
BS	9	9	4						22
ES	7	12	3						22
PC			14	18	13	12	4		61
PE					3	3	10		16
OE					3		3	3	9
PROJ		1		-	2	2	4	8	17
MC				0	0				0
Total	21	23	22	21	21	20	21	11	160

Structure of UG program in CME

CATEGORY	AICTE (CSE)	CME affiliated to OU(19-23)	Autonomous R 2021	Autonomous R 2023
HS	16	12	8	13
BS	23	22	21	22
ES	29	25	28	22
PC	59	60	61	61
PE	12	18	17	16
OE	9	9	9	9
PROJ	15	13	16	17
MC	0	0	0	0
Total	163	159	160	160

Abbreviation	Category	Credit Break up
HS	Humanities, Social Sciences and Management	13
BS	Basic Sciences including Mathematics, Physics and Chemistry	22
ES	Engineering Sciences including Workshop, Drawing, Basic Electrical / Electronics	22
PC	Professional Core Subjects	61
PE	Professional Elective Subjects	16
OE	Open Elective Subjects	9
PROJ	Project Work, Seminars, Internship	17
MC	Mandatory Courses	0
Total		160

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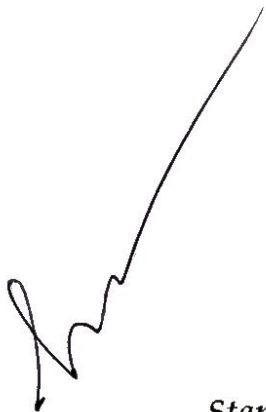
Stanley College of Engineering and Technology for Women
(Autonomous)
B.E Computer Engineering (CME)

Autonomous Scheme (2023-2027)

Semester	Theory		Practical		Credits		
	CIE	SEE	CIE	SEE	Theory	Practical	Total
I	200	300	160	240	15	6	21
II	160	240	240	360	15	8	23
III	200	300	160	240	18	4	22
IV	250	300	120	180	18	3	21
V	240	360	220	180	16	5	21
VI	200	300	130	120	16	4	20
VII	200	300	180	120	15	6	21
VIII	40	60	40	120	3	8	11
Total	1490	2160	1250	1560	116	44	160

CME Scheme (2021-2025) (Autonomous)

Semester	Theory		Practical		Credits		
	CIE	SEE	CIE	SEE	Theory	Practical	Total
I	240	360	160	240	12	8	20
II	200	300	210	240	13	9	22
III	200	300	120	180	15	6	21
IV	200	300	170	180	15	6	21
V	200	300	120	180	16	5	21
VI	200	300	170	180	15	8	23
VII	200	300	120	180	15	6	21
VIII	40	60	40	60	3	8	11
Total	1480	2220	1160	1440	104	56	160




Stanley College of Engineering and Technology for Women (Autonomous)
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CATEGORY-WISE COURSES

HUMANITIES & SOCIAL SCIENCES COURSES [HS]

(i) Number of Humanities & Social Science Courses: 6

(ii) Credits: 13

S. No.	Course Code	Course Title	L	T	P	Semester	Credits
1	SHS901EG, SHS911EG	English + Lab	2	-	2	I,II	3
2	SHS902EG	Universal Human Values	2	-	-	I	2
3	SHS916CM	Design Thinking	-	-	2	I	1
4	SHS912EG	Advanced Communication Skills Lab	-	-	2	III	1
5	SHS901BM	Managerial Economics & Financial Accountancy	3	-	-	IV	3
6	SHS902BM	Entrepreneurship and Startups	3	-	-	VI	3
TOTAL CREDITS							13

BASIC SCIENCE COURSES [BS]

(i) Number of Basic Sciences Courses: 5

(ii) Credits: 22

S.No.	Course Code	Course Title	L	T	P	Semester	Credits
1	SBS101MT	Mathematics-I	3	1	-	I	4
2	SBS904CH, SBS914CH	Applied Chemistry + Lab	3	1	2	I	5
3	SBS202MT	Mathematics- II	3	1	-	II	4
4	SBS902PH, SBS912PH	Applied Physics + Lab	3	1	2	II	5
5	SBSX01MT	Mathematics-III	3	1	-	III	4
TOTAL CREDITS							22

Stanley College of Engineering and Technology for Women (Autonomous)
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Prof. S. Srinivasa Rao

ENGINEERING SCIENCE COURSES [ES]

(i) Number of Engineering Sciences Courses: 7

(ii) Credits:22

S.No.	Course Code	Course Title	L	T	P	Semester	Credits
1	SES101CM, SES111CM	Programming for Problem Solving + Lab	3	-	4	I	5
2	SES915ME	Engineering Graphics Lab	-	-	4	I	2
3	SESX03EE, SESX13EE	Fundamentals of Electrical & Electronics Engineering + Lab	3	1	2	II	5
4	SES201CM, SES211CM	Data Structures + Lab	3	-	4	II	5
5	SES914ME	Engineering Workshop	-	-	4	II	2
7	SESX01EC	Logic and Switching Theory	3	-	-	III	3
TOTAL CREDITS							22

Prof. S. Srinivasa Rao

G. Vaidyanathan

Stanley College of Engineering and Technology for Women (Autonomous)
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PROGRAM CORE COURSES [PC]

(i) Number of Program Core Courses: 17

(ii) Credits: 62

S.No.	Course Code	Course Title	L	T	P	Semester	Credits
1	SPC301CM	Discrete Mathematics	3	-	-	III	3
2	SPC302CM, SPC312CM	OOPs Using Java + Lab	3	1	2	III	5
3	SPC303CM, SPC313CM	Concepts in Computer Organization & Microprocessor + Lab	3	1	2	III	5
4	SPC314CM	Python Programming Lab	-	-	2	III	1
5	SPC401CM	Automata Language and Computation	3	-	-	IV	3
6	SPC402CM, SPC412CM	Data Communication & Computer Networks + Lab	3	1	2	IV	5
7	SPC403CM, SPC413CM	Operating Systems + Lab	3	1	2	IV	5
8	SPC404CM, SPC414CM	Database Management Systems + Lab	3	1	2	IV	5
9	SPC501CM	Design and Analysis of Algorithms	3	1	-	V	4
10	SPC502CM, SPC512CM	Internet of Things + Lab	3	-	2	V	4
11	SPC503CM, SPC513CM	Compiler Design + Lab	3	-	2	V	4
12	SPC514CM	Web Technology Applications Lab	-	-	2	V	1
13	SPC601CM	Software Engineering	3	-	-	VI	3
14	SPC602CM, SPC612CM	Machine Learning + Lab	3	1	2	VI	5
15	SPC603CM, SPC613CM	Introduction to AI + Lab	3	-	2	VI	4
16	SPC701CM, SPC711CM	Deep Learning + Lab	3	-	2	VII	4
TOTAL CREDITS							61

Stanley College of Engineering and Technology for Women (Autonomous)
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Prof. S. Srinivas Rao

Ch. Karthi

PROFESSIONAL ELECTIVE COURSES [PE]

- (i) Number of Professional Elective Courses: 5
(ii) Credits: 16

S. No.	Course Code*	Course Title	L	T	P	Semester	Credits
1	PE	Professional Elective-I	3	-	-	V	3
2	PE	Professional Elective-II	3	-	-	VI	3
3	PE	Professional Elective-III	3	-	-	VII	3
4	PE	Professional Elective-IV	3		-	VII	3
5	PE	Professional Elective-V	3	-	2	VII	4
TOTAL CREDITS							16

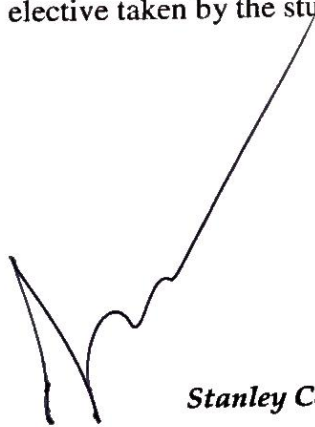
*The Course codes for the elective courses shall be the course code for the elective taken by the student.

OPEN ELECTIVE COURSES [OE]

- (i) Number of Open Elective Courses: 3
(ii) Credits: 9

S.No.	Course Code	Course Title	L	T	P	Semester	Credits
1	OE	Open Elective-I	3	-	-	V	3
2	OE	Open Elective-II	3	-	-	VII	3
3	OE	Open Elective-III	3	-	-	VIII	3
TOTAL CREDITS							9

The Course codes for the elective courses shall be the course code for the elective taken by the student.



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**PROJECT WORK, SEMINAR AND INTERNSHIP IN INDUSTRY OR ELSE
WHERE [PW]**

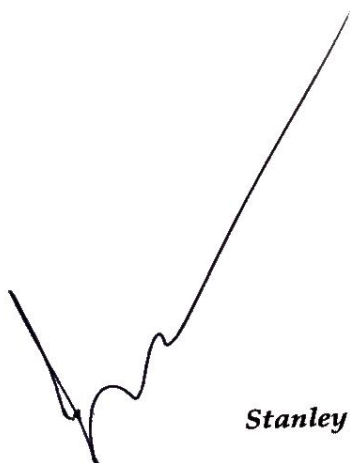
- (i) Number of PW Courses: 7
(ii) Credits:16

S. No.	Course Code	Course Title	L	T	P	Semester	Credits
1	SPW211CM	Idea Lab	-	-	2	II	1
2	SPW411CM	Internship-1	-	-	-	V	1
3	SPW511CM	Technical Seminar	-	-	2	V	1
4	SPW611CM	Mini Project Lab(Independent Project)	-	-	4	VI	2
5	SPW711CM	Project Work-I	-	-	6	VII	3
6	SPW612CM	Internship-II	-	-	-	VII	1
7	SPW811CM	Project Work-II	-	-	16	VIII	8
							17

MANDATORY COURSES [MC]

Note: These are mandatory non-credit courses.

S. No.	Course Code	Course Title	L	T	P	Semester	Credits
1	SAC903CH	Environmental Science	2	-	-	IV	0
2	SMC901HS	Indian Constitution	2	-	-	V	0
Total Credits							0



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Stanley College of Engineering and Technology for Women (Autonomous)
Proposed for the academic batch 2023-2027

Course Code	Course Title				Core / Elective	
SES101CM	Programming for Problem Solving				Core	
	Contact Hours per Week				CIE	SEE
Pre Requisite	L	T	D	P		
-	3	-	-		40	60
						3

Course Objectives

The course should enable the students to :

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

Course Outcomes

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

UNIT - I INTRODUCTION

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

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

UNIT - II ITERATIVE CONTROL STRUCTURES AND ARRAYS

Iterative Control structures: Loop control statements: while, for and do while loops. jump statements, break, continue, goto statements.

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

UNIT – III FUNCTIONS, STRUCTURES AND UNIONS

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

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

UNIT – IV POINTERS AND DYNAMIC MEMORY ALLOCATION **Pointers:**

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

Dynamic memory allocation: Basic concepts, library functions.

UNIT - V FILE HANDLING, SEARCHING AND SORTING **Files :**

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

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



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G. Vaidyanathan

Text Books :

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

Reference Books :

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



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Course Code	Course Title					Core / Elective	
SES111CM	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 :

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

Course Outcomes :

1. Understand the concept of basics of C, data types and variables.
2. Understand the concept of operators, precedence of operators, conditional statements and looping statements.
3. Explore the concept of strings, functions, recursive functions and differences between call by value and call by reference.
4. Explore the concept of storage classes, 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

Concept :Basic I/O,Operators

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

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

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

Concept: Basic I/O,Conditionalexecution,loops, Arrays(integer 1D,2D)

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

Concept: Sub Programs:User Defined Functions,Recursion

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

Concept: Strings

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

Concept :Structures and Unions:

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

Concept :Pointers


19. Write a C program to access 1D Array and 2D array using Pointers
20. Write a C program to concatenate two strings using pointers.
21. Write a C program to find the length of string using pointers.

Concept: Files ,Searching, Sorting

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

Text Books :

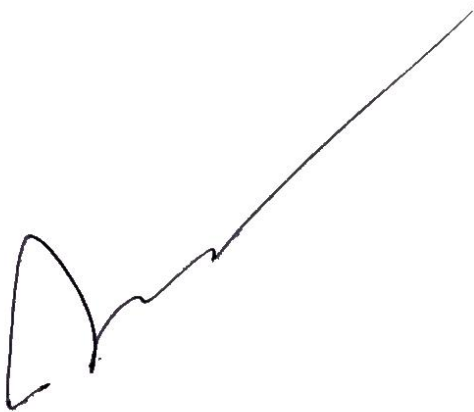
1. Somasekhara, "Problem Solving with C ", PHI.
2. Byron Gottfried, "Programming with C", Schaum's Outlines Series, McGraw Hill Education, 3rd Edition, 2017.
3. E. Balagurusamy, "Programming in ANSI C", McGraw Hill Education, 6th Edition, 2012.


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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.



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Course Code	Course Title					Core/Elective	
SHS916CM SHS0111CM	DESIGN THINKING (Common to CSE,CME,IT and ADE)					Mandatory	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	2	-	-	-	50	-	0

Course Objectives:

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

Course Outcomes: At the end of this course, the 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 successful communicate the solutions to problems.

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.



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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

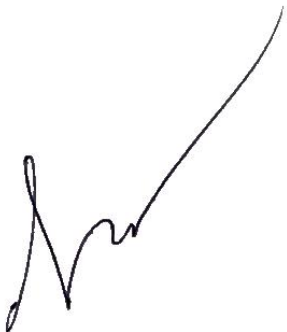
Learn how to apply design for environment principles to a product life cycle.

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. 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.



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Course Code	Course Title					Core/Elective	
SES201CM	DATA STRUCTURES					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
C Programming Language	3	-	-	-	40	60	3

Course Objectives:

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

Course Outcomes:

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

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

UNIT-I INTRODUCTION TO DATA STRUCTURES, SEARCHING AND SORTING

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

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

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

UNIT-II LINEAR DATA STRUCTURES

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

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

UNIT-III LINKED LISTS

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

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

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Dr. Vaidhyan

UNIT-IV NON-LINEAR DATA STRUCTURES

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

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

UNIT-V BINARY TREES AND HASHING

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

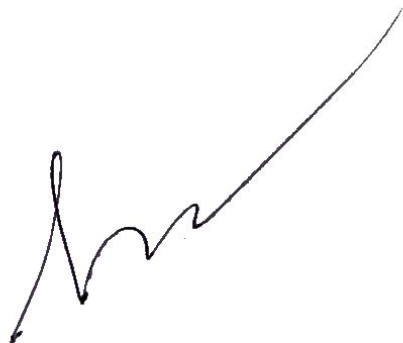
Hashing and collision: Introduction, hash tables, hash functions, collisions, applications of hashing.

TEXT BOOKS:

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

REFERENCES:

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



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Course Code	Course Title				Core / Elective		
SES211CM	DATA STRUCTURES LAB				Core		
	Contact Hours per Week				CIE	SEE	Credits
Pre Requisite	L	T	D	P			
C Programming in C	-	-	-	4	40	60	2

Course Objectives :

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

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

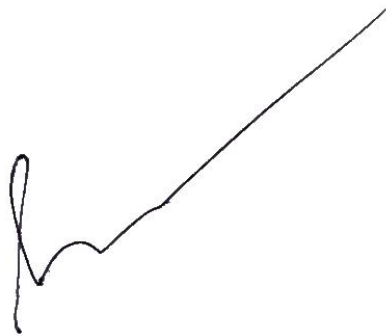
1. Understand the concept of data structures, C Programming and apply algorithm for solving problems like Sorting, searching, insertion and deletion of data.
2. Understand linear data structures for processing of ordered or unordered data.
3. Explore various operations on dynamic data structures like single linked list and doubly linked list.
4. Explore the concept of 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

1. Write C programs for implementing the following searching techniques: Linear, Binary and Fibonacci search.
2. Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order: Merge, Quick and Heap Sort.
3. Write a C program to implement stack: using arrays and linked list.
4. Write a C program to implement queue: using arrays and linked list.

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5. Write a C program that uses stack operations to convert a given infix expression in to its postfix equivalent, implement the stack using an array.
6. Write a C program that uses stack operations to evaluate postfix expression, implement the stack using an array.
7. Write a C program to implement single linked list.
8. Write a C program to implement double linked list.
9. Write a C program for implementing Graph Traversal Techniques: Depth First Traversal and Breadth First Traversal.
10. Write a C program to create Binary Search Tree, perform insertion and traversal (in order, pre order, post order)
11. Write a C program to implement hashing.



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Course Code	Course Title					Core/Elective	
SPW211CM SPW0221CM	IDEA Lab						
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
--	-	-	-	2	-	-	0

Course Objectives:

1. To learn all the skills associated with the tools and inventory associated with the IDEA Lab.
2. Learn useful mechanical and electronic fabrication processes.
3. Learn necessary skills to build useful and standalone systems/ projects with Closures.

Course Outcomes:

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

1. Demonstrate an understanding of conventional manufacturing processes.
2. Design and fabricate machine components using a 3D printer machine.
3. Demonstrate skills in laser cutting, vinyl cutting machine and 3D Scanner.
4. Design and fabricate machine components using PCB boards.
5. Demonstrate an understanding of the use of various sensors and its application with Arduino

LIST OF EXPERIMENTS

1. Schematic and PCB layout design of a suitable circuit, fabrication and testing of the circuit.
2. Machining of 3D geometry on soft material such as soft wood or modelling wax.
3. 3D scanning of computer mouse geometry surface. 3D printing of scanned geometry using FDM or SLA printer.
4. 2D profile cutting of press fit box/casing in acrylic (3 or 6 mm thickness)/cardboard, MDF (2 mm) board using laser cutter & engraver.
5. 2D profile cutting on plywood /MDF (6-12 mm) for press fit designs.
6. Familiarity and use of welding equipment.
7. Familiarity and use of normal and wood lathe.
8. Embedded programming using Arduino and/or Raspberry Pi.
9. Design and implementation of a capstone project involving embedded hardware, software and

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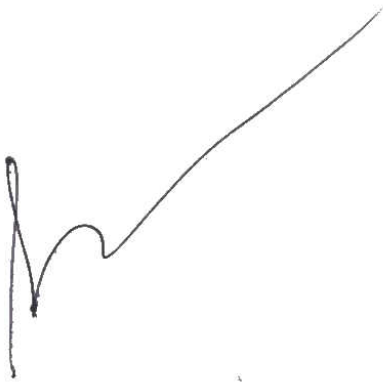
machined or 3D printed enclosure.

TEXT BOOKS:

1. AICTE's Prescribed Textbook: Workshop / Manufacturing Practices (with Lab Manual), Khanna Book Publishing.
2. All-in-One Electronics Simplified, A.K. Maini; 2021. ISBN-13: 978-9386173393, Khanna Book Publishing Company, New Delhi.

REFERENCE BOOKS:

1. Simplified Q&A - Data Science with Artificial Intelligence, Machine Learning and Deep Learning, Rajiv Chopra, ISBN: 978-9355380821, Khanna Book Publishing Company, New Delhi.
2. 3D Printing & Design, Dr. SabrieSoloman, ISBN: 978-9386173768, Khanna Book Publishing Company, New Delhi.
3. The Big Book of Maker Skills: Tools & Techniques for Building Great Tech Projects. Chris Hackett. Weldon Owen; 2018. ISBN-13: 978-1681884325



Prof. S. Srinivasa Rao