SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

AFFILIATED TO MADURAI KAMARAJ UNIVERSITY,MADURAI

RE-ACCREDITED WITH 'A' GRADE (THIRD CYCLE) BY NAAC WITH CGPA 3.11)

Programme Scheme, Scheme of Examination and Syllabi

(From 2023-2024 Batch onwards)

Department of Computer Science

PG Programme

Approved in the Academic Council – XIV held on 31/07/2023

Curriculum Design and Development Cell

Annexure G

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
(AFFILIATED TO MADURAI KAMARAJ UNIVERSITY, MADURAI
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Curriculum Design and Development Cell

HOD	Dean of Applied Science	Dean of Academic Affairs	Principal

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
MEMBERS OF BOARD OF STUDIES

S.No.	Board Members	Name and Designation
1.	Chairman of the Board	**Mrs. L.Priya M.Sc.,M.Phil.,** Head & Assistant Professor of Computer Science, Sri Kaliswari College(Autonomous),Sivakasi.
2.	University Nominee	**Dr.K.Perumal** Professor Department of Computer ApplicationSchool of Information Technology Madurai Kamaraj University,Madurai-625021
3.	Academic Expert 1.	**Dr. C.R.Sakthivel** Head Of the Department, Department of Computer Science, Sri Ramakrishna Mission Vidyala, Coimbatore.
4.	Academic Expert 2.	**Mrs. E.Ponmalar** Associate Professor, Department of Computer Science,SFR College for Women, Sivakasi.
5.	Industrialist	**Mr. G.Mahesh Kumar** Virtuo Technologies,Sivakasi.
6.	Alumnus	**Mr.G.Vijayapandi** Director @ Unobi TechnologiesPrivate Limited,Sivakasi
Members		
7.	Mrs. M.Saranya	Assistant Professor in Computer Science
8.	Mrs.C.Kavitha	Assistant Professor in Computer Science
9.	Mrs.M.Shanmuga Eswari	Assistant Professor in Computer Science
10.	Mr. G.Ramkumar	Assistant Professor in Computer Science
11.	Mrs. A.Karmehala	Assistant Professor in Computer Science
12.	Ms.P.R.Chowmya	Assistant Professor in Computer Science
13.	Mrs.B.Maheswari	Assistant Professor in Computer Science
14.	Mr.P.Marimuthu	Assistant Professor in Computer Science
15.	Ms.K.Gowri	Assistant Professor in Computer Science
16.	Mr.P.Manimuthu	Assistant Professor in Computer Science
17.	Mrs.R.Subasri	Assistant Professor in Computer Science

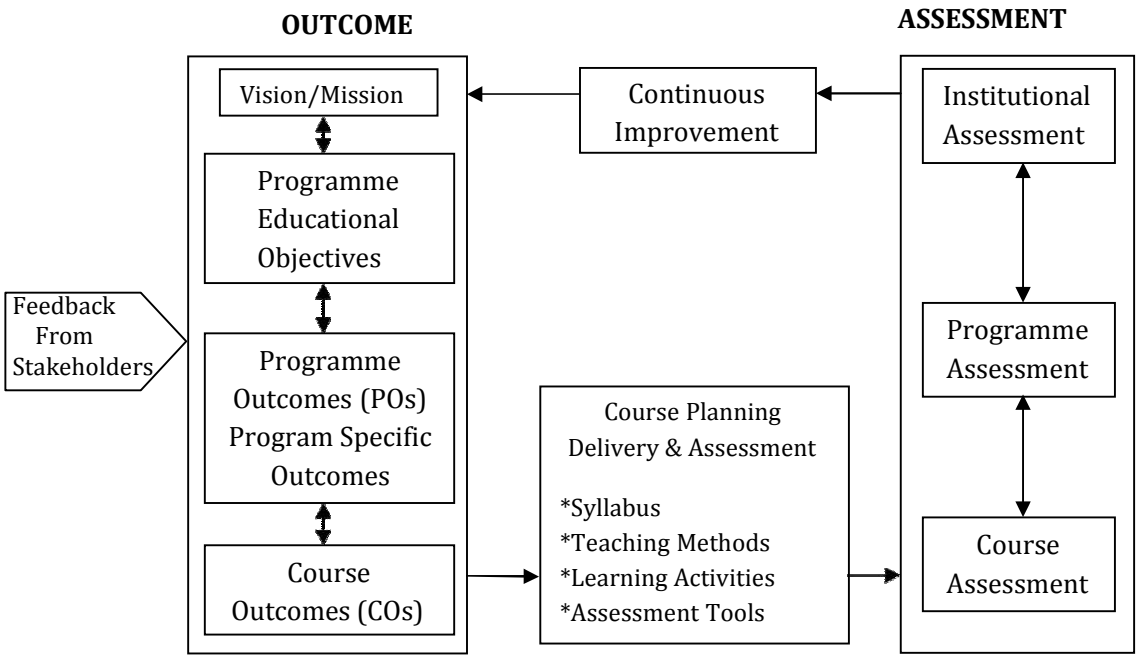
SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
(AFFILIATED TO MADURAI KAMARAJ UNIVERSITY, MADURAI
RE-ACCREDITED WITH 'A' GRADE (THIRD CYCLE) BY NAAC WITH CGPA 3.11)
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
GUIDELINES FOR OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM
(From 2023-2024 Batch onwards)

INTRODUCTION

Sri Kaliswari College in its pursuit of imparting quality education has marked a remarkable growth in terms of academic excellence, infrastructure, student strength, ICT facilities, library and placement records since its establishment in 2000-2001.This institution constitutes an academic community that is committed to encourage the student community to experience and share knowledge, identify their potential, enhance the employability skills and enable them to pursue their goals. After the conferment of autonomous status in the year 2012, the college has so far gone for revision of the syllabi three times and is continually updating the syllabi to meet the needs and demands of the student community.

The institution in its success journey of imparting quality education has Re-Accredited with A grade with CGPA (3.11) in its third cycle of Accreditation by NAAC. As an added feather to its cap, the institution has taken a giant leap to embrace the Outcome-Based Education system to enable the student community to develop their knowledge, skill and attitude simultaneously through a focussed learning and help the graduates to compete with their global counterparts and prepare them for life.

I. OUTCOME-BASED EDUCATION (OBE) FRAMEWORK



II. VISION OF THE INSTITUTION

- To impart quality higher education to produce highly talented youth capable of developing the nation

III. MISSION OF THE INSTITUTION

- Ensuring quality in all aspects of the activities
- Developing the latent skills of the rural youth
- Providing value - based education to instill courage and confidence
- Nurturing the entrepreneurial skills of the rural youth
- Creating competency to meet global challenges
- Imbibing social awareness and social responsibilities

IV. VISION OF THE DEPARTMENT

- To impart eminence in computer education to produce technically competent graduates with human values.

V. MISSION OF THE DEPARTMENT

- Empower the youth in rural communities with computer education
- Enhance their knowledge and strengthen their core competence in computers through analytical learning.
- Produce employable graduates by imparting total quality education

VI. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The Graduates will

PEO1: acquire broad knowledge of Computer Science and employ successfully and continue their professional education.

PEO2: pursue professional careers and take up research programme and display ethical code of conduct in usage of Internet and cyber systems.

PEO3: apply latest trending technological tools for performing experiments, investigations and analysis by identifying various solutions.

PEO4: collaborate with multi-diverse groups and able to act with team spirit in work place and in the society.

PEO5: attain the ability to survive in rapidly changing Hi-Tech world and take part in lifelong learning.

VII. PROGRAMME OUTCOMES (POs)

PO1: Disciplinary Knowledge

Acquire comprehensive knowledge related to their academic disciplines that form a part of a postgraduate programme of study.

PO2: Critical Thinking, Problem Solving and Analytical Reasoning

Develop students' ability of critical observation, capacity to apply their competencies and skills to identify, evaluate, analyse and solve problems.

PO3: Scientific Reasoning and Research Related Skills

Ability to analyze, draw conclusions from qualitative/quantitative data and critically evaluate ideas and also acquire necessary research skills to carry out an experiment or investigation

PO4: Communication Skills and Digital Literacy

Communicate effectively both in oral and written form and acquire the ability to comprehend and write effective reports, design documents and make effective presentations integrating modern technology.

PO5: Ethics, Values and Multicultural Competence

Perform professionally with social, cultural and ethical responsibility as an individual as well as in multifaceted teams with positive attitude

PO6: Team Work, Leadership and Employability Skills

Develop the ability to work collaboratively and effectively with others, respecting individual roles and responsibilities and acquire the pre-requisite skills required for placements and higher education.

PO7: Self-directed and Life-long Learning

Recognize the need for engaging in independent and life-long learning in the broadest context of technological changes.

VIII. PROGRAMME SPECIFIC OUTCOMES (PSOs) – M.Sc. Computer Science

On the successful completion of M.Sc. Computer Science, the students will

PSO1: acquire necessary skills and sound knowledge in the principles of hardware and software aspects of computing systems.

PSO2: demonstrate the knowledge of computer programming and the ability to develop creative solutions to the problems and understand the effects of future developments of computer systems and technology.

PSO3: apply mathematics, logic, and statistics to the design, development, and analysis of software systems and obtain ability to interpret and present the solutions of their research for mining, image processing, security and other computing issues.

PSO4: acquire technical, practical and communicative skills to work in multidisciplinary teams and carry out small and large scale projects by utilizing modern tools.

PSO5: utilize the knowledge of computing technology with commitment on social, ethical and cyber values.

PSO6: obtain ability to work independently on a substantial software project and as an effective team leader.

PSO7: strengthen the industry ready skills by pursing lifelong learning in computer network, hardware, software operations of an organization.

IX. PO-PSO Mapping Matrix – M.Sc. Computer Science

PO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
PO1	✓						
PO2		✓					
PO3			✓				
PO4				✓			
PO5					✓		
PO6						✓	
PO7							✓

X. PO-PEO Mapping Matrix – M.Sc. Computer Science

PO / PEO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	✓				
PO2	✓		✓		
PO3		✓	✓		
PO4				✓	
PO5		✓		✓	✓
PO6				✓	
PO7					✓

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science

REGULATIONS

Duration of the Programme **:** Two years (equivalent to four semesters)

Eligibility

Candidate should have passed B.Sc. Computer Science or any other degree accepted by the Syndicate of the Madurai Kamaraj University, Madurai as its equivalent.

Medium of Instruction : English

Age Limit

Maximum age limit : No Age limit

Transitory Permission

Students joined from 2023 - 2025 may be permitted to write their examinations in this pattern up to April 2028.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SCHEME OF EXAMINATION

For all the PG Programmes, the internal and external marks are distributed as follows:

For all Theory Courses : Internal Marks: 25; External Marks: 75

For Courses with both Theory and Practical, assessment will be for both Theory and Practical.

For Skill Enhancement Professional Competency Course: Internal Assessment for 100 Marks in Online Mode will be conducted (Objective Type Questions)

For all Practical Courses, Project and Internship : Internal Marks: 25; External Marks: 75

Internal Mark Distribution for Theory Courses

Assessment Type	Marks	Scheme of Assessment
Internal Test	10 marks	Two Internal Tests and 1 Model Exam will be conducted and average of the best two will be considered
Written Assignment E-Assignment/ Case Studies/ Reviews/ Field Assignments/ Poster Presentations/ Portfolios	5 marks	Any two of the Assignments will be given and the average of the two will be considered
Seminar	5 marks	One Seminar for each course
Viva/ Oral Exam/ Group Discussion/ Role Play	5 marks	Test will be conducted in any one of the Oral Mode

Internal Mark Distribution for Practical Courses

Assessment Type	Marks	Scheme of Assessment
Lab work /Program Execution	15 marks	Two Internal Tests will be conducted and the average of the two will be considered
Observation/Record Notebook	5 marks	Assessment will be done during every practical class
Viva –Voce / Lab Quiz	5 marks	Two Lab Quiz Tests/viva-voce will be conducted and the average of the two will be considered

External Mark Distribution for Practical Courses

Assessment Type	Marks	Scheme of Assessment
Lab work/Program Execution	65 marks	End result of the Practical
Viva –Voce	10 marks	Oral Mode Test

Internal Mark Distribution for Courses with both Theory and Practical

Assessment Type	Marks	Scheme of Assessment
Internal Test	10 marks	Two Internal Tests and 1 Model Exam will be conducted and average of the best two will be considered
Written Assignment E-Assignment/ Case Studies/ Reviews/ Field Assignments/ Poster Presentations/ Portfolios	5 marks	Any two of the Assignments will be given and the average of the two will be considered
Lab work /Program Execution	10 marks	Two Internal Tests will be conducted and the average of the two will be considered

External Mark Distribution for Courses with both Theory and Practical

Assessment Type	Marks	Scheme of Assessment
External Written Test	50 marks	Two hours External Exam will be conducted for 50 marks
Lab work /Program Execution	20 marks	End result of the Practical
Viva –Voce	05 marks	Oral Mode Test

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
QUESTION PAPER PATTERN

Internal Test – 40 Marks – 1 hr 45 mins Duration

S.No	Type of Questions	Marks
1.	Objective type Questions: Multiple Choice – 5 questions Answer in a Word/Sentence – 4 questions	 05 04
2.	Short Answer–2 questions –either or type	3x7=21
3.	Long Answer–1 question – either or type	1x10=10

Summative Examinations – 75 Marks -3 hrs Duration

S.No	Type of Questions	Marks
1.	Objective type Questions: Multiple Choice – 5 questions Answer in a Word/Sentence – 5 questions	 05 05
2.	Short Answer - 5 questions – either or type	5x7=35
3.	Long Answer - 3 questions – either or type	3x10=30

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science

Attainment of Course outcomes

Attainment of Course outcomes is computed using Direct and Indirect assessment methods. Direct Method of Assessment is based on performance of the students in the Continuous Internal Assessment Tests, Summative Examinations and supporting activities such as Seminar, Assignment, Case study, Group Discussion, Quiz, etc and Indirect Method of Assessment is based on periodical feedback from the students at the end of each course.

Weightage of Direct and Indirect Assessment in computation of attainment of each course is 70% for Direct Assessment and 30% for Indirect Assessment.

Direct Assessment of Course outcome attainment

i) **Rubrics**:

Internal Assessment contributes 60% and Summative Examinations Assessment contributes 40% to the Direct Assessment of a course outcome for Theory Courses. For the Practical Courses, Internal Assessment contributes 70% and Summative Examinations Assessment contributes 30% to the Direct Assessment of a course outcome.

ii) Setting of Target:

50% of the maximum mark is set as target of Internal Assessment tools and the average mark of the class is set as target of Summative Examinations Assessment.

Formula for calculating percentage attainment of each course outcome

Based on the result of Summative Examinations and Internal Assessment tools, the number of students scoring more than the target is found out.

For each Internal Assessment Tools,

$$\text{Percentage attainment of each course outcome} = \frac{\text{No. of. Students who scored more than the target in the concerned course outcome}}{\text{Total Number of Students}} \times 100$$

Percentage attainment of each Course outcome for Internal Assessment tools = Average of percentage attainment of all Internal Assessment tools

For Summative Examinations,

$$\text{Percentage attainment of each Course outcome} = \frac{\text{No. of. Students who scored more than the target in the concerned CO}}{\text{Total Number of Students}} \times 100$$

Formula for calculating Attainment Percentage of Course outcome of a course

Percentage Attainment of Course outcome for Internal Assessment tools	=	Average of percentage attainment of all COs
Percentage Attainment of Course outcome for Summative Examinations	=	Average of percentage attainment of all COs

Final Direct Assessment of Course outcome Attainment

For Theory Courses

Percentage Attainment of Course outcome through Direct Assessment	=	(0.6 x percentage attainment of CO for internal assessment tool) + (0.4 x percentage attainment of CO for summative examinations)

For Practical Courses

Percentage Attainment of Course outcome through Direct Assessment	=	0.7 x percentage attainment of CO for Internal Assessment tools + 0.3 x percentage attainment of CO for Summative Examinations

Indirect Assessment of CO Attainment

The course outcome feedback is conducted at the end of every semester by distributing structured feedback questionnaire to the students. The analysis of this feedback questionnaire is done on the following score. The feedback forms will be sorted with various scores and feedbacks with a score more than 5.5 are considered as satisfactory level for calculations for indirect attainment.

A : 10-8.5 **B :** 8.4-7.0 **C :** 6.9-5.5 **D :** 5.4-4.0 **E :** 3.9-0

Percentage attainment for each CO = $\frac{\text{Satisfaction Number}}{\text{Response Received}} \times 100$

Percentage Attainment of CO of a course = Average of percentage attainment of all COs

Final Assessment of CO attainment

Average course attainment = 0.7 x Direct assessment of CO attainment + 0.3 x Indirect assessment of CO attainment

Expected Level of Attainment for each of the Course Outcomes

Percentage of CO Attainment	Level of Attainment
= 70% and above	Excellent
= 60% - <70 %	Very good
= 50% -< 60 %	Good
= 40% - < 50 %	Satisfactory
Below 40%	Not Satisfactory

Assessment of PO Attainment

At the end of the each programme, the Direct PO Assessment is done from the CO Attainment of all courses. The Direct PO Attainment for a particular course is determined from the attainment values obtained for each course outcome related to that PO and the CO-PO mapping values.

Weighted contribution of the course in attainment of each PO = $\frac{\text{Weighted Percentage of contribution of the course in attainmentof each PO x average course attainment}}{100}$

Percentage attainment for each PO = $\frac{\text{Total weightage of all courses contributed to each PO}}{\text{Total weightage of all courses contributed to all POs}} \times 100$ x weighted contribution of the course in the attainment of each PO

Percentage Attainment of PO = Average of percentage attainment of all POs

Expected Level of Attainment for each of the Programme Outcomes

Percentage of PO Attainment	Level of Attainment
= 70% and above	Excellent
= 60% - <70 %	Very good
= 50% -< 60 %	Good
= 40% - < 50 %	Satisfactory
Below 40%	Not Satisfactory

Attainment of Programme Educational Objectives (PEO)

PEOs are assessed after 3 to 4 years of graduation. Attainment is measured based on the Feedback from Stakeholders

1. Alumni
2. Parents
3. Employer

The analysis of this feedback questionnaire is done on the following score. The feedback forms will be sorted with various scores and feedbacks with a score more than 5.5 are considered as satisfactory level for calculations for Indirect Attainment.

A : 10-8.5 **B :** 8.4-7.0 **C :** 6.9-5.5 **D :** 5.4-4.0 **E :** 3.9-0

$$\text{Percentage attainment of PEOs} = \frac{\text{Satisfaction number}}{\text{Response Received}} \times 100$$

Expected Level of Attainment for each of the Programme Educational Objectives

Percentage of PEO Attainment	Level of Attainment
= 70% and above	Excellent
= 60% - <70 %	Very good
= 50% -< 60 %	Good
= 40% - < 50 %	Satisfactory
Below 40%	Not Satisfactory

SRI KALISWARI COLLEGE (AUTONOMOUS), Sivakasi

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DEPARTMENT OF COMPUTER SCIENCE

PG Programme - M.Sc. Computer Science

CURRICULUM STRUCTURE

OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(From 2023-2024 Batch onwards)

Courses	Sem I	Sem II	Sem III	Sem IV	Credits
Core Courses	5 (4) 5 (4) 5P(4) 5P(4)	5 (4) 4 (4) 5P(4) 4P(4)	5 (4) 5 (3) 5P(3) 4P(3)	5 (5) 5 (5)	55
Project with Viva Voce	-	-	-	12(6)	7
Elective Courses	5(3) 5(3)	4(3) 4(3)	4(3) 4(3)	4(3)	21
Non Major Elective Course	-	4(2)	3(2)	-	4
Skill Enhancement Course/Professional Competency Skill	-	-	-	4(2)	2
Internship/ Industrial Training	-	-	(2)	-	2
Extension Activity	-	-	-	(1)	1
Total Hours(Per week)/Credits	30(22)	30(24)	30(23)	30(22)	91 120

Self-paced Learning (Swayam Course)	-	-	2 Credits	-	2 Credits

SRI KALISWARI COLLEGE (AUTONOMOUS), Sivakasi

DEPARTMENT OF COMPUTER SCIENCE

PG Programme - M.Sc. Computer Science

CURRICULUM PATTERN

OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(From 2023-2024 Batch onwards)

PROGRAMME CODE – PCS

Semester	Course Code	Course Name	Hours	Credits	Internal Marks	External Marks
I	23PCSC11	**Core Course – I:** Analysis & Design of Algorithms	5	4	25	75
	23PCSC12	**Core Course – II:** Object Oriented Analysis and Design & C++	5	4	25	75
	23PCSO11 23PCSO12	**Elective Courses Generic/ Discipline Specific - I:** Python Programming Critical Thinking, Design Thinking and Problem Solving	5	3	25	75
	23PCSO13 23PCSO14	**Elective Courses Generic/ Discipline Specific - II:** Embedded Systems Digital Image Processing	5	3	25	75
	23PCSC1P	**Core Course – III:** Algorithm and OOPS Lab	5	4	25	75
	23PCSC1Q	**Core Course – IV:** Python Programming Lab	5	4	25	75
		Total	**30**	**22**		
II	23PCSC21	**Core Course – V:** Data Mining and Warehousing	5	4	25	75
	23PCSC22	**Core Course – VI:** Advanced Java Programming	4	4	25	75
	23PCSO21 23PCSO22	**Elective Courses Generic/ Discipline Specific - III:** Advanced Operating Systems Wireless Network	4	3	25	75
	23PCSO23 23PCSO24	**Elective Courses Generic/ Discipline Specific - IV:** Internet of Things Mobile Computing	4	3	25	75
	23PCSC2P	**Core Course – VII:** Advanced Java Programming Lab	5	4	25	75
	23PCSC2Q	**Core Course – VIII:** – Data Mining Lab using R	4	4	25	75
	23PCSN21	**Non Major Elective Course – I :** Office Automation	4	2	25	75
			30	**24**		

III	23PCSC31	**Core Course – IX :** Network Security and Cryptography	5	4	25	75
	23PCSC32	**Core Course – X:** Cloud Computing	5	3	25	75
	23PCSO31 23PCSO32	**Elective Courses Generic/ Discipline Specific - V:** Advanced Software Engineering Software Project Management	4	3	25	75
	23PCSO33 23PCSO34	**Elective Courses Generic/ Discipline Specific - VI:** Artificial Intelligence & Machine Learning Robotic Process Automation for Business	4	3	25	75
	23PCSC3P	**Core Course – XI:** Cloud Computing Lab	5	3	25	75
	23PCSC3Q	**Core Course – XII:** Network Security and Cryptography Lab	4	3	25	75
	23PCSN31	**Non Major Elective Course – II :** Web Designing	3	2	25	75
	23PCSJ31	Internship/Industrial Training	-	2	25	75
		Total	**30**	**23**		
IV	23PCSC41	**Core Course –XIII:** Data Science & Analytics	5	5	25	75
	23PCSC4P	**Core Course –XIV:** Web Application Development & Hosting Lab	5	5	25	75
	23PCSO41 23PCSO42	**Elective Courses Generic/ Discipline Specific - VII:** Block Chain Technology Compiler Design	4	3	25	75
	23PCSS4P	**Skill Enhancement Course**: **Professional Competency Course:** Computer Science for Competitive Exams	4	2	25	75
	23PCSJ41	**Core Course –XV:** Project and Viva Voce	12	6	25	75
		Extension Activity	-	1	25	75
		Total	**30**	**22**		

SRI KALISWARI COLLEGE (AUTONOMOUS), Sivakasi
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
(From 2023-2024 Batch onwards)

PROGRAMME ARTICULATION MATRIX (PAM)

Semester	Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	23PCSC11	**Core Course – I:** Analysis & Design of Algorithms	15	12	10	7	2	5	5
	23PCSC12	**Core Course – II:** Object Oriented Analysis and Design & C++	14	14	11	8	0	7	10
	23PCSO11 23PCSO12	**Elective Courses Generic/ Discipline Specific - I:** Python Programming Critical Thinking, Design Thinking and Problem Solving	14	14	11	8	0	7	10
	23PCSO13 23PCSO14	**Elective Courses Generic/ Discipline Specific - II:** Embedded Systems Digital Image Processing	15	11	3	5	1	2	5
	23PCSC1P	**Core Course – III:** Algorithm and OOPS Lab	15	10	8	5	2	5	5
	23PCSC1Q	**Core Course – IV:** Python Programming Lab	15	12	10	7	2	5	5
II	23PCSC21	**Core Course – V:** Data Mining and Warehousing	15	14	11	9	0	15	15
	23PCSC22	**Core Course – VI:** Advanced Java Programming	13	13	10	7	0	7	7
	23PCSO21 23PCSO22	**Elective Courses Generic/ Discipline Specific - III:** Advanced Operating Systems Wireless Network	15	11	3	5	1	2	5
	23PCSO23 23PCSO24	**Elective Courses Generic/ Discipline Specific - IV:** Internet of Things Mobile Computing	13	13	10	7	0	7	7
	23PCSC2P	**Core Course – VII:** Advanced Java Programming Lab	15	13	7	2	3	2	5
	23PCSC2Q	**Core Course – VIII:** – Data Mining Lab using R	15	11	3	5	1	2	5
	23PCSN21	**Non Major Elective Course – I :** Office Automation	13	13	7	2	3	2	5
III	23PCSC31	**Core Course – IX :** Network Security and Cryptography	12	12	9	9	10	2	7

	23PCSC32	**Core Course – X:** Cloud Computing	12	12	9	9	10	2	7
	23PCSO31 23PCSO32	**Elective Courses Generic/ Discipline Specific - V:** Advanced Software Engineering Software Project Management	15	12	2	3	2	8	3
	23PCSO33 23PCSO34	**Elective Courses Generic/ Discipline Specific - VI:** Artificial Intelligence & Machine Learning Robotic Process Automation for Business	15	11	3	5	1	2	5
	23PCSC3P	**Core Course – XI:** Cloud Computing Lab	15	15	13	5	5	10	6
	23PCSC3Q	**Core Course – XII:** Network Security and Cryptography Lab	13	12	11	3	5	10	10
	23PCSN31	**Non Major Elective Course – II :** Web Designing	12	8	2	10	0	7	5
	23PCSJ31	Internship/Industrial Training	8	12	4	7	1	5	8
IV	23PCSC41	**Core Course –XIII:** Data Science & Analytics	14	14	11	8	0	7	10
	23PCSC4P	**Core Course –XIV:** Web Application Development &Hosting Lab	13	13	10	7	4	5	6
	23PCSO41 23PCSO42	**Elective Courses Generic/ Discipline Specific - VII:** Block Chain Technology Compiler Design	15	13	7	2	3	2	5
	23PCSS4P	**Skill Enhancement Course**: **Professional Competency Course:** Computer Science for Competitive Exams	14	10	11	12	6	5	5
	23PCSJ41	**Core Course –XV:** Project and Viva Voce	14	10	11	12	6	5	5
		Extension Activity	8	2	1	7	9	8	5
Total Weightage of all Courses Contributing to PO			**365**	**311**	**198**	**177**	**76**	**146**	**176**

SRI KALISWARI COLLEGE (AUTONOMOUS), Sivakasi
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
(From 2023-2024 Batch onwards)

PROGRAMME ARTICULATION MATRIX – WEIGHTED PERCENTAGE

Semester	Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	23PCSC11	**Core Course – I:** Analysis & Design of Algorithms	4.11	3.86	5.05	3.95	2.63	3.42	2.84
	23PCSC12	**Core Course – II:** Object Oriented Analysis and Design & C++	3.84	4.5	5.56	4.52	0	4.79	5.68
	23PCSO11 23PCSO12	**Elective Courses Generic/ Discipline Specific - I:** Python Programming Critical Thinking, Design Thinking and Problem Solving	3.84	4.5	5.56	4.52	0	4.79	5.68
	23PCSO13 23PCSO14	**Elective Courses Generic/ Discipline Specific - II:** Embedded Systems Digital Image Processing	4.11	3.54	1.52	2.82	1.32	1.37	2.84
	23PCSC1P	**Core Course – III:** Algorithm and OOPS Lab	4.11	3.22	4.04	2.82	2.63	3.42	2.84
	23PCSC1Q	**Core Course – IV:** Python Programming Lab	4.11	4.5	5.56	5.08	0	10.27	8.52
II	23PCSC21	**Core Course – V:** Data Mining and Warehousing	3.56	4.18	5.05	3.95	0	4.79	3.98
	23PCSC22	**Core Course – VI:** Advanced Java Programming	4.11	3.54	1.52	2.82	1.32	1.37	2.84
	23PCSO21 23PCSO22	**Elective Courses Generic/ Discipline Specific - III:** Advanced Operating Systems Wireless Network	3.56	4.18	5.05	3.95	0	4.79	3.98
	23PCSO23 23PCSO24	**Elective Courses Generic/ Discipline Specific - IV:** Internet of Things Mobile Computing	4.11	4.18	3.54	1.13	3.95	1.37	2.84
	23PCSC2P	**Core Course – VII:** Advanced Java Programming Lab	4.11	3.54	1.52	2.82	1.32	1.37	2.84
	23PCSC2Q	**Core Course – VIII:** – Data Mining Lab using R	3.56	4.18	3.54	1.13	3.95	1.37	2.84
	23PCSN21	**Non Major Elective Course –**	3.56	1.93	0	4.52	1.32	3.42	2.84

		I : Office Automation							
III	23PCSC31	**Core Course – IX :** Network Security and Cryptography	3.29	3.86	4.55	5.08	13.16	1.37	3.98
	23PCSC32	**Core Course – X:** Cloud Computing	3.29	3.86	4.55	5.08	13.16	1.37	3.98
	23PCSO31 23PCSO32	**Elective Courses Generic/ Discipline Specific - V:** Advanced Software Engineering Software Project Management	4.11	3.86	1.01	1.69	2.63	5.48	1.7
	23PCSO33 23PCSO34	**Elective Courses Generic/ Discipline Specific - VI:** Artificial Intelligence & Machine Learning Robotic Process Automation for Business	4.11	3.54	1.52	2.82	1.32	1.37	2.84
	23PCSC3P	**Core Course – XI:** Cloud Computing Lab	4.11	4.82	6.57	2.82	6.58	6.85	3.41
	23PCSC3Q	**Core Course – XII:** Network Security and Cryptography Lab	3.56	3.86	5.56	1.69	6.58	6.85	5.68
	23PCSN31	**Non Major Elective Course – II :** Web Designing	3.29	2.57	1.01	5.65	0	4.79	2.84
	23PCSJ31	Internship/Industrial Training	2.19	3.86	2.02	3.95	1.32	3.42	4.55
	23PCSC41	**Core Course –XIII:** Data Science & Analytics	3.84	4.5	5.56	4.52	0	4.79	5.68
IV	23PCSC4P	**Core Course –XIV:** Web Application Development &Hosting Lab	3.56	4.18	5.05	3.95	5.26	3.42	3.41
	23PCSO41 23PCSO42	**Elective Courses Generic/ Discipline Specific - VII:** Block Chain Technology Compiler Design	4.11	4.18	3.54	1.13	3.95	1.37	2.84
	23PCSS4P	**Skill Enhancement Course**: **Professional Competency Course:** Computer Science for Competitive Exams	3.84	3.22	5.56	6.78	7.89	3.42	2.84
	23PCSJ41	**Core Course –XV:** Project and Viva Voce	3.84	3.22	5.56	6.78	7.89	3.42	2.84
		Extension Activity	2.19	0.64	0.51	3.95	11.84	5.48	2.84
Total Weighted Percentage of Course Contribution to Pos			**100**	**100**	**100**	**100**	**100**	**100**	**100**

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - I
CORE COURSE – I: ANALYSIS & DESIGN OF ALGORITHMS (23PCSC11)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 4 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- Enable the students to learn the elementary data structures and algorithms.
- Presents an introduction to the algorithms, their analysis and design
- Discuss various methods like Basic Traversal and Search Techniques, divide and conquer method, Dynamic programming, backtracking
- Understood the various design and analysis of the algorithms

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: describe the fundamentals of designing and analyzing the algorithm

CO2[K2]: explain elementary data structures, divide & conquer, greedy method, basic traversal & searching technique, backtracking

CO3[K3]: use binary search, merge & quick sort, minimum cost spanning trees, knapsack to solve simple sorting & searching problem

CO4[K4]: analyze divide and conquer, greedy, dynamic programming, backtracking methodologies and compare different data structures

CO5[K5]: choose elementary data structures, sorting techniques, dynamic programming and basic traversal searching techniques.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	2	1	1	1	1
CO2[K2]	3	3	2	1	-	1	1
CO3[K3]	3	2	2	1	-	1	1
CO4[K4]	3	2	2	2	-	1	1
CO5[K5]	3	2	2	2	1	1	1
Weightage of the course	15	12	10	7	2	5	5
Weighted percentage of Course contribution to Pos	**4.11**	**3.86**	**5.05**	**3.95**	**2.63**	**3.42**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(15 hrs)**

Introduction: - Algorithm Definition and Specification – Space complexity- Time Complexity- Asymptotic Notations - Elementary Data Structure: Stacks and Queues – Binary Tree - Binary Search Tree - Heap – Heapsort- Graph.

UNIT II **(15 hrs)**

Basic Traversal And Search Techniques: Techniques for Binary Trees- Techniques for Graphs -Divide and Conquer: - General Method – Binary Search – Merge Sort – Quick Sort.

UNIT III **(15 hrs)**

The Greedy Method:- General Method–Knapsack Problem–Minimum Cost Spanning Tree– Single Source Shortest Path.

UNIT IV **(15 hrs)**

Dynamic Programming:- General Method–Multistage Graphs–All Pair Shortest Path–Optimal Binary Search Trees – 0/1 Knapsacks – Traveling Salesman Problem – Flow Shop Scheduling.

UNIT V **(15 hrs)**

Backtracking:-General Method–8-Queens Problem–Sum Of Subsets–Graph Coloring– Hamiltonian Cycles – Branch And Bound: - The Method – Traveling Salesperson.

TEXTBOOKS

1. Ellis Horowitz. *Computer Algorithms.* Galgotia Publications.
2. Alfred V.Aho,John E.Hopcroft, Jeffrey D.Ullman. *Data Structures and Algorithms*.

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1. Good rich. *DataStructures & Algorithms in Java.* Wiley, Third Edition.
2. Skien. *The Algorithm Design Manual.* Springer, Second Edition, 2008.
3. Anany Levith. *Introduction to the Design and Analysis of algorithm*. Asia : Pearson Education, 2003.
4. Robert Sedgewick, Phillipe Flajolet. *An Introduction to the Analysis of Algorithms*. Addison-Wesley Publishing, 1996.

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1. https://nptel.ac.in/courses/106/106/106106131/
2. https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
3. https://www.javatpoint.com/daa-tutorial

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - I
CORE COURSE – II: OBJECT ORIENTED ANALYSIS AND DESIGN & C++
(23PCSC12)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 4 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- To understand the concepts of the object model, classes and objects, objectorientation, machine view and model management view.
- Develop, explore the conceptual model into various scenarios and applications.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: define the concepts of Object-Oriented Analysis and Design

C02[K2]: illustrate the concepts of Objects and various C++ OOPs features

CO3[K3]: apply C++ concepts to solve simple problems

CO4[K4]: examine Object Oriented features of C++

CO5[K5]: develop simple C++ program with Object Oriented Concepts

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	2	1	-	1	1
CO2[K2]	3	2	1	2	-	1	1
CO3[K3]	3	3	2	2	-	1	3
CO4[K4]	2	3	3	2	-	2	2
CO5[K5]	3	3	3	1	-	2	3
Weightage of the course	14	14	11	8	0	7	10
Weighted percentage of Course contribution to POs	**3.84**	**4.5**	**5.56**	**4.52**	**0**	**4.79**	**5.68**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(15 hrs)**

The Object Model: The Evolution of the Object Model – Elements of the Object Model – Applying the Object Model. **Classes and Objects:** The Nature of an Object – Relationship among Objects**.**

UNIT II **(15 hrs)**

Classes and Object: Nature of Class – Relationship Among classes – The Interplay of classes and Objects. **Classification:** The importance of Proper Classification – identifying classes and objects – Key Abstractions and Mechanism.

UNIT III **(15 hrs)**

Introduction to C++: Input and output statements in C++ - Declarations - control structures – Functions in C++.

UNIT IV **(15 hrs)**

Classes and Objects – Constructors and Destructors – operators overloading – Type Conversion - Inheritance – Pointers and Arrays.

UNIT V **(15 hrs)**

Memory Management Operators – Polymorphism – Virtual functions – Files – Exception Handling – String Handling -Templates.

TEXTBOOKS

a. Grady Booch. *Object Oriented Analysis and Design with Applications.* SecondEdition, Pearson Education.

b. Ashok N.Kamthane. *Object-Oriented Programming with ANSI & Turbo C++.* Pearson Education, 2003.

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1. Balagurusamy. *Object Oriented Programming with C++*. TMH. Second Edition, 2003.

Web sources

1. https://onlinecourses.nptel.ac.in/noc19_cs48/preview
2. https://nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs19/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - I
ELECTIVE COURSES GENERIC/ DISCIPLINE SPECIFIC - I: PYTHON PROGRAMMING (23PCSO11)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- To present introduction to Python, creation of web applications, network applications and working in the clouds
- To use functions for structuring Python programs
- To understand different Data Structures of Python
- To Represent compound data using Python lists, tuples and dictionaries

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: define the concepts of Python Paradigms

CO2[K2]: explain the Python concepts

CO3[K3]: develop simple python applications using functions, dictionaries, files, client server and map reduce

CO4[K4]: examine modules, packages, dictionaries, Map reducing, web client and web server, and working in clouds

CO5[K5]: assess objects, exception handling ,map reduce, client server in python applications

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	2	1	-	1	1
CO2[K2]	3	2	1	2	-	1	1
CO3[K3]	3	3	2	2	-	1	3
CO4[K4]	2	3	3	2	-	2	2
CO5[K5]	3	3	3	1	-	2	3
Weightage of the course	14	14	11	8	0	7	10
Weighted percentage of Course contribution to Pos	**3.84**	**4.5**	**5.56**	**4.52**	**0**	**4.79**	**5.68**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT -I **(15 hrs)**

Python: Introduction – Numbers – Strings – Variables – Lists – Tuples – Dictionaries – Sets – Comparison.

UNIT -II **(15 hrs)**

Code Structures: if, else if, and else – Repeat with while – Iterate with for – Comprehensions – Functions – Generators – Decorators – Namespaces and Scope – Handle Errors with try and except – User Exceptions.

UNIT -III **(15 hrs)**

Modules, Packages, and Programs: Standalone Programs – Command - Line Arguments – Modules and the import Statement – The Python Standard Library. **Objects and Classes:** Define a Class with class – Inheritance – Override a Method – Add a Method – Get Help from Parent with super–Inself Defense –Get and Set Attribute Values with Properties –Name Mangling for Privacy – Method Types – Duck Typing – Special Methods –Composition.

UNIT- IV **(15 hrs)**

Data Types: TextStrings – Binary Data. **Storing and Retrieving Data:** File Input/Output – Structured Text Files – Structured Binary Files - Relational Databases – NoSQL Data Stores. **Web:** Web Clients – Web Servers – Web Services and Automation

UNIT-V **(15 hrs)**

Systems: Files – Directories – Programs and Processes – Calendars and Clocks. **Concurrency:** Queues – Processes – Threads – Green Threads and event – twisted – Redis. **Networks:** Patterns – The Publish - Subscribe Model – TCP/IP – Sockets – ZeroMQ – Internet Services – Web Services and APIs – Remote Processing – Big Fat Data and MapReduce – Working in the Clouds.

TEXTBOOKS

1. Bill Lubanovic. *Introducing Python*. O'Reilly, First Edition, 2014.
2. MarkLutz. *Learning Python*. O'Reilly, Fifth Edition, 2013.

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Books

1. David M.Beazley. *Python Essential Reference developer's library,* Fourth Edition, 2009.
2. Sheetal Taneja, Naveen Kumar. *Python Programming - A Modular Approach*. Pearson Publications.

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1. https://www.programiz.com/python-programming/
2. https://www.tutorialspoint.com/python/index.htm
3. https://onlinecourses.swayam2.ac.in/aic20_sp33/preview

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - I
(2023 – 2025)
ELECTIVE COURSES GENERIC/ DISCIPLINE SPECIFIC - I: CRITICAL THINKING, DESIGN THINKING AND PROBLEM SOLVING (23PCSO12)
(For those who have joined in June 2023 and later)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- Learn critical thinking and its related concepts
- Learn design thinking and its related concepts
- Develop Thinking patterns, Problem solving & Reasoning

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: explain the concepts of Critical thinking and its related technology

CO2[K2]: define the critical thinking and problem solving skills

CO3[K3]: apply design thinking in problems

CO4[K4]: analyze the concepts of Thinking patterns, Problem solving & Reasoning in real time applications

CO5[K5]: categorize a decision and take actions based on analysis

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	2	1	-	1	1
CO2[K2]	3	2	1	2	-	1	1
CO3[K3]	3	3	2	2	-	1	3
CO4[K4]	2	3	3	2	-	2	2
CO5[K5]	3	3	3	1	-	2	3
Weightage of the course	14	14	11	8	0	7	10
Weighted percentage of Course contributio nto Pos	**3.84**	**4.5**	**5.56**	**4.52**	**0**	**4.79**	**5.68**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – Critical Thinking **(15 hrs)**

Critical Thinking: Definition - Conclusions and Decisions - Beliefs and Claims - Evidence – finding – evaluation – Inferences - Facts – opinion - probable truth - probably false - Venn diagram. **Applied critical thinking:** Inference – Explanation – Evidence – Credibility - Two Case Studies - critical thinking and science - critical evaluation - self assessment.

UNIT II – Design Thinking **(15 hrs)**

Design Thinking: Introduction - Need of Design Thinking - problem to question - design thinking process - Traditional Problem Solving versus Design Thinking - phases of Design Thinking - problem exploration - Stake holder assessment - design thinking for manufacturers - smart Idea to implementation.

UNIT III – Case Study **(15 hrs)**

Thinking to confidence - fear management - duty Vs passion - Team management - Tools for Thinking - prototype design - Relevance of Design and Design Thinking in engineering - human centered design - case study: apply design thinking in problem.

UNIT IV – Problem Solving **(15 hrs)**

Problem solving: problem definition - problem solving methods – selecting and using information – data processing – solution methods – solving problems by searching - recognizing patterns - spatial reasoning – necessity and sufficiency – choosing and using models – making choices and decisions.

UNIT V – Reasoning **(15 hrs)**

Reasoning: Deductive and hypothetical reasoning - computational problem solving – generating – implementing - and evaluating solutions - interpersonal problem solving. **Advanced problem solving:** Combining skills – using imagination - developing models - Carrying out investigations - Data analysis and inference - Graphical methods of solution – Probability - tree diagrams and decision trees.

TEXTBOOKS

1. John Butterworth and Geoff Thwaites. *Thinking skills: Critical Thinking and Problem Solving*. Cambridge University Press, 2013.
2. H.S.Fogler and S.E.LeBlanc. *Strategies for Creative Problem Solving.* Pearson, Upper Saddle River, NJ, 2008.

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1. A. Whimbey and J. Lochhead. *Problem Solving & Comprehension.* Lawrence Erlbaum, Mahwah, NJ, 1999.
2. M. Levine. *Effective Problem Solving*. Prentice Hall, Upper Saddle River, NJ, 1994.
3. Michael Baker. *The Basic of Critical Thinking, The Critical Thinking Co press,* 2015.
4. David Kelley and Tom Kelley. *Creative Confidence.* 2013.

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1. https://www.tutorialspoint.com/critical_thinking/index.htm
2. https://www.tutorialspoint.com/design_thinking/design_thinking_quick_guide.htm
3. https://nptel.ac.in/courses/109/104/109104109/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - I
ELECTIVE COURSES GENERIC/ DISCIPLINE SPECIFIC - II: EMBEDDED SYSTEMS
(23PCSO13)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- Present the introduction to 8051 Microcontroller Instruction Set, concepts on RTOS & Software tools.
- Gain the knowledge about the embedded software development.
- Learn about Microcontroller and software tools in the embedded systems.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: describe the concepts in Embedded System

CO2[K2]: discuss Embedded System features

CO3[K3]: apply 8051 instruction set and programming and embedded software development tools

CO4[K4]: analyze various real time embedded systems using RTOS

CO5[K5]: evaluate the importance of Embedded System

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	1	-	1	-	-	1
CO2[K2]	3	2	1	1	1	-	1
CO3[K3]	3	3	1	1	-	1	1
CO4[K4]	3	2	1	1	-	-	1
CO5[K5]	3	3	-	1	-	1	1
Weightage of the course	15	11	3	5	1	2	5
Weighted percentage of Course contribution to POs	**4.11**	**3.54**	**1.52**	**2.82**	**1.32**	**1.37**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – 8051 MICROCONTROLLER **(15 hrs)**

8051 Microcontroller: Introduction – 8051 Architecture – Input / Output Pins, Ports and Circuits - External Memory - Counters / Timers - Serial Data Input / Output –Interrupts.

UNIT II – PROGRAMMING BASICS **(15 hrs)**

Instruction Set and Programming: Moving Data - Addressing Modes - Logical operations - Arithmetic Operation - Jump and Call Instructions - Simple Program. **Applications:** Keyboard Interface - Display Interface - Pulse Measurements - DIA and AID Conversions - Multiple Interrupts.

UNIT III – CONCEPT ON RTOS **(15 hrs)**

Concepts on RTOS: Introduction to RTOS - Selecting an RTOS - Task and Task states - Tasks and data - Semaphores and shared data. **More operating systems services:** Interrupt Process communication - Message Queues, Mailboxes and pipes - Timer Functions - Events - Memory Management - Interrupt Routines in an RTOS Environment.

UNIT IV – DESIGN USING RTOS **(15 hrs)**

Basic Design using a RTOS: Principles - Encapsulating semaphores and Queues - Hard real time scheduling considerations - Saving memory space and power - introductions to RTL & QNX.

UNIT V – SOFTWARE TOOLS **(15 hrs)**

Embedded software Development Tools: Hosts and Target Machines - Linker/Locators for Embedded software - getting embedded software into the Target systems. **Debugging Techniques:** Testing on your Host machine - Instruction set simulators - The assert macro - using laboratory tools.

TEXTBOOKS

1. David E.Simon. *An Embedded Software primer*. Asia: Pearson Education, 2003.
2. Kenneth J.Ayala. *The 8051 Microcontroller and Architecture programming and application*. Penram International, Second Edition.

REFERENCES

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1. Raj Kamal. *Embedded Systems - Architecture, programming and design*. Tata McGraw Hill, 2003.

Web Sources

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2. https://www.javatpoint.com/embedded-system-tutorial
3. https://www.tutorialspoint.com/embedded_systems/index.htm

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - I
ELECTIVE COURSES GENERIC/ DISCIPLINE SPECIFIC - II: DIGITAL IMAGE PROCESSING
(23PCSO14)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- This course introduces the learners to the fundamental concepts of Image processing and various techniques to enhance an image in spatial and frequency domain and also the knowledge in image segmentation, compression and restoration.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: describe the fundamental concepts of digital image, image enhancement, image restoration, image compression, image segmentation and edge detection

CO2[K2]: explain the image enhancement using filters, filters in image restoration, morphological image processing, image segmentation and edge detection

CO3[K3]: use various filters in image enhancement and image restoration and basic algorithms for morphological image processing , image compression and various operators in edge detection

CO4[K4]: compare lossy and lossless compression and various operators in Edge detection

CO5[K5]: choose appropriate technique for image enhancement, restoration, compression, segmentation and Edge detection

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	1	-	1	-	-	1
CO2[K2]	3	2	1	1	1	-	1
CO3[K3]	3	3	1	1	-	1	1
CO4[K4]	3	2	1	1	-	-	1
CO5[K5]	3	3	-	1	-	1	1
Weightage of the course	15	11	3	5	1	2	5
Weighted percentage of Course contribution to POs	**4.11**	**3.54**	**1.52**	**2.82**	**1.32**	**1.37**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(15 hrs)**

Introduction: Fundamental Steps in Digital Image Processing – Components of an Image Processing System. **Digital Image Fundamentals:** Elements of Visual Perception – Light and the Electromagnetic System – Image Sensing and Acquisition – Image Sampling and Quantization – Some Basic Relationship between Pixels – Linear and Nonlinear Operations.

UNIT II **(15 hrs)**

Image Enhancement in Spatial Domain: Some Basic Gray Level Transformation – Histogram Processing - Enhancement using Arithmetic/Logic Operations – Basics of Spatial Filtering – Smoothing Spatial Filtering – Sharpening Spatial Filters. **Image Enhancement in Frequency Domain:** Smoothing Frequency Domain Filters – Sharpening Frequency Domain Filters – Homomorphic Filtering.

UNIT III **(15 hrs)**

Image Restoration: A Model of the Image Degradation/Restoration Process Noise Models – Restoration in the Presence of Noise Only Spatial Filtering – Periodic Noise Reduction by Frequency Domain Filtering – Inverse Filtering – Minimum Mean Square Error (Wiener) Filtering – Constrained Least Square Filtering – Geometric Mean Filter.

UNIT IV **(15 hrs)**

Image Compression: Fundamentals – Image Compression Models - Elements of Information Theory - Error-Free Compression – Lossy Compression – Image Compression Standards. **Morphological Image Processing:** Preliminaries – Dilation and Erosion – Opening and Closing – The Hit or Miss Transformation – Some Basic Morphological algorithm.

UNIT V **(15 hrs)**

Image Segmentation: Detection of Discontinuation – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Segmentation by Morphological Watersheds – The Use of Motion in Segmentation. **Edge Detection:** Gradient Operators – Compass Operators – Laplace operators and Zero Crossings – Stochastic Gradients – Performance of Edge Detection Operators – Line and Spot Detection.

TEXTBOOKS

1. Rafael C. Gonzalez, Richard E. Woods. *Digital Image Processing*. Pearson, Second Edition.
2. A.K Jain. *Fundamentals of Image Processing*. New Delhi: PHI Private Limited, 2001.

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1. Anil K. Jain. *Fundamentals of Digital Image Processing.* Pearson, 2002.
2. Madhuri A.Joshi. *Digital Image Processing - An Algorithmic Approach.* New Delhi: PHI Learning, 2009.
3. HandaB, Dutta MajumderD. *Digital Image Processing and Analysis.* New Delhi: PHI Learning, 2009.

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1. https://www.tutorialspoint.com/dip/index.htm
2. http://www.owlnet.rice.edu/~elec539/Projects99/BACH/proj2/intro.html
3. https://www.cs.auckland.ac.nz/courses/compsci773s1c/lectures/ImageProcessinghtml/topic3.htm

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - I
CORE COURSE – III: ALGORITHM AND OOPS LAB (23PCSC1P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 4 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- This course covers the basic data structuresl like Stack,Queue,Tree and List.
- This course enables the students to learn the applications of the data structures using various techniques
- It also enables the students to understand C++ language with respect to OOAD concepts and application of OOPS concepts.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K2]: demonstrate the concepts of OOPs using C++.

CO2[K3]: use the OOPs concepts for sorting and searching methods

CO3[K4]: simplify the development of solution using C++ andalgorithms.

CO4[K5]: choose required data structure and C++ concepts to solve a problem.

CO5[K6]: develop simple C++ programs

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	1	1	1	1	1
CO2[K3]	3	2	1	1	-	1	1
CO3[K4]	3	2	2	1	-	1	1
CO4[K5]	3	2	2	1	-	1	1
CO5[K6]	3	2	2	1	1	1	1
Weightage of the course	15	10	8	5	2	5	5
Weighted percentage of Course contribution to Pos	**4.11**	**3.22**	**4.04**	**2.82**	**2.63**	**3.42**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

1. Write a program to solve the tower of Hanoi using recursion.
2. Write a program to traverse through binary search tree using traversals.
3. Write a program to perform various operations on stack using linked list.
4. Write a program to perform various operation in circular queue.
5. Write a program to sort an array of an elements using quick sort.
6. Write a program to solve number of elements in ascending order using heap sort.
7. Write a program to solve the knapsack problem using greedy method
8. Write a program to search for an element in a tree using divide& conquer strategy.
9. Write a program to place the 8 queens on an 8X8 matrix so that no twoqueens attack.
10. Write a C++ program to perform Virtual Function
11. Write a C++ program to perform Parameterized Constructor
12. Write a C++ program to perform Friend Function
13. Write a C++ program to perform Function Overloading
14. Write a C++ program to perform Single Inheritance
15. Write a C++ program to perform Employee Details using files

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - I
CORE COURSE - IV: PYTHON PROGRAMMING LAB (23PCSC1Q)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 4 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- To presents an overview of elementary data items, lists, dictionaries, sets and tuples
- To understand and write simple python programs
- To understand OOPS concepts of Python
- To develop web applications using Python

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K2]: demonstrate basic python concepts

CO2[K3]: use different python features

CO3[K4]: compute various operations using python

CO4[K5]: choose required python constructs to solve simple problem

CO5[K6]: develop applications using python

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	2	1	-	3	3
CO2[K3]	3	2	1	2	-	3	3
CO3[K4]	3	3	2	2	-	3	3
CO4[K5]	3	3	3	2	-	3	3
CO5[K6]	3	3	3	2	-	3	3
Weightage of the course	15	14	11	9	0	15	15
Weighted percentage of Course contribution to POs	**4.11**	**4.5**	**5.56**	**5.08**	**0**	**10.27**	**8.52**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

Implement the following problems using Python Programming

1. Programs using elementary data items, lists, dictionaries and tuples
2. Programs using conditional branches
3. Programs using loops
4. Programs using functions
5. Programs using exception handling
6. Programs using inheritance
7. Programs using polymorphism
8. Programs to implement file operations
9. Programs using modules.
10. Programs for creating dynamic and interactive web pages using forms

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - II
CORE COURSE – V: DATA MINING AND WAREHOUSING (23PCSC21)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 4 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- To enable the students to learn the concepts of Mining tasks, classification, clustering and Data Warehousing,
- To develop skills by using recent data mining software for solving practical problems

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: describe basic concepts of data mining and warehousing

CO2[K2]: explain data mining techniques and concepts of warehousing

CO3[K3]: use data mining algorithms

CO4[K4]: compare and evaluate different data mining techniques

CO5[K5]: evaluate the use of data mining algorithms to solve real world problems

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	1	1	-	1	1
CO2[K2]	3	2	1	2	-	1	1
CO3[K3]	3	3	2	2	-	1	1
CO4[K4]	2	3	3	1	-	2	2
CO5[K5]	2	2	3	1	-	2	2
Weightage of the course	13	13	10	7	0	7	7
Weighted percentage of Course contribution to Pos	**3.56**	**4.18**	**5.05**	**3.95**	**0**	**4.79**	**3.98**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(15 hrs)**

Basic data mining tasks – data mining versus knowledge discovery in databases – data mining issues – data mining metrics – social implications of data mining – data mining from a database perspective.**Data mining techniques:** Introduction – a statistical perspective on data mining – similarity measures – decision trees – neural networks – genetic algorithms.

UNIT II **(15 hrs)**

Classification: Introduction –Statistical –based algorithms - distance–based algorithms - decision tree - based algorithms - neural network – based algorithms – rule-based algorithms – combining techniques.

UNIT III **(15 hrs)**

Clustering: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms - Partitional Algorithms. **Association rules:** Introduction - large item sets - basic algorithms – parallel & distributed algorithms – comparing approaches - incremental rules – advanced association rules techniques – measuring the quality of rules.

UNIT IV **(15 hrs)**

Data warehousing: Introduction - characteristics of a data warehouse – data marts – other aspects of data mart. **Online analytical processing:** introduction – OLTP & OLAP systems - Data modeling – star schema for multidimensional view – data modeling – multifact star schema or snow flake schema – OLAP TOOLS – State of the market – OLAP TOOLS and the internet.

UNIT V **(15 hrs)**

Developing a data warehouse: Why and how to build a data warehouse – data warehouse architectural strategies and organization issues - design consideration – data content – metadata distribution of data – tools for data warehousing – performance considerations – crucial decisions in designing a data warehouse. **Applications of data warehousing and data mining in government:** Introduction - national data warehouses – other areas for data warehousing and data mining.

TEXTBOOKS

1. Margaret H.Dunham. *Data Mining: Introductory and Advanced Topics*. Pearson education, 2003.
2. C.S.R. Prabhu. *Data Warehousing Concepts, echniques, Products and Applications.* PHI, Second Edition.

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1. Arun K.Pujari. *DataMiningTechniques*. Universities Press (India) Pvt. Ltd., 2003.
2. Alex Berson, Stephen J.Smith. *Data Warehousing, Data Mining and OLAP*. TMCH, 2001.
3. Jiawei Han & Micheline Kamber. *Data Mining Concepts and Techniques*. Academic press, 2001

Web Sources

1. https://www.javatpoint.com/data-warehouse
2. https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-cs12/
3. https://www.btechguru.com/training--it--database-management-systems--file- structures--introduction-to-data-warehousing-and-olap-2-video-lecture-- 12054--26--151.html

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - II
CORE COURSE – VI: ADVANCED JAVA PROGRAMMING (23PCSC22)
(For those who have joined in June 2023 and later)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 4 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- Enable the students to learn the basic functions, principles and concepts of advanced java programming.
- Provide knowledge on concepts needed for distributed Application Architecture.
- Learn JDBC, Servlet packages, JQuery, Java Server Pages and JAR file format.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: define various concepts of Java Programming

CO2[K2]: explain various Java Programming concepts

CO3[K3]: apply the concepts of Java to develop simple programs

CO4[K4]: examine advanced Java programming techniques

CO5[K6]: develop simple java programming applications

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	1	-	1	-	-	1
CO2[K2]	3	2	1	1	1	-	1
CO3[K3]	3	3	1	1	-	1	1
CO4[K4]	3	2	1	1	-	-	1
CO5[K6]	3	3	-	1	-	1	1
Weightage of the course	15	11	3	5	1	2	5
Weighted percentage of Course contribution to Pos	**4.11**	**3.54**	**1.52**	**2.82**	**1.32**	**1.37**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – BASICS OF JAVA **(12 hrs)**

Java Basics Review: Components and event handling – Threading concepts – Networking features – Media techniques.

UNIT II – REMOTE METHOD INVOCATION **(12 hrs)**

Remote Method Invocation - Distributed Application Architecture - Creating stubs and skeletons - Defining Remote objects - Remote Object Activation - Object Serialization - Java Spaces.

UNIT III – DATABASE **(12 hrs)**

Java in Databases – JDBC principles – database access – Interacting – database search – Creating multimedia databases – Database support in web applications.

UNIT IV – SERVLETS **(12 hrs)**

Java Servlets: Java Servlet and CGI programming - A simple java Servlet - Anatomy of a java Servlet – Reading data from a client - Reading http request header - sending data to a client and writing the http response header - working with cookies. **Java Server Pages:** JSP Overview – Installation - JSP tags - Components of a JSP page – Expressions – Scriptlets - Directives-Declarations - A complete example.

UNIT V – ADVANCED TECHNIQUES **(12 hrs)**

JAR file format creation – Internationalization – Swing Programming – Advanced java Techniques.

TEXTBOOKS

1. Jamie Jaworski. *Java Unleashed.* SAMS Techmedia Publications, 1999.
2. Campione, Walrath and Huml. *The Java Tutorial.* Addison Wesley, 1999.

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1. Jim Keogh. *The Complete Reference J2EE*. Tata McGraw Hill Publishing Company Ltd, 2010.
2. David Sawyer McFarland. *JavaScript And JQuery – The Missing Manual.* Oreilly Publications, 2011.
3. Deitel and Deitel. *Java How to Program.* Pearson Education Asia.

Web Sources

1. https://www.javatpoint.com/servlet-tutorial
2. https://www.tutorialspoint.com/java/index.htm
3. https://onlinecourses.nptel.ac.in/noc19_cs84/preview

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- II
ELECTIVE COURSES GENERIC/ DISCIPLINE SPECIFIC - III: ADVANCED OPERATING SYSTEMS (23PCSO21)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- Enable the students to learn the different types of operating systems and their functioning.
- Gain knowledge on Distributed Operating Systems
- Gain insight into the components and management aspects of real time and mobile operating systems.
- Learn case studies in Linux Operating Systems

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1[K1]: define the basic concepts, principles and functions of Operating System.
CO2[K2]: explain the features of various operating systems.
CO3[K3]: determine concepts of RTOS, Distributed OS, Handheld device OS
CO4[K4]: analyze the concepts of operating system.
CO5[K5]: assess how an operating system functions

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	1	1	-	1	1
CO2[K2]	3	2	1	2	-	1	1
CO3[K3]	3	3	2	2	-	1	1
CO4[K4]	2	3	3	1	-	2	2
CO5[K5]	2	2	3	1	-	2	2
Weightage of the course	13	13	10	7	0	7	7
Weighted percentage of Course contribution to POs	**3.56**	**4.18**	**5.05**	**3.95**	**0**	**4.79**	**3.98**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

Basics of Operating Systems: What is an Operating System? – Main frame Systems –Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems –Real-Time Systems – Handheld Systems – Feature Migration – Computing Environments -Process Scheduling – Cooperating Processes – Inter Process Communication- Deadlocks –Prevention – Avoidance – Detection – Recovery.

UNIT II **(12 hrs)**

Distributed Operating Systems: Issues – Communication Primitives – Lamport‟s Logical Clocks – Deadlock handling strategies – Issues in deadlock detection and resolution-distributed file systems –design issues – Case studies – The Sun Network File System-Coda.

UNIT III **(12 hrs)**

Realtime Operating Systems : Introduction – Applications of Real Time Systems – Basic Model of Real Time System – Characteristics – Safety and Reliability - Real Time Task Scheduling

UNIT IV **(12 hrs)**

Operating Systems for Handheld Systems: Requirements–Technology Overview–Handheld Operating Systems– PalmOS - Symbian Operating System-Android–Architecture of android– Securing handheld systems

UNIT V **(12 hrs)**

Case Studies : Linux System: Introduction – Memory Management – Process Scheduling – Scheduling Policy - Managing I/O devices – Accessing Files- iOS : Architecture and SDK Framework - Media Layer - Services Layer - Core OS Layer - File System

TEXTBOOKS

1. Abraham Silberschatz, Peter Baer Galvin and GregGagne. *Operating System Concepts*. John Wiley & Sons, Seventh Edition, 2004.
2. MukeshSinghal and Niranjan G. Shivaratri.*Advanced Concepts in Operating Systems –Distributed, Database, and Multiprocessor Operating Systems.* Tata McGraw-Hill, 2001

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1. RajibMall.*Real-Time Systems:Theory and Practice*. India: Pearson Education,2006.
2. Pramod Chandra P.Bhatt,. *An introduction to operating systems, concept and practice*, PHI, Third edition, 2010.
3. Daniel.P.Bovet & MarcoCesati. *Understanding the Linux kernel*,O"Reilly,Third Edition,2005
4. Neil Smyth*. iPhone iOS4 Development Essentials–Xcode.* Payload media, FourthEdition, 2011.

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1. https://onlinecourses.nptel.ac.in/noc20_cs04/preview
2. https://www.udacity.com/course/advanced-operating-systems--ud189
3. https://minnie.tuhs.org/CompArch/Resources/os-notes.pdf

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- II
ELECTIVE COURSES GENERIC/ DISCIPLINE SPECIFIC - III: WIRELESS NETWORK (23PCSO22)

(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- This course introduces the learners to the Wireless Networks Concepts of IEEE 802.11, IEEE 802.15 standards, LAN, MAN, WAN, OSI and TCP/IP.
- Present the overview of Wireless network and Architectures.
- Enable the students to learn the concept of wireless network.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: define the basics of wireless networks, spread spectrum, IEEE architecture

CO2[K2]: explain wireless networks, protocol architecture, IEEE architecture, IoT and bluetooth and LTE

CO3[K3]: outline the process of FHSS, DSSS, CDMA, LAN, MAN, WAN, OSI, TCP/IP, Bluetooth, LTE, IEEE 802.11 and IEEE 802.15 standards.

CO4[K4]: compare the FHSS, DSSS, CDMA, LAN, MAN, WAN, OSI,TCP/IP, Bluetooth, LTE, IEEE 802.11 and IEEE 802.15 standards.

CO5[K5]: evaluate the FHSS, DSSS, CDMA, LAN, MAN, WAN, OSI, TCP/IP, Bluetooth, LTE,IEEE 802.11 and IEEE 802.15 standards

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	1	1	-	1	1
CO2[K2]	3	2	1	2	-	1	1
CO3[K3]	3	3	2	2	-	1	1
CO4[K4]	2	3	3	1	-	2	2
CO5[K5]	2	2	3	1	-	2	2
Weightageof the course	13	13	10	7	0	7	7
Weighted percentage of Course contribution to POs	**3.56**	**4.18**	**5.05**	**3.95**	**0**	**4.79**	**3.98**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

Transmission Fundamentals: Signals for Conveying Information – Analog and Digital Data Transmission – Channel Capacity – Transmission Media – Multiplexing. **Communication Networks:** LANs, MANs, and WANs **-** Switching Techniques - Circuit Switching - Packet Switching - Quality of Service.

UNIT II **(12 hrs)**

Protocols and the TCP/IP suite: The Need for a Protocol Architecture – The TCP/IP Protocol Architecture – The OSI Model. **Spread Spectrum**: The Concept of Spread Spectrum – Frequency Hopping Spread Spectrum - Direct Sequence Spread Spectrum - Code Division Multiple Access.

UNIT III **(12 hrs)**

Wireless LAN Technology: IEEE 802 Architecture – IEEE 802.11 Architecture and Services – IEEE 802.11 Medium Access Control – IEEE 802.11 Physical Layer – Gigabit WI-FI – Other IEEE 802.11 Standards - IEEE 802.11i Wireless LAN Security.

UNIT IV **(12 hrs)**

Bluetooth and IEEE 802.15: he Internet of Things – Bluetooth Motivation and Overview **-** Bluetooth Specifications - Bluetooth High Speed and Bluetooth Smart – IEEE 802.15 – ZigBee.

UNIT V **(12 hrs)**

Fourth Generation Systems and LTE-Advanced: LTE Architecture - Evolved Packet Core - LTE Resource Management - LTE Channel Structure and Protocols - LTE Radio Access Network - LTE-Advanced.

TEXTBOOK

1. Cory Beard, William Stallings. *Wireless Communication Networks and Systems.* Pearson, Sixth Edition, 2016.

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1. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming. *3G Evolution HSPA and LTE for Mobile Broadband*. Academic Press, Second Edition, 2008.
2. Anurag Kumar, D.Manjunath, Joy kuri. *Wireless Networking.* Elsevier, First Edition, 2011.
3. Jochen Schiller. *Mobile Communications.* Pearson Education, Second Edition,2012.
4. Simon Haykin , Michael Moher, David Koilpillai. *Modern Wireless Communications.* Pearson Education, First Edition ,2013

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1. https://www.cisco.com/c/en_in/solutions/small-business/resource-center/networking/wireless-network.html
2. https://searchnetworking.techtarget.com/tip/The-4-different-types-of-wireless-networks
3. https://www.shireeninc.com/types-of-wireless-networks/
4. https://en.wikipedia.org/wiki/Wireless_network

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - II
ELECTIVE COURSES GENERIC/DISCIPLINE SPECIFIC - IV: INTERNET OF THINGS (23PCSO23)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- Learn about Internet of Things where various communicating entities are controlled and managed for decision making in the application domain.
- Enable students to learn the Architecture of IoT and IoT Technologies.
- Developing IoT applications and Security in IoT, Basic Electronics for IoT, Arduino IDE, Sensors and Actuators Programming NODEMCU using Arduino IDE.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: define the key components in IoT

CO2[K2]: describe basic electronics used in IoT & its role

CO3[K3]: develop simple applications using Arduino IDE

CO4[K4]: analyze the working of various sensors and actuators

CO5[K5]: evaluate the usage of IoT in real world environment.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	1	1	-	-	1
CO2[K2]	3	3	1	1	-	-	1
CO3[K3]	3	3	1	-	1	-	1
CO4[K4]	3	2	2	-	1	1	1
CO5[K5]	3	2	2	-	1	1	1
Weightage of the course	15	13	7	2	3	2	5
Weighted percentage of Course contribution to POs	**4.11**	**4.18**	**3.54**	**1.13**	**3.95**	**1.37**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' NoCorrelation)

UNIT I – INTRODUCTION **(12 hrs)**

Introduction to IoT: Evolution of IoT – Definition & Characteristics of IoT - Architecture of IoT – Technologies for IoT – Developing IoT Applications – Applications of IoT – Industrial IoT – Security in IoT

UNIT II – BASIC ELECTRONICS FOR IoT **(12 hrs)**

Basic Electronics for IoT: Electric Charge, Resistance, Current and Voltage – Binary Calculations – Logic Chips – Microcontrollers – Multipurpose Computers – Electronic Signals – A/D and D/A Conversion – Pulse Width Modulation.

UNIT III – PROGRAMMING USING ARDUINO **(12 hrs)**

Search Algorithms: Random search - Search with closed and open list - Depth first and Breadth first search - Heuristic search - Best first search - A* algorithm - Game Search. **Programming Fundamentals with C using Arduino IDE:** Installing and Setting up the Arduino IDE – Basic Syntax – Data Types/ Variables/ Constant – Operators – Conditional Statements and Loops – Using Arduino C Library Functions for Serial, delay and other invoking Functions – Strings and Mathematics Library Functions

UNIT IV – SENSORS AND ACTUATORS **(12 hrs)**

Sensors and Actuators: Analog and Digital Sensors – Interfacing temperature sensor, ultrasound , sensor and infrared (IR) sensor with Arduino – Interfacing LED and Buzzer with Arduino.

UNIT V- SENSOR DATA IN INTERNET **(12 hrs)**

Sending Sensor Data Over Internet: Introduction to ESP8266 NODEMCU WiFi Module – Programming NODEMCU using Arduino IDE – Using WiFi and NODEMCU to transmit data from temperature sensor to Open Source IoT cloud platform (ThingSpeak).

TEXTBOOKS

1. Arshdeep Bahga, Vijay Madisetti. *Internet of Things: A Hands-On Approach*. 2014. ISBN: 978-0996025515
2. Boris Adryan, Dominik Obermaier, Paul Fremantle. *The Technical Foundations of IoT*. Artech Houser Publishers, 2017.

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1. Michael Margolis. *Arduino Cookbook*. O'Reilly, 2011.
2. Marco Schwartz. *Internet of Things with ESP8266*. Packt Publishing, 2016.
3. Dhivya Bala. *ESP8266: Step by Step Tutorial for ESP8266 IoT, ArduinoNODEMCU Dev. Kit*. 2018.

Web Sources

1. https://onlinecourses.nptel.ac.in/noc20_cs66/preview
2. https://www.javatpoint.com/iot-internet-of-things
3. https://www.tutorialspoint.com/internet_of_things/index.htm

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - II
ELECTIVE COURSES GENERIC/DISCIPLINE SPECIFIC - IV: MOBILE COMPUTING (23PCSO24)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- This course introduces the learners to the Mobile Computing concepts ofWireless LAN, WIMAX, BLUETOOTH, GPRS, HSPA, LTE GSM and CDMA.
- Present the overview of Mobile computing, Applications and Architectures.
- Describe the futuristic computing challenges.
- Enable the students to learn the concept of mobile computing

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: describe the Mobile Computing Architecture,mobile devices, GSM, CDMA,3G and 4G and short range networks

CO2[K2]: explain GSM, CDMA, 2G, 3G, 4G, GPRS, HSPA, LTE, Wireless LAN, WIMAXand BLUETOOTH.

CO3[K2]: interpret the GSM, CDMA, 2G, 3G, 4G, GPRS, HSPA, LTE, Wireless LAN, WIMAX and BLUETOOTH.

CO4[K4]: examine the Working of GSM, CDMA, 2G, 3G, 4G, GPRS, HSPA, LTE, Wireless LAN, WIMAX and BLUETOOTH.

CO5[K5]: discuss the Process of GSM, CDMA, 2G, 3G, 4G, GPRS, HSPA, LTE,Wireless LAN, WIMAX and BLUETOOTH.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	1	1	-	-	1
CO2[K2]	3	3	1	1	-	-	1
CO3[K2]	3	3	1	-	1	-	1
CO4[K4]	3	2	2	-	1	1	1
CO5[K5]	3	2	2	-	1	1	1
Weightage of the course	15	13	7	2	3	2	5
Weighted percentage of Course contribution to POs	**4.11**	**4.18**	**3.54**	**1.13**	**3.95**	**1.37**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' NoCorrelation)

UNIT I – INTRODUCTION **(12 hrs)**

Mobile Communication Overview: Mobile Communication – Mobile Computing – Mobile Computing Architecture – Mobile Devices – Mobile network systems – Data Dissemination.

UNIT II – Mobile Devices **(12 hrs)**

Mobile Devices and Systems : Cellular Networks and Frequency Reuse – Mobile Smart phones, Smart mobiles and Systems – Handheld Pocket Computers – Handheld Devices – Smart Systems – Limitations of Mobile Devices – Automotive Systems.

UNIT III – GSM Architecture **(12 hrs)**

GSM and Other 2G Architectures: GSM-Services and System Architecture – Radio Interfaces of GSM – Protocols of GSM – Localization – Call Handling – Handover – Security – New Data Services – General Packet Radio service – High-Speed Circuit Switched Data – DECT.

UNIT IV – CDMA, 3G and 4G **(12 hrs)**

CDMA, 3G and 4G: Modulation – Multiplexing – Controlling the Medium Access - Code Division Multiple Access – IMT-2000 3G Wireless Communication Standards – I-Mode – OFDM – High Speed Packet Access 3G Network – Long-term Evolution – Wimax Rel 1.0 IEEE 802.16e – Broadband Wireless Access – 4G Networks – Mobile Satellite Communication Networks.

UNIT V- Wireless Networks **(12 hrs)**

Mobile Wireless Short-Range Networks: Wireless LAN - 802.11 Architecture and Protocol Layers – Wireless Application Protocol - Wireless Application Protocol 2.0 – Bluetooth-Enabled Devices Network – Layers in Bluetooth Protocol – Security in Bluetooth Protocol – IrDA Protocols – ZigBee.

TEXTBOOK

1. Raj Kamal. *Mobile Computing.* Oxford University Press, Second Edition, 2012.

REFERENCES

Books

1. Jochen Schiller. *Mobile Communications.* PHI, Second Edition, 2003
2. Dharma Prakash Agarval, Qing and An Zeng. *Introduction to Wireless and Mobile systems.* Thomson Asia Pvt Ltd, 2005
3. Prasant Kumar Pattnaik, Rajib Mall. *Fundamentals of Mobile Computing.* PHI Learning Pvt.Ltd, 2012.

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1. https://medium.com/@blogstevej327stuff/what-is-mobile-computing-9d58ed30df80
2. https://www.tutorialspoint.com/mobile_computing/mobile_computing_over view.htm
3. https://en.wikipedia.org/wiki/Mobile_computing
4. https://www.javatpoint.com/mobile-computing

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - II
CORE COURSE – VII: ADVANCED JAVA PROGRAMMING LAB (23PCSC2P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 4 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- To enable the students to implement the simple programs using JSP, JAR
- To provide knowledge on using Servlets, Applets
- To introduce JDBC and navigation of records
- To understand RMI & its implementation
- To introduce to Socket programming

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K2]: demonstrate the concepts of Java

CO2[K3]: apply Java concepts to solve simple problem

CO3[K4]: examine the working of Java constructs in various applications

CO4[K5]: assess the ways to handle databases, applets, servlets, and JSP using Java

CO5[K6]: develop a simple applications using java

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	1	-	1	-	-	1
CO2[K3]	3	2	1	1	1	-	1
CO3[K4]	3	3	1	1	-	1	1
CO4[K5]	3	2	1	1	-	-	1
CO5[K6]	3	3	-	1	-	1	1
Weightage of the course	15	11	3	5	1	2	5
Weighted percentage of Course contribution to Pos	**4.11**	**3.54**	**1.52**	**2.82**	**1.32**	**1.37**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

1. Display a welcome message using Servlet.
2. Design a Purchase Order form using Html form and Servlet.
3. Develop a program for calculating the percentage of marks of a student using JSP.
4. Design a Purchase Order form using Html form and JSP.
5. Prepare a Employee pay slip using JSP.
6. Write a program using JDBC for creating a table, Inserting, Deleting records and list out the records.
7. Write a program using Java servlet to handle form data.
8. Write a simple Servlet program to create table of all the headers it receives along with their associated values.
9. Write a program in JSP by using session object.
10. Write a program to build a simple Client Server application using RMI.
11. Create an applet for a calculator application.
12. Program to send a text message to another system and receive the text messagefrom the system (use socket programming)

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - II
CORE COURSE - VIII: DATA MINING LAB USING R (23PCSC2Q)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 4 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To enable the students to learn the concepts of Data Mining algorithms namely classification, clustering, regression
- To understand & write programs using the DM algorithms, to apply statistical interpretations for the solutions, able to use visualizations techniques for interpretations.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1[K2]: demonstrate data mining techniques
CO2[K3]: apply different data mining algorithms to solve real world applications.
CO3[K4]: compare different visualizations techniques using R.
CO4[K5]: inspect the working of various R Commands
CO5[K6]: develop a solution using R with simple dataset.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	1	1	-	-	1
CO2[K3]	3	3	1	1	-	-	1
CO3[K4]	3	3	1	-	1	-	1
CO4[K5]	2	2	2	-	1	1	1
CO5[K6]	2	2	2	-	1	1	1
Weightage of the course	13	13	7	2	3	2	5
Weighted percentage of Course contribution to POs	**3.56**	**4.18**	**3.54**	**1.13**	**3.95**	**1.37**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

LIST OF PROGRAMS

1. Implement Apriori algorithm to extract association rule of data mining.
2. Implement k-means clustering technique.
3. Implement any one Hierarchal Clustering.
4. Implement Classification algorithm.
5. Implement Decision Tree.
6. Linear Regression.
7. Data Visualization.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - II
NON MAJOR ELECTIVE COURSES - I: OFFICE AUTOMATION (23PCSN21)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 2 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- Understand and apply the basic concepts of a word processing package.
- Understand and apply the basic concepts of electronic spreadsheet software.
- Understand and apply the basic concepts of database management system.
- Understand and create a presentation using PowerPoint tool.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K2]: demonstrate the features of word processing , spreadsheet and powerpoint tool
CO2[K3]: apply various features of Office package
CO3[K4]: examine the appropriate tools and options to create document, worksheetand presentation
CO4[K5]: select appropriate tools and options to create document, worksheetand presentation
CO5[K6]: design a simple document, presentation slide and do calculation inWorksheets

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	1	-	2	-	1	1
CO2[K3]	3	1	-	2	-	1	1
CO3[K4]	3	1	-	1	-	1	1
CO4[K5]	2	1	-	1	-	1	1
CO5[K6]	2	2	-	2	1	1	1
Weightage of the course	13	6	0	8	1	5	5
Weighted percentage of Course contribution to POs	**3.56**	**1.93**	**0**	**4.52**	**1.32**	**3.42**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(9 hrs)**

Introductory concepts: Memory unit– CPU-Input Devices: Key board, Mouse and Scanner. **Output devices:** Monitor - Printer. **Introduction to Operating systems & its features:** DOS– UNIX–Windows. Introduction to Programming Languages.

UNIT II **(9 hrs)**

Word Processing: Open, Save and close word document-Editing text – tools-formatting – bullets – Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers-numbering- printing–Preview options-merge.

UNIT III **(9 hrs)**

Spreadsheets: Excel– opening, entering text and data, formatting, navigating-Formulas–entering, handling and copying- Charts– creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.

UNIT IV **(9 hrs)**

Database Concepts: The concept of data base management system- Data field, records, and files, Sorting and indexing data- Searching records. Designing queries and reports- Linking of data files- Understanding Programming environment in DBMS – Developing menu drive applications in query language(MS–Access).

UNIT V **(9 hrs)**

Power point: Introduction to Power point - Features – Understanding slide typecasting &viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition– Animation effects, audio inclusion, timers.

TEXTBOOK

1. Peter Norton. *Introduction to Computers.* Tata McGraw-Hill.

REFERENCES

Book

1. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons. *Microsoft 2003.* Tata McGraw-Hill.

Web Sources

1. https://www.udemy.com/course/office-automation-certificate-course/
2. https://www.javatpoint.com/automation-tools

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - III
CORE COURSE – IX: NETWORK SECURITY AND CRYPTOGRAPHY (23PCSC31)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 4 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- Enable students to learn the Introduction to Cryptography, Web Security and Case studies in Cryptography.
- To gain knowledge on classical encryption techniques and concepts of modular arithmetic and number theory
- To explore the design issues and working principles of various authentication Applications and various secure communication standards including Kerberos, IPsec, and SSL / TLS and email.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: describe the concepts of Cryptography and Security

CO2[K2]: explain Cryptography and Security concepts

CO3[K3]: apply simple encryption and decryption techniques

CO4[K4]: compare different encryption and decryption techniques tosolve problems related to confidentiality and authentication

CO5[K5]: evaluate the use of appropriate security techniques to solve network security problem

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	3	1	2	2	-	2
CO2[K2]	2	3	2	2	2	--	1
CO3[K3]	2	2	2	3	2	1	2
CO4[K4]	3	2	2	1	2		1
CO5[K5]	3	2	2	1	2	1	1
Weightageof the course	12	12	9	9	10	2	7
Weighted percentage of Course contributionto POs	3.29	3.86	4.55	5.08	13.16	1.37	3.98

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(15 hrs)**

Introduction to Cryptography – Security Attacks – Security Services –Security Algorithm- Stream cipher and Block cipher - Symmetric and Asymmetric-key Cryptosystem. **Symmetric Key Algorithms:** Introduction – DES – Triple DES – AES – IDEA – Blowfish – RC5.

UNIT II **(15 hrs)**

Public-key Cryptosystem: Introduction to Number Theory – RSA Algorithm – Key Management – Diffie-Hellman Key exchange – Elliptic Curve Cryptography Message Authentication and Hash functions – Hash and Mac Algorithm – Digital Signatures and Authentication Protocol.

UNIT III **(15 hrs)**

Network Security Practice: Authentication Applications – Kerberos – X.509 Authentication services and Encryption Techniques - E-mail Security – PGP – S / MIME – IP Security.

UNIT IV **(15 hrs)**

WebSecurity – Secure Socket Layer – Secure Electronic Transaction - System Security - Intruders and Viruses – Firewalls– Password Security.

UNIT V **(15 hrs)**

CaseStudy: Implementation of Cryptographic Algorithms – RSA – DSA – ECC (C/JAVA Programming) - Network Forensic – Security Audit - **Other Security Mechanism:** Introduction to Stenography – Quantum Cryptography – Water Marking - DNA Cryptography.

TEXTBOOKS

1. William Stallings. *Cryptography and Network Security*. PHI/ Pearson Education.
2. Bruce Schneir. *Applied Cryptography*. CRC Press.

REFERENCES

Books

1. A.Menezes, P Van Oorschot and S.Vanstone. *Hand Book of Applied Cryptography*. CRC Press, 1997.
2. Ankit Fadia. *Network Security*. Mac Millan.

Web Sources

1. https://nptel.ac.in/courses/106/105/106105031/
2. http://www.nptelvideos.in/2012/11/cryptography-and-network-security.html
3. https://www.tutorialspoint.com/cryptography/index.htm

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - III
CORE COURSE – X: CLOUD COMPUTING (23PCSC32)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- To impart fundamental concepts of Cloud Computing.
- To impart a working knowledge of the various cloud service types and their uses and pitfalls.
- To enable the students to know the common features and differences in the service offerings of the three major Cloud Computing service providers, namely Amazon, Microsoft and Google.
- To provide know-how of the various aspects of application design, benchmarking and security on the Cloud.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: describe the concepts of Cloud computing.

CO2[K2]: explain the services given by cloud computing.

CO3[K3]: write about various features of cloud computing.

CO4[K4]: examine the cloud applications

CO5[K5]: evaluate the working of cloud computing

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	3	1	2	2	-	2
CO2[K2]	2	3	2	2	2	--	1
CO3[K3]	2	2	2	3	2	1	2
CO4[K4]	3	2	2	1	2		1
CO5[K5]	3	2	2	1	2	1	1
Weightage of the Course	12	12	9	9	10	2	7
Weighted percentage of Course contribution to POs	**3.29**	**3.86**	**4.55**	**5.08**	**13.16**	**1.37**	**3.98**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(15 hrs)**

Introduction Cloud Computing : Introduction – From Collaboration to cloud - Working of cloud computing - pros and cons – benefits - developing cloud computing services - Cloud service development - discovering cloud services.

UNIT II **(15 hrs)**

Cloud Computing For Everyone: Centralizing email communications - cloud computing for community - collaborating on schedules - collaborating on group projects and events - cloud computing for corporation – mapping – schedules - managing projects - presenting on road.

UNIT III **(15 hrs)**

Using Cloud Services : Collaborating on calendars - Schedules and task management - exploring on line scheduling and planning - collaborating on event management - collaborating on contact management - collaborating on project management - collaborating on word processing – spreadsheets - and databases.

UNIT IV **(15 hrs)**

Outside the cloud: Evaluating web mail services – Evaluating instant messaging – Evaluating web conference tools – creating groups on social networks – Evaluating online.

UNIT V **(15 hrs)**

Storing And Sharing: Understanding cloud storage - evaluating on line file storage - exploring on line book marking services - exploring on line photo editing applications - exploring photo sharing communities - controlling it with web based desktopson.

TEXTBOOK

1. Michael Miller. *Cloud Computing.* New Delhi: Pearson Education, 2009.

REFERENCES

Book

1. Anthony T. Velte. *Cloud Computing: A Practical Approach*. Tata McGraw Hill Education Private Limited, First Edition, 2009.

Web Sources

1. https://nptel.ac.in/courses/106/105/106105167/
2. https://www.tutorialspoint.com/cloud_computing/index.htm
3. https://www.javatpoint.com/cloud-computing-tutorial

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - III
ELECTIVE COURSES GENERIC/ DISCIPLINE SPECIFIC - V: ADVANCED SOFTWARE ENGINEERING (23PCSO31)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To Introduce Software Engineering, Design, Testing and Maintenance,
- Enable the students to learn the concepts of Software Engineering and learn about Software Project Management, Software Design & Testing.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: describe the Software Engineering process.

CO2[K2]: explain about Software project management skills, design andquality management

CO3[K3]: write about the terminologies of software engineering

CO4[K4]: analyze Software Requirements Specification, Software Testing, Maintenance and Software Re-Engineering

CO5[K5]: evaluate the software designing Software Requirements Specification, Software Testing, Maintenance and Software Re-Engineering

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	-	-	-	1	-
CO2[K2]	3	2	-	-	-	1	-
CO3[K3]	3	2	-	1	-	2	1
CO4[K4]	3	3	1	1	1	2	1
CO5[K5]	3	3	1	1	1	2	1
Weightage of the Course	15	12	2	3	2	8	3
Weighted percentage of Course contribution to Pos	**4.11**	**3.86**	**1.01**	**1.69**	**2.63**	**5.48**	**1.7**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

Introduction: The Problem Domain – Software Engineering Challenges - Software Engineering Approach – **Software Processes:** Software Process – Characteristics of a Software Process – Software Development Process Models – Other software processes.

UNIT II **(12 hrs)**

Software Requirements Analysis and Specification: Requirement engineering – Type of Requirements – Feasibility Studies – Requirements Elicitation – Requirement Analysis – Requirement Documentation – Requirement Validation – Requirement Management – SRS - Formal System Specification – Axiomatic Specification – Algebraic Specification. **Case study:** Student Result management system. Software Quality Management – Software Quality, Software Quality Management System, ISO 9000, SEI CMM.

UNIT III **(12 hrs)**

Software Project Management: Responsibilities of a software project manager – Project planning – Metrics for Project size estimation – Project Estimation Techniques – Empirical Estimation Techniques – COCOMO – Halstead‟s software science – Staffing level estimation – Scheduling– Organization and Team Structures – Staffing – Risk management – Software Configuration Management – Miscellaneous Plan.

UNIT IV **(12 hrs)**

Software Design: Outcome of a Design process – Characteristics of a good software design – Cohesion and coupling - Strategy of Design – Function Oriented Design – Object Oriented Design - Detailed Design - IEEE Recommended Practice for Software Design Descriptions**.**

UNIT V **(12 hrs)**

Software Testing: A Strategic approach to software testing – Terminologies – Functional testing– Structural testing – Levels of testing – Validation testing - Regression testing – Art of Debugging–Testingtools-Metrics-ReliabilityEstimation.SoftwareMaintenance -Maintenance Process - Reverse Engineering – Software Re-engineering - Configuration Management Activities.

TEXTBOOKS

1. Pankaj Jalote. *An Integrated Approach to Software Engineering.* Delhi: Narosa Publishing House, 3rd Edition.
2. Rajib Mall. *Fundamentals of SoftwareEngineering.* PHI Publication, Third Edition.

REFERENCES

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1. K.K.Aggarwal and Yogesh Singh. *Software Engineering.* New Age International Publishers, Third edition.
2. Software Engineering. *A Practitioners Approach.* R.S.Pressman, McGraw Hill.
3. Carlo Ghezzi, M.Jarayeri, D.Manodrioli. *Fundamentals of Software Engineering.* PHI Publication.

Web Sources

1. https://www.javatpoint.com/software-engineering-tutorial
2. https://onlinecourses.swayam2.ac.in/cec20_cs07/preview
3. https://onlinecourses.nptel.ac.in/noc19_cs69/preview

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - III
ELECTIVE COURSES GENERIC/ DISCIPLINE SPECIFIC - V: SOFTWARE PROJECT MANAGEMENT (23PCSO32)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

This course introduces the learners to the software project idea, project evaluation, project planning, decision making, and communication plans

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: describe the key phases of software project management

CO2[K2]: explain software project and programme management, project and activity planning, project evaluation, risk management, monitoring and control, managing contracts, people and environment

CO3[K3]: apply project and programme management, project and activity planning, project evaluation and risk management

CO4[K4]: examine project planning, activity planning and risk management in software project management

CO5[K5]: discuss case studies on stakeholder identification, cost analysis, project Planning and network planning models

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	-	-	-	1	-
CO2[K2]	3	2	-	-	-	1	-
CO3[K3]	3	2	-	1	-	2	1
CO4[K4]	3	3	1	1	1	2	1
CO5[K5]	3	3	1	1	1	2	1
Weightage of the Course	15	12	2	3	2	8	3
Weighted percentage of Course contribution to Pos	**4.11**	**3.86**	**1.01**	**1.69**	**2.63**	**5.48**	**1.7**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

Introduction to Software Project Management: Software Project Management – Project – Software Projects Versus Other Types of Project – Contract Management and Technical Project Management – Plans, Methods and Methodologies – Some Ways of Categorizing Software Projects – Stakeholders – Setting Objectives – The Business Case – Project Success and Failure – What is Management? – Management Control – Traditional versus Modern Project Management Practices. **Project Evaluation and Programme Management:** A Business Case - Project Portfolio Management – Evaluation of Individual Projects – Programme Management – Managing the Allocation of Resources within the Programmes – Strategic Programme Management. **Case Study:** College Payroll Project to identify Stakeholders, Objectives and to do Cost Benefit Analysis.

UNIT II **(12 hrs)**

An Overview of Project Planning: Stepwise Project Planning – All Steps (Step 0-Step 10). **Selection of an Appropriate Project Approach:** Build or Buy? – Choosing Methodologies and Technologies – Software Processes and Process Models – Choice of Process Models – Structure Versus Speed of Delivery – The Waterfall Model – The Spiral Model – Software Prototyping. **Case Study:** College Payroll Project in Project Planning.

UNIT III **(12 hrs)**

Activity Planning: Objectives of Activity planning – When to Plan – Project Schedules – Project and Activities – Sequencing and Scheduling Activities – Network Planning models – Formulating a Network Model – The Forward Pass – The Backward Pass – Identifying the Critical path – Activity Float – Shortening the Project Duration – Identifying Critical Activities. **Risk Management:** Risk – Categories of Risk – Risk identification – Risk Planning – Evaluating Risks to the Schedule – Applying the PERT technique – Monte Carlo simulation – Critical Chain Concepts. **Case Study :** Network Planning Models for Account Maintenance System.

UNIT IV **(12 hrs)**

Monitoring and Control: Creating the Framework – Collecting the Data – Review – Project Termination Review - Cost Monitoring – Earned Value Analysis – Prioritizing Monitoring – Change Control – Software Configuration Management. **Managing Contracts:** Types of Contract Stages in Contract Placement – Typical Terms of a Contract – Contract Management – Acceptance**.**

UNIT V **(12 hrs)**

Managing People in Software Environments: Selecting the Right person for the Job – Instruction in the Best Methods – Motivation – The Oldham-Hackman job characteristics model – Stress – Health and Safety – Some Ethical and Professional concerns. **Working in Teams:** Becoming a Team – Decision making – Organization and

Team Structures – Coordination Dependencies – Dispersed and Virtual Teams – Communications Genres – Communication Plans – Leadership.

TEXTBOOK

1. Bob Hughes, Mike Cotterell and Rajib Mall. *Software Project Management*. 2012, TataMcGraw Hill, Fifth Edition, New Delhi.

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1. Adolfo Villafiorita. *Introduction to Software Project Management*. CRCPress,2014
2. Jalote. *Software Project Management in Practice*. Pearson Education, 2002
3. Royce. *Software Project Management*. Pearson Education, 1999

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1. https://teaching.csse.uwa.edu.au/units/CITS3220/lectures/09projManIntro. pdf
2. https://www.javatpoint.com/software-project-planning
3. https://www.javatpoint.com/software-engineering-risk-management
4. https://www.project-management-nowhow.com/contract_management.html
5. https://www.slideshare.net/NurIslam5/organization-and-team-structures

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - III
ELECTIVE COURSES GENERIC/ DISCIPLINE SPECIFIC – VI: ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (23PCSO33)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- Enable the students to learn the basic functions of AI, Heuristic Search Techniques.
- Provide knowledge on concepts of representations and mappings and predicatelogic.
- Introduce Machine Learning with respect Data Mining, Big Data and Cloud.
- Study about Applications & Impact of ML

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: describe the AI problems and techniques

CO2[K2]: explain AI and machine learning concepts

CO3[K3]: apply the principles of AI

CO4[K4]: analyze the impact of machine learning on applications

CO5[K5]: evaluate various AI techniques and machine learning concepts

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	1	-	1	-	-	1
CO2[K2]	3	2	1	1	1	-	1
CO3[K3]	3	3	1	1	-	1	1
CO4[K4]	3	2	1	1	-	-	1
CO5[K5]	3	3	-	1	-	1	1
Weightage of the course	15	11	3	5	1	2	5
Weighted percentage of Course contribution to POs	**4.11**	**3.54**	**1.52**	**2.82**	**1.32**	**1.37**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – INTRODUCTION **(12 hrs)**

Introduction: AI Problems - Al techniques - Criteria for success. **Problems, Problem Spaces, Search:** State space search - Production Systems - Problem Characteristics - Issues in design of Search.

UNIT II – SEARCH TECHNIQUES **(12 hrs)**

Heuristic Search techniques: Generate and Test - Hill Climbing - Best-First, Problem Reduction, Constraint Satisfaction, Means - end analysis. **Knowledge representation issues:** Representations and mappings - Approaches to Knowledge representations - Issues in Knowledge representations - Frame Problem.

UNIT III – PREDICATE LOGIC **(12 hrs)**

Using Predicate logic: Representing simple facts in logic - Representing Instance and Isa relationships - Computable functions and predicates - Resolution - Natural deduction. **Representing knowledge using rules:** Procedural Vs Declarative knowledge - Logic programming - Forward Vs Backward reasoning – Matching - Control knowledge.

UNIT IV – MACHINE LEARNING **(12 hrs)**

Understanding Machine Learning: What Is Machine Learning? – Defining Big Data – Big Data in Context with Machine Learning – The Importance of the Hybrid Cloud – Leveraging the Power of Machine Learning - The Roles of Statistics and Data Mining with Machine Learning - Putting Machine Learning in Context - Approaches to Machine Learning.

UNIT V – APPLICATIONS OF MACHINE LEARNING **(12 hrs)**

Looking Inside Machine Learning: The Impact of Machine Learning on Applications - Data Preparation - The Machine Learning Cycle.

TEXTBOOKS

1. Elaine Rich and Kevin Knight. *Artificial Intelligence*. Tata McGraw Hill Publishers company Pvt Ltd, 1991.
2. George FLuger. *Artificial Intelligence*. Pearson Education Publications, 2002.

REFERENCES

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1. Judith Hurwitz, Daniel Kirsch. *Machine Learning For Dummies*. IBM Limited Edition.

Web Sources

1. https://www.ibm.com/downloads/cas/GB8ZMQZ3
2. https://www.javatpoint.com/artificial-intelligence-tutorial
3. https://nptel.ac.in/courses/106/105/106105077/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - III
(2023 – 2025)
ELECTIVE COURSES GENERIC/ DISCIPLINE SPECIFIC - VI: ROBOTIC PROCESS AUTOMATION FOR BUSINESS (23PCSO34)
(For those who have joined in June 2023 and later)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- Learn the concepts of RPA, its benefits, types and models.
- Gain the knowledge in application of RPA in Business Scenarios.
- Identify measures and skills required for RPA

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: demonstrate the benefits and ethics of RPA
CO2[K2]: review the Automation cycle and its techniques
CO3[K3]: discover inferences and information processing of RPA
CO4[K4]: analyze RPA in Business Scenarios
CO5[K5]: evaluate Robots & leveraging automation

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	1	-	1	-	-	1
CO2[K2]	3	2	1	1	1	-	1
CO3[K3]	3	3	1	1	-	1	1
CO4[K4]	3	2	1	1	-	-	1
CO5[K5]	3	3	-	1	-	1	1
Weightage of the course	15	11	3	5	1	2	5
Weighted percentage of Course contribution to POs	**4.11**	**3.54**	**1.52**	**2.82**	**1.32**	**1.37**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – INTRODUCTION **(12 hrs)**

Introduction to RPA - Overview of RPA - Benefits of RPA in a business environment - Industries & domains fit for RPA - Identification of process for automation - Types of Robots - Ethics of RPA & Best Practices - Automation and RPA Concepts - Different business models for implementing RPA - Centre of Excellence – Types and their applications - Building an RPA team- Approach for implementing RPA initiatives

UNIT II – AUTOMATION **(12 hrs)**

Role of a Business Manager in Automation initiatives - Skills required by a Business Manager for successful automation - The importance of a Business Manager in automation - Analyzing different business processes - Process Mapping frameworks - Role of a Business Manager in successful implementation – Part 1 - Understanding the Automation cycle – First 3 automation stages and activities performed by different people

UNIT III – AUTOMATION IMPLEMENTATION **(12 hrs)**

Evaluating the Automation Implementation Detailed description of last 3 stages and activities performed by different people - Role of a Business Manager in successful completion – Part 2 - Activities to be performed post-implementation - Guidelines for tracking the implementation success - Metrics/Parameters to be considered for gauging success - Choosing the right licensing option - Sending emails - Publishing and Running Workflows.

UNIT IV – ROBOT **(12 hrs)**

Ability to process information through scopes/systems - Understand the skill of information processing and its use in business - Leveraging automation - Creating a Robot - New Processes. Establish causality by variable behavior - Understand the skill of drawing inference or establishing causality by tracking the behavior of a variable as it varies across time/referenced variable - Leveraging automation for this skill - Robot & new process creation

UNIT V- ROBOT SKILL **(12 hrs)**

Inference from snapshots of curated terms – Omni-source data curation - Multisource trend tracking - Understand the skill of drawing inference from the behavior of curated terms by taking snapshots across systems in reference to time/variable(s) - Leveraging automation for this skill – Robot creation and new process creation for this skill. **Contemporary Issues:** Expert lectures, online seminars – webinars

TEXTBOOKS

1. Alok Mani Tripathi" *Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool*" Packt Publishing Limited March 2018.
2. Tom Taulli "*The Robotic Process Automation Handbook*" Apress , February 2020

REFERENCES

Book

1. Steve Kaelble" *Robotic Process Automation*" John Wiley & Sons, Ltd., 2018

Web Sources

1. https://www.tutorialspoint.com/uipath/uipath_robotic_process_automation_introduction.htm
2. https://www.javatpoint.com/rpa
3. https://onlinecourses.nptel.ac.in/noc19_me74/preview

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - III
CORE COURSE – XI: CLOUD COMPUTING LAB (23PCSC3P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- To provide students a sound foundation of the Cloud Computing
- able to start using and adopting Cloud Computing services and tools in their real life scenarios

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K2]: demonstrate the concepts of cloud computing.
CO2[K3]: apply various cloud programming concepts to solve problems on the cloud.
CO3[K4]: analyze various cloud programming model.
CO4[K5]: evaluate various cloud programming model.
CO5[K6]: develop a solution based on the core concepts of the cloud computing Paradigm.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	2	1	1	2	2
CO2[K3]	3	3	3	1	1	2	1
CO3[K4]	3	3	3	1	1	2	1
CO4[K5]	3	3	3	1	1	2	1
CO5[K6]	3	3	2	1	1	2	1
Weightage of the course	15	15	13	5	5	10	6
Weighted percentage of Course contribution to POs	**4.11**	**4.82**	**6.57**	**2.82**	**6.58**	**6.85**	**3.41**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

LIST OF PROGRAMS

1. Working with Google Drive to make spreadsheet and notes.
2. Launch a Linux Virtual Machine.
3. To host a static website
4. Exploring Google cloud for the following
    a) Storage
    b)Sharing of data
    c) manage your calendar, to-do lists
    d) a document editing tool
5. Working and installation of GoogleApp Engine
6. Working and installation of Microsof t Azure
7. To Connect Amazon RedshiftwithS3bucket
8. To Create and Query a NoSQL Table

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - III
(2023 – 2025)
CORE COURSE - XII: NETWORK SECURITY AND CRYPTOGRAPHY LAB (23PCSC3Q)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- Enable students to learn the Introduction to Cryptography, Web Security and Case studies in Cryptography,
- To gain knowledge on various encryption techniques and concepts

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K2]: demonstrate the basic concepts of Cryptography and Network Security.

CO2[K3]: apply the algorithms for Cryptography and Network Security.

CO3[K4]: examine the various malware attacks, encryption and decryption techniques.

CO4[K5]: evaluate different encryption and decryption techniques.

CO5[K6]: develop simple applications using cryptographic algorithms**.**

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	3	1	1	2	2
CO2[K3]	3	3	2	1	1	2	2
CO3[K4]	3	2	2	1	1	2	2
CO4[K5]	2	2	2	-	1	2	2
CO5[K6]	2	2	2	-	1	2	2
Weightage of the course	13	12	11	3	5	10	10
Weighted percentage of Course contribution to POs	**3.56**	**3.86**	**5.56**	**1.69**	**6.58**	**6.85**	**5.68**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

Implement the following

1. Write a program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in the string with 0 and display the result
2. Write a program to perform encryption and decryption using the Ceaser Cipher
3. Write a program to perform encryption and decryption using the Hill Cipher
4. Write a program to perform encryption and decryption using the Substitution Cipher
5. Write a program to perform encryption and decryption using the DES algorithm
6. Connect to switch with a computer and enable the port security
7. Defeating malware using Building Trojans and Rootkit hunter
8. Implement signature scheme – Digital Signature Standard
9. Identify and capture the user name and password in a same network using wireshark
10. Implement Man-in-the-middle attack and Session hijacking

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - III
NON MAJOR ELECTIVE COURSE - II: WEB DESIGNING (23PCSN31)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 3 **INT. MARKS : 25**
CREDITS : 2 **EXT. MARKS : 75**
DURATION : 45 hrs **MAX. MARKS: 100**

Course Objectives

- This course introduces the learners to markup language, and formatting using HTML and CSS.
- Enable to develop simple dynamic web pages

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1[K1]: define the concepts of HTML and JavaScript
CO2[K2]: demonstrate basic tags of HTML and elements of CSS
CO3[K3]: develop a HTML page using text, images, tables, lists and links
CO4[K4]: simplify to design a webpage using CSS
CO5[K5]: choose the HTML and JavaScript constructs to design a website

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	1	-	1	1
CO2[K2]	2	2	-	3	-	2	1
CO3[K3]	3	1	1	2	-	1	2
CO4[K4]	2	2	-	2	-	1	-
CO5[K5]	2	1	-	2	-	2	1
Weightage of the Course	12	8	2	10	0	7	5
Weighted percentage of Course contribution to Pos	**3.29**	**2.57**	**1.01**	**5.65**	**0**	**4.79**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(9 hrs)**

Introducing HTML and CSS: What HTML is – What HTML files look like – HTML Attributes – Using the Style Attribute. **Learning the Basics of HTML:** Structuring your HTML – The Title – Headings – Paragraphs – Comments. **Organising Information with Lists:** Lists – Numbered Lists – Unordered Lists –

Definition Lists – Nesting Lists – Other Uses of Lists.

UNIT II **(9 hrs)**

Using Images on Your Web Pages: Images on the Web – Image Formats – Inline Images – Images and Text – Images and Links – Image Backgrounds. **Working With Links:** Creating Links – Links to Other Documents on the Web – Links to Specific Places within Documents. **Designing Forms:** Using the <Form> Tag – Using the <Label> Tag – Creating Form Controls – Creating Text Controls – Creating Password Controls – Creating Radio Buttons.

UNIT III **(9 hrs)**

Formatting Text with HTML and CSS: Character Level Elements – Character Formatting Using CSS – Horizontal Rules – Line Break – Special Characters – Fonts and Font Sizes. **Building Tables:** Creating Tables – Table Parts – Sizing Tables, Borders and Cells – Table and Cell Color – Aligning Your Table Content – Spanning Multiple Rows and Columns.

UNIT IV **(9 hrs)**

Introduction To Javascript: Beginning With Javascript – Putting It All Together. **Placing Javascript in an HTML File:** Using the HTML Script Tags – Creating Your First Script – Using External Javascript Files – Using Javascript Comments.

UNIT V **(9 hrs)**

Conditional Statements And Loops: Defining Conditional Statements – Using Conditional Statements – Using if/else Statement Blocks – Using the SwitchStatement – Using the Conditional Operator – Defining Loops – Using Loops – For– while – do while – for in – for each in – Using break and continue.

TEXTBOOKS

1. Laura Lemay, Rafe Colburn, Jennifer Kyrnin. *Mastering HTML, CSS & JavaScript Web Publishing.* New Delhi : BPB Publications.
2. John Pollock. *JavaScript A Beginner's Guide.* McGraw Hill Education, Third Edition

REFERENCES

Books

1. Jon Duckett. *Beginning HTML, XTML, CSS and JavaScript.* Wiley Publishing
2. Julie C. Meloni. *HTML, CSS & JavaScript.* Pearson Education, 2012
3. Eric Freeman, Elisabeth Robson. *Head First JavaScript Programming (A Brain-Friendly Guide).* O'Reilly Media, Inc., 2014

Web Sources

1. https://www.geeksforgeeks.org/web-technology/html-css/
2. https://www.javatpoint.com/html-tutorial
3. https://www.tutorialspoint.com/javascript/index.htm
4. https://javascript.info/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme – M.Sc. Computer Science
SEMESTER-III
INTERNSHIP/INDUSTRIAL TRAINING (23PCSJ31)
(From 2023-2024 Batch onwards)

HOURS/WEEK: - **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 25 Days **MAX. MARKS: 100**

Course Objectives

- To learn and develop new skills relevant to the field of study or career interests.
- To understand different departments, roles, and functions within the organization to broaden knowledge and explore potential career paths.
- To apply the knowledge gained in academic studies to real-world scenarios.
- To bridge the gap between classroom learning and professional life.
- To gain exposure to different tasks, projects, and challenges relevant to the chosen field.

Course Outcomes (CO)

On successful completion of the course, the learners should be able to

CO1 [K1]: identify different career paths within the industry and gain insights into potential future roles.

CO2 [K3]: apply theoretical concepts and academic knowledge to real-world situations and challenges encountered during the internship.

CO3[K4]: analyze problems, generate innovative solutions, and make informed decisions.

CO4[K5]: evaluate how to manage time effectively and prioritize tasks to meet deadlines and deliver quality work.

CO5[K6]: create a portfolio of the work, projects, and achievements during the internship.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	-	1	1	1	2
CO2[K3]	2	3	-	1	-	1	2
CO3[K4]	2	2	-	2	-	1	1
CO4[K5]	-	2	1	-	-	1	1
CO5[K6]	1	3	3	3	-	1	2
Weightage of the Course	8	12	4	7	1	5	8
Weighted percentage of Course contribution to Pos	**2.19**	**3.86**	**2.02**	**3.95**	**1.32**	**3.42**	**4.55**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

Rules and Regulations

1. Each Student has to undergo 25 days institutional/industry based training during the fourth semester summer vacation.
2. Internships could be undertaken in different media organizations, industries and educational institutions which should be approved by the department.
3. Students should keep a detailed record of activities performed and hours spent in training and report the same to the Faculty Coordinator/Mentor/Guide regularly about the progress of internship on weekly basis
4. At the end of the internship, the student must submit a full-fledged detailed internship report (not exceeding 20 pages) along with attendance certificate
5. The Internship carries 100 marks out of which 25 marks for Internal and 75 Marks for External.
5. The viva voce board shall consist of the Head of the Department and the Internal Examiner (Senior Faculty member)
6. The training programme shall be evaluated as per the following pattern

Internal (25 Marks)	**External (75 Marks)**
Training Review : 15 Marks	Training Report : 25 Marks
Daily Log Report : 5 Marks	Viva Voce : 50 Marks
PPT Presentation :5 Marks	

EACH INTERNSHIP REPORT WILL FOLLOW THE FORMAT DESCRIBED:

- Title Page
- College Certificate Page
- Internship Certificate provided by the internship institution
- Declaration Page
- Acknowledgement
- Company Profile
- Organizational structure of the concern
- Weekly work plan
- List of figures, List of Tables
- Index
- Chapters

List of Chapters

1. Introduction
2. Nature of work
3. Role in the organization
4. Questionnaires and Observations about work
5. Operating Environment
6. Detailed Description of Technology used
7. Implementation
8. Conclusion
9. Appendix

Text Format in the report : Times New Roman 12 with 1.5 line
Margins 1.5" left and 1" all other

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - IV
CORE COURSE – XII: DATA SCIENCE & ANALYTICS (23PCSC41)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 5 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- To introduce the students to data science, bigdata & its ecosystem.
- To learn data analytics & its life cycle
- To explore the programming language R, with respect to the data miningalgorithms.
- To relate the relationship between artificial intelligence, machine learning and data science

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: describe basics of data science steps, data analytics tools, terminologies, R, clustering and artificial intelligence basics

CO2[K2]: compare and contrast data analytics tools, clustering, machine learningand deep learning

CO3[K3]: explain data science ecosystem, R graphical user interface, visualizing variables, naïve bayes, and association rules

CO4[K4]: summarize various clustering algorithms, data analytic life cycles, Bayes theorem, decision tree, and regression analysis

CO5[K5]: discuss descriptive, exploratory, visualization of data analysis through R

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	2	1	-	1	1
CO2[K2]	3	2	1	2	-	1	1
CO3[K3]	3	3	2	2	-	1	3
CO4[K4]	2	3	3	2	-	2	2
CO5[K5]	3	3	3	1	-	2	3
Weightage of the course	14	14	11	8	0	7	10
Weighted percentage of Course contribution to POs	**3.84**	**4.5**	**5.56**	**4.52**	**0**	**4.79**	**5.68**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(15 hrs)**

Introduction of Data Science: data science and bigdata–facets of data-data science process- Ecosystem- The Data Science process – six steps - Machine earning.

UNIT II **(15 hrs)**

Data Analytics : data analytics life cycle - review of data analytics- Advanced data Analytics -technology and tools.

UNIT III **(15 hrs)**

Basic Data Analytics using R : R Graphical User Interfaces – Data Import and Export – Attribute and Data Types –Descriptive Statistics – Exploratory Data Analysis –Visualization Before Analysis – Dirty Data – Visualizing a Single Variable – Examining Multiple Variables – Data Exploration Versus Presentation.

UNIT IV **(15 hrs)**

Overview of Clustering : K-means – Use Cases – Overview of the Method – Perform a K-means Analysis using R –Classification – **Decision Trees :** Overview of a Decision Tree – DecisionTree Algorithms – Evaluating a Decision Tree – Decision Tree in R . **Bayes' Theorem:** Naïve Bayes Classifier – Smoothing – Naïve Bayes in R.

UNIT V **(15 hrs)**

Artificial intelligence: Machine Learning and deep learning in data science - Clustering, association rules. Linear regression - logistic regression - Additional regression methods.

TEXTBOOKS

1. *Introducing-Data-Science-Big-Data-Machine-Learning-and-more-using- Python-tools-*2016. Pdf
2. Wiley. *Data science in bigdata analytics,* John Wiley & Sons,2015

REFERENCES

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1. Lars Nielson .*A Simple Introduction to Data science*.2015
2. Davy Cielen, Arno D.B.Meysman, Mohamed Ali. *Introducing Data Science.* Manning publications. 2016
3. Roger D.Peng. *R Programming for Data Science*. Lean publications, 2015
4. *Data Science & Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*

Web Sources

1. https://www.tutorialspoint.com/python_data_science/index.htm
2. https://www.javatpoint.com/data-science
3. https://nptel.ac.in/courses/106/106/106106179/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- IV
CORE COURSE - XI: WEB APPLICATION DEVELOPMENT & HOSTING LAB
(23PCSC4P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 25**
CREDITS : 5 **EXT. MARKS : 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- Able to design a web page using HTML tags
- To enable the students to use Frame sets, hyperlinks and different formatting features of HTML tags
- Enable the students to use Forms & other control sin a webpage
- To create interactive applications using PHP

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K2]: recall the basic HTML tags to create static web pages

CO2[K3]: use hyperlinks, frames, images, tables, in a webpage

CO3[K4]: analyse the required HTML tags to create an simple web applications

CO4[K5]: assess various web applications developed using HTML and PHP.

CO5[K6]: create web page using HTML & PHP.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	1	1	-	1	1
CO2[K3]	3	2	1	2	1	1	1
CO3[K4]	3	3	2	2	1	1	-
CO4[K5]	2	3	3	1	1	-	2
CO5[K6]	2	2	3	1	1	2	2
Weightage of the course	13	13	10	7	4	5	6
Weighted percentage of Course contribution to POs	**3.56**	**4.18**	**5.05**	**3.95**	**5.26**	**3.42**	**3.41**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

LIST OF PROGRAMS

1. Develop a website for your college using advanced tags of HTML.
2. Write names of several countries in a paragraph and store it as an HTML document, world.html. Each country name must be a hot text. When you click India (for example), it must open india.html and it should provide a brief introduction about India.
3. Develop a HTML document to i) display Text with Bullets / Numbers - Using Lists ii) to display the Table Format Data
4. Develop a Complete Web Page using Frames and Framesets which gives the Information about a Hospital using HTML.
5. Write a HTML document to print your Bio-Data in an eat format using several components.
6. Develop a HTML document to display a Registration Form for an inter - collegiate function.
7. Using HTML form accept Customer details like Name, City, Pin code, Phone number and Email address and validate the data and display appropriate messages for violations using PHP

   (Eg. Name is Mandatory field; Pin code must be 6 digits, etc.).
8. Write a program to accept two numbers n1 and n2 using HTML forM & N and display the Prime

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - IV
ELECTIVE COURSES GENERIC/ DISCIPLINE SPECIFIC - VII: BLOCK CHAIN TECHNOLOGY (23PCSO41)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- Understand the fundamentals of block chain and crypto currency.
- Understand the influence and role of block chain in various other fields.
- Learn security features and its significance.
- Identify problems &challenges posed by Block Chain

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: define the concepts of blockchain technology and crypto currency

CO2[K2]: explain the fundamentals of blockchain and crypto currency

CO3[K3]: apply and identify security measures, and various types of block chain services

CO4[K4]: analyze Blockchain in various domains

CO5[K5]: assess security, privacy, and efficiency of a Blockchain system

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	1	1	-	-	1
CO2[K2]	3	3	1	1	-	-	1
CO3[K3]	3	3	1	-	1	-	1
CO4[K4]	3	2	2	-	1	1	1
CO5[K5]	3	2	2	-	1	1	1
Weightage of the Course	15	13	7	2	3	2	5
Weighted percentage of Course contribution to Pos	**4.11**	**4.18**	**3.54**	**1.13**	**3.95**	**1.37**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – INTRODUCTION (12 hrs)

Introduction to Blockchain - The big picture of the industry – size, growth, structure, players. Bitcoin versus Crypto currencies versus Blockchain - Distributed Ledger Technology (DLT). Strategic analysis of the space – Blockchain platforms, regulators, application providers. The major application: currency, identity, chain of custody.

UNIT II – NETWORK AND SECURITY (12 hrs)

Advantage over conventional distributed database- Blockchain Network- Mining Mechanism - Distributed Consensus- Blockchain 1.0, 2.0 and 3.0 – transition, advancements and features. Privacy, Security issues in Blockchain

UNIT III – CRYPTOCURRENCY (12 hrs)

Crypto currency - History, Distributed Ledger, Bitcoin protocols -Symmetric- key cryptography - Public-key cryptography - Digital Signatures -High and Low trust societies - **Types of Trust model:** Peer-to-Peer, Leviathan, and Intermediary. Application of Cryptography to Blockchain

UNIT IV – CRYPTOCURRENCY REGULATION (12 hrs)

Crypto currency Regulation - Stakeholders, Roots of Bit coin, Legal views - exchange of crypto currency - Black Market - Global Economy. Cyrpto economics – assets, supply and demand, inflation and deflation – Regulation.

UNIT V- CHALLENGES IN BLOCK CHAIN (12 hrs)

Opportunities and challenges in Block Chain – **Application of block chain:** Industry 4.0 – machine to machine communication – Data management in industry– future prospects. Block chain in Health 4.0 - Blockchain properties - Healthcare Costs - Healthcare Quality - Healthcare Value - Challenges for using blockchain for healthcare data.

TEXTBOOKS

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder. *Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction.* Princeton University Press (July 19, 2016).
2. Antonopoulos. *Mastering Bitcoin: Unlocking Digital Cryptocurrencies*

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1. Satoshi Nakamoto. *Bitcoin: A Peer-to-Peer Electronic Cash System*
2. Rodrigo da Rosa Righi, Antonio Marcos Alberti and Madhusudan Singh. "*Blockchain Technology for Industry 4.0*". Springer 2020.

Web Sources

1. https://www.javatpoint.com/blockchain-tutorial
2. https://www.tutorialspoint.com/blockchain/index.htm
3. https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-cs01/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - IV
ELECTIVE COURSES GENERIC/ DISCIPLINE SPECIFIC - VII: COMPILER DESIGN
(23PCSO42)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 3 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- Implementation of Compilers for high level languages includes Scanning, Parsing, Semantic Analysis, Code Generation and Code Optimization.
- Specify and analyze the lexical, syntactic and semantic structures of high level language features.
- Separate the lexical, syntactic and semantic analysis into meaningful phases for a compiler to undertake language translation

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: describe the front end and back end process of the compiler during compilation

CO2[K2]: explain the functionalities of each phase in compilation

CO3[K3]: draw finite automata from regular expression, flow graph from intermediate code and use context free grammar

CO4[K4]: differentiate bottom up parsing, top down parsing and LR Parsing

CO5[K5]: discuss the lexical analysis, syntax analysis, SDT, intermediate code generation, code optimization phases of compilation

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	1	1	-	-	1
CO2[K2]	3	3	1	1	-	-	1
CO3[K3]	3	3	1	-	1	-	1
CO4[K4]	3	2	2	-	1	1	1
CO5[K5]	3	2	2	-	1	1	1
Weightage of the Course	15	13	7	2	3	2	5
Weighted percentage of Course contribution to Pos	**4.11**	**4.18**	**3.54**	**1.13**	**3.95**	**1.37**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

Introduction: The Structure of a Compiler – The Evolution of Programming Languages – Application of Compiler Technology – Programming Language Basics. **Lexical Analysis:** The Role of the Lexical Analyzer - Input Buffering - Specificationof Tokens - Recognition of Tokens –The Lexical-Analyzer Generator Lex - Finite Automata - From Regular Expressions to Automata - Design of a Lexical-Analyzer Generator - Optimization of DFA-Based Pattern Matchers.

UNIT II **(12 hrs)**

Syntax Analysis: Introduction- Context-Free Grammars - Writing a Grammar-Top-Down Parsing - Bottom-Up Parsing - Operator-Precedence Parsing. **Introduction To LR Parsing:** Simple LR – More Powerful LR Parsers - Using Ambiguous Grammars - Parser Generators

UNIT III **(12 hrs)**

Syntax-Directed Translation: Syntax- Directed Definitions – Evaluation Order for SDD's – Application Of Syntax-Directed Translation - Syntax-Directed Translation Schemes – Implementing L-Attributed SDD's.

UNIT IV **(12 hrs)**

Intermediate Code Generation: Variants of Syntax Trees- Three-Address Code – Types And Declarations – Translation of Expressions – Type Checking – Control Flow – Backpatching – Switch-Statements – Intermediate Code Procedures.

UNIT V **(12 hrs)**

Code Generation: Issues in the Design of a Code Generator- The Target Language - Addresses in the Target Code - Basic Blocks and Flow Graphs - Optimization of Basic Blocks - A Simple Code Generator - Peephole Optimization - Register Allocation and Assignment – Instruction Selection by Tree Rewriting – Optimal Code Generation for Expressions – Dynamic Programming Code Generation.

TEXTBOOK

1. Alfred V.Aho, Monica S.Lam, Ravi Sethi and Jeffrey D.Ullman. *Compilers : Principles, Techniques and Tools*. Newyork City : Pearson Education Inc, Second Edition, 2007

REFERENCES

Books

1. Allen I.Holub. *Compiler Design in C.* New Delhi : Prentice Hall of India , 1990.
2. Alfred Aho and Jeffery Ullman. *Principles of Compiler Design.* United States : Addison-Wesley,1977
3. Jack W.Crenshaw. *Let's Build a Compiler.1995*.

Web Sources

1. https://compilers.iecc.com/crenshaw/tutorfinal.pdf
2. http://www.penguin.cz/~radek/book/lets_build_a_compiler.pdf
3. https://www.geeksforgeeks.org/last-minute-notes-compiler-design-gq/
4. https://www.tutorialspoint.com/automatatheory/deterministicfiniteautomaton.htm
5. https://www.geeksforgeeks.org/intermediate-code-generation-in-compiler-design/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER - IV
SKILL ENHANCEMENT COURSE: PROFESSIONAL COMPETENCY COURSE: COMPUTER SCIENCE FOR COMPETITIVE EXAMS (23PCSS4P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS : 25**
CREDITS : 2 **EXT. MARKS : 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- Understand the fundamentals of computing technology
- develop an understanding of how computing technology presents new ways to address problems
- acquire knowledge in many domains of computer field

Course Outcomes (CO)

On successful completion of the course, the learners will be able to

CO1[K1]: describe the basics of computers related to competitive exams

CO2[K2]: explain the basic concepts in core areas

CO3[K3]: use the various concepts and techniques in different domains ofcomputer science and applications

CO4[K4]: examine the different problematic domains to find the solution

CO5[K6]: prepare themselves for competitive exams

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	2	1	1	1
CO2[K2]	3	2	2	2	1	1	1
CO3[K3]	3	2	2	2	1	1	1
CO4[K4]	3	2	3	3	1	1	1
CO5[K6]	2	2	3	3	2	1	1
Weightage of the course	14	10	11	12	6	5	5
Weighted percentage of Course contribution to POs	**3.84**	**3.22**	**5.56**	**6.78**	**7.89**	**3.42**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I **(12 hrs)**

Discrete Structures and Optimization: Mathematical Logic: Propositional and Predicate Logic - Normal Form. **Graph Theory:** Graph Types - Paths Planner graph- Tree and its Traversals Boolean Algebra: Boolean Functions and its Representation- Simplifications of Boolean Functions. **Programming Languages: Programming in C:** Tokens – Identifiers - Data Types– Arrays - Structures – Union – String – Pointers – Functions - File Handling. **Object Oriented Programming:** Class – Object - Inheritance- Encapsulation - Abstract Class – Polymorphism – Templates - Exception and Event Handling. **Web Programming:** HTML – DHTML – XML – Scripting – Java – Servlets - Applets.

Computer Graphics: Video-Display Devices - Raster-Scan and Random-Scan Systems - Graphics Monitors - Input Devices - Points and Lines - Line Drawing Algorithms - 2D Transformations - 3D Object Representation – 3D Transformation - Viewing Pipeline and Coordinates.

UNIT II **(12 hrs)**

Database System Concepts- Architecture and Modeling: Data Models - Schemas - Database Languages - Entity-Relationship Diagram - Relational Model - Relational Algebra and Relational Calculus - **SQL:** DDL – DML - TCL - SQL Injection. Normalization. **Data Warehousing and Data Mining:** Data Modeling for Data Warehouses - Concept Hierarchy - OLAP and OLTP - Association Rules - Classification - Clustering - Regression - Support Vector Machine - K-Nearest Neighbour - Hidden Markov Model - Summarization - Dependency Modeling - Link Analysis - Sequencing Analysis - Social Network Analysis.

Process Models: Software Process - Process Lifecycle - Process Models. **Requirements:** Functional and Non-Functional Requirements - Developing Use Cases - Requirement Analysis and Modeling - Requirements Review - Software Requirment and Specification (SRS) Document.

UNIT III **(12 hrs)**

Software Design: Abstraction - Architecture - Patterns - Modularity - Information Hiding - Functional Independence - Cohesion and Coupling - Object-Oriented Design - Data Design - Architectural Design - User Interface Design - Component Level Design. **Software Quality:** Quality Control - Quality Assurance - Risk Management - Risk Mitigation - Monitoring and Management (RMMM) - Software Reliability. Estimation and Scheduling of Software Projects: Software Sizing - LOC and FP based Estimations - Constructive Cost Model (COCOMO). **Software Testing:** Verification and Validation - Error - Unit and Integration Testing - White-box and Black-box Testing - Basis Path Testing - Control Structure Testing - Deriving Test Cases - Alpha and Beta Testing - Regression Testing - Performance Testing - Stress Testing.

Data Structures: Arrays and their Applications - Sparse Matrix - Stacks -Queues - Priority Queues - Linked Lists – Trees – Forest - Data Structure for Sets – Graphs - Sorting and Searching Algorithms - Hashing. **Performance Analysis of Algorithms and Recurrences:** Time and Space Complexities. **Design Techniques:** Divide and Conquer - Dynamic Programming - Greedy Algorithms – Backtracking - Branch and Bound. **Graph Algorithms:** Breadth - First Search - Depth-First Search - Shortest Paths - Maximum Flow - Minimum Spanning Trees.

UNIT IV **(12 hrs)**

Digital Logic Circuits and Components: Logic Gates - Boolean Algebra - Map Simplifications - Flip-Flops - Decoders - Multiplexers - Registers and Counters - Memory Unit. **Input- Output Organization:** Asynchronous Data Transfer - Modes of Transfer - Priority Interrupt DMA. **Memory Hierarchy:** Main Memory - Auxiliary Memory -Associative Memory - Cache Memory - Virtual Memory. **System Software:** Machine - Assembly and High-Level Languages - Compilers and Interpreters - Loading - Linking. Process Management: Process Scheduling and Operations - Inter process Communication - Process Synchronization - Critical-Section Problem - Semaphores - Synchronization. **Threads:** Multi-core Programming - Multithreading Models & Issues. **CPU Scheduling:** Scheduling Criteria and Algorithms - Thread Scheduling. **Deadlocks:** Methods for Handling Deadlocks - Deadlock Prevention - Avoidance and Detection - Recovery from Deadlock. **Memory Management:** Contiguous Memory Allocation - Paging - Segmentation - Page Replacement.

Regular Language Models: Deterministic Finite Automaton (DFA) - Non-Deterministic Finite Automaton (NDFA) - Regular Languages - Regular Grammars. **Context Free Language:** Pushdown Automaton (PDA) - Non-Deterministic Pushdown Automaton (NPDA) - Context Free Grammar.

UNIT V **(12 hrs)**

Compiler Design: Syntax Analysis: Top Down Parsing - Recursive Descent Predictive Parsing - LL(1) Parsing - Bottom up Parsing - LR Parser - LALR(1) Parser. **Semantic Analysis:** Dependency Graph - Evaluation Order - S-attributed and L-attributed Definitions - Type-Checking - Symbol Table. **Intermediate Code Generation:** Intermediate Representations – Code Generation and Code Optimization Control-flow - Data- flow Analysis - Local Optimization - Global Optimization - Loop Optimization - Peep-Hole Optimization. **Network Models:** OSI Reference Model and its Protocols - TCP/IP Protocol Suite Functions of OSI and TCP/IP Layers: Framing - Error Detection and Correction - Flow and Error Control - Sliding Window Protocol - HDLC - Multiple Access – CSMA/CD - Network Devices - Backbone Networks - Virtual LANs. IPv4 Structure and Address Space - IPv6 Packet Format - Mapping Logical to Physical Address (ARP). **World Wide Web (WWW):** Uniform Resource Locator (URL) - Domain Name Service (DNS) - Electronic Mail Architecture - SMTP - POP and IMAP - TELNET and FTP.

Mobile Technology: GSM and CDMA - Mobile IP and Mobile Communication Protocol - Communication Satellites - Wireless Networks and Topologies - Cellular Topology. **Cloud Computing and IoT:** SaaS - PaaS - IaaS - Public and Private Cloud - Cloud Storage. **Natural Language Processing:** Grammar and Language - Parsing Techniques - Semantic Analysis and Pragmatics. **Fuzzy Sets:** Notion of Fuzziness - Fuzzification and Defuzzification - Operations on Fuzzy Sets - Fuzzy Functions and Linguistic Variables - Fuzzy Relations - Fuzzy Rules and Fuzzy Inference - Fuzzy Control System and Fuzzy Rule Based Systems. **Artificial Neural Networks (ANN):** Supervised - Unsupervised and Reinforcement Learning - Single Perceptron - Multi Layer Perceptron - Self Organizing Maps - Hopfield Network.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- IV
CORE COURSE –XV: PROJECT AND VIVA VOCE (23PCSJ41)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 12 **INT. MARKS : 25**
CREDITS : 6 **EXT. MARKS : 75**
DURATION : 180 hrs **MAX. MARKS: 100**

Course Objectives:

- To familiarize the students with the objectives and stages in formulating a Research Project
- To enable the learners to identify the different stages of Research Methodology
- To adhere to the rules formulated in the latest edition of MLA hand book
- To employ the accurate documentation in executing Research project

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1[K1]: identify the unexplored areas of research
CO2[K2]: outline the objectives in formulating a research paper
CO3[K3]: apply the latest rules of documentation to cite Print, Non-print and Web Publications in a research paper
CO4[K4]: analyze the stages in writing a thesis – collecting and evaluating Sources and drafting documentation
CO5[K6]: prepare a rightly documented research project with adequate discussion, interpretation and evaluation

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	2	1	1	1
CO2[K2]	3	2	2	2	1	1	1
CO3[K3]	3	2	2	2	1	1	1
CO4[K4]	3	2	3	3	1	1	1
CO5[K6]	2	2	3	3	2	1	1
Weightage of the course	14	10	11	12	6	5	5
Weighted percentage of Course contribution to POs	**3.84**	**3.22**	**5.56**	**6.78**	**7.89**	**3.42**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

Guidelines

1. Students are required to submit a project at the end of the IV semester. The student will work under a faculty member as the research guide.
2. Depending on the interest of the students, project research areas will be chosen.
3. Students must meet the guide periodically.
4. The project carries 100 marks of which 25 Marks for Internal Assessment and 75 Marks for External Examination.
5. There will be two project review sessions.
6. Each student must either present paper or participate in Conferences/Seminars related to his Project work.
7. A draft of the final project report should be submitted to the Project Guide for review at least three weeks prior to the end of the semester.
8. The project report should be of minimum 40 pages (excluding bibliography &appendices)
9. Three copies of the final project report should be submitted.
10. The Head of the department and the Project Guide will evaluate the final Project Report.
11. The viva voce board shall consist of the External Examiner, the Head of the Department and the Internal Examiner (Research Project Guide)

The following rubrics will be taken into account for the evaluation of Project work and viva-voce:

Internal Assessment (25 Marks)		**External Examination (75 Marks)**	
Project Report & Review	: 15 Marks	Project Report	: 25 Marks
PowerPoint Presentation	: 5 Marks	Viva Voce	: 50 Marks
Participation/Publications in Conferences or Seminars	: 5 Marks		

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
PG Programme
SEMESTER III & IV
EXTENSION ACTIVITY
(From 2023 -2024 Batch Onwards)

HOURS/WEEK: -
CREDIT : 1
DURATION : - **INT. MARKS: 100**

Course Objectives

- To promote community involvement, encourage civic participation, and foster a sense of ownership and responsibility.
- To involve the learners in organizing campaigns, seminars, or public events to educate the public, promote understanding, and advocate for positive change.
- To create platforms for knowledge sharing, partnership development, and collective action.
- To encourage environmental conservation, promote responsible resource management, or foster sustainable livelihoods.
- To raise awareness about social issues, advocate for marginalized groups, or implement programs that promote inclusivity and equal opportunities.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1[K1]: recognize the importance of community service through training and education
CO2[K2]: interpret ecological concerns, consumer rights, gender issues & legal protection
CO3[K3]: develop team spirit, verbal/nonverbal communication and organizational ethics by participating in community service
CO4[K4]: examine the necessity of professional skills & community-oriented services for a holistic development
CO5[K6]: create awareness on human rights, legal rights, First Aid, Physical fitness and wellbeing

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	-	-	2	2	1	1
CO2 [K2]	2	1	-	2	1	1	1
CO3 [K3]	2	-	-	1	2	2	1
CO4 [K4]	1	1	1	1	2	2	1
CO5 [K6]	1	-	-	1	2	2	1
Weightage of the course	8	2	1	7	9	8	5
Weighted percentage of Course contribution to Pos	**2.19**	**0.64**	**0.51**	**3.95**	**11.84**	**5.48**	**2.84**

Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

Details of the Courses

1. Physical Education
2. Red Ribbon Club (RRC)
3. Youth Red Cross (YRC)
4. Fine Arts Club
5. Library and Information Service Club
6. Yoga Club
7. ECO Club
8. Consumer Club
9. Human Rights Club
10. Women Empowerment Cell
11. Legal Awareness League