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 2021-2022 Batch onwards)

Department of Computer Science

PG Programme

Approved in the Academic Council – XIII held on 11/08/2021

Curriculum Design and Development Cell
Annexure G

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

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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. M.Thangaraj** Professor & Head Department of Computer Science Madurai Kamaraj University, Madurai -625021
3.	Academic Expert 1.	**Mrs. E.Ponmalar** Associate Professor, Department of Computer Science, SFR College for Women, Sivakasi.
4.	Academic Expert 2.	**Dr. C.R.Sakthivel** Head Of the Department, Department of Computer Science, Sri Ramakrishna Mission Vidyala, Coimbatore.
5.	Industrialist	**Mr.G.Mahesh Kumar** Virtuo Technologies,Sivakasi.
6.	Alumni	**Mr.M.Manoj Babu** Process Associate, HCL Technologies Limited, Bangalore. **Mr.G.Kirubhakaran** Member Technical Staff, Zoho Corporation, Tenkasi.
Members		
7.	Mrs. M.Saranya	Assistant Professor in Computer Science
8.	Mrs.C.Kavitha	Assistant Professor in Computer Science
9.	Mr. G.Ramkumar	Assistant Professor in Computer Science
10.	Mrs. A.Karmehala	Assistant Professor in Computer Science
11.	Mr.M.Balamurugan	Assistant Professor in Computer Science
12.	Mr.R.Ramkumar	Assistant Professor in Computer Science
13.	Mr.G.Vignesh Kumar	Assistant Professor in Computer Science
14.	Dr.M.J.Abinash	Assistant Professor in Computer Science
15.	Ms.P.R.Chowmya	Assistant Professor in Computer Science

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

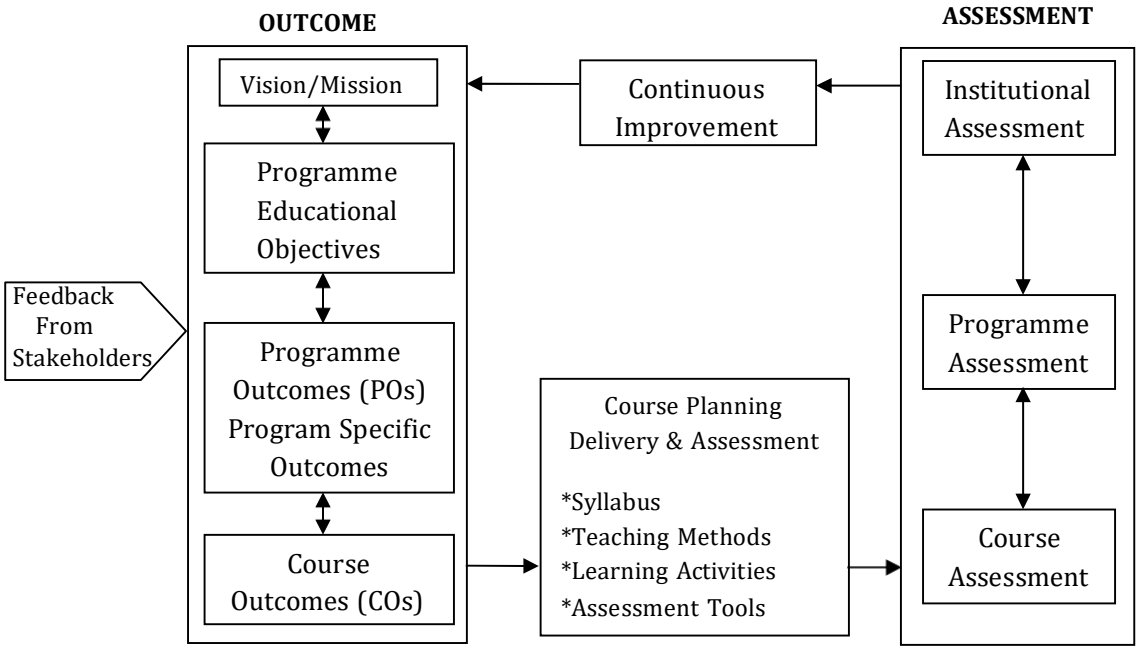
(AFFILIATED TO MADURAI KAMARAJ UNIVERSITY, MADURAI
RE-ACCREDITED WITH 'A' GRADE (THIRD CYCLE) BY NAAC WITH CGPA 3.11)
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
GUIDELINES FOR OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM
(From 2021-2022 Batch onwards)

INTRODUCTION

Sri Kaliswari College in its pursuit of imparting quality education has been 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 (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 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 Higher Secondary(+2) level Mathematics with Bachelor's degree in Computer Science/Information Technology and BCA degree accepted by the Syndicate of the Madurai Kamaraj University, Madurai as its equivalent.

Candidate should have passed the Degree with minimum of 55% marks in Part-III. In case of the candidate, they should have passed the degree with a minimum of 50%marks in Part-III.

Medium of Instruction : English

Age Limit

Maximum age limit : No Age limit

Transitory Permission

Students joined from 2021 - 2023 may be permitted to write their examinations in this pattern up to April 2026.

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

For both UG and PG Programmes, the Internal and External marks are distributed as follows:

For all Theory Courses : Internal Marks: 40; External Marks: 60

For all Practical Courses and Project : Internal Marks: 50; External Marks: 50

Internal Mark Distribution for Theory Courses

Assessment Type	Marks	Scheme of Assessment
Internal Test	15 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 one of the Assignments will be given
Quiz	5 marks	One Quiz Test will be conducted
Viva/ Oral Exam/ Group discussion/ Role Play	10 marks	Test will be conducted in any one of the Oral Mode
Seminar	5 marks	One Seminar for each course

Internal Mark Distribution for Practical Courses

Assessment Type	Marks	Scheme of Assessment
Lab work/Program Execution	40 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 with company based interview questions/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	40 marks	End result of the Practical
Viva –Voce	10 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 – 4 questions Answer in a Word/Sentence – 4 questions	 04 04
2.	Short Answer –3 questions – either or type	3x4=12
3.	Long Answer–2 questions – either or type	2x10=20

Summative Examinations – 60 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	5x4=20
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,

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

$$\text{Percentage attainment of each Course outcome for Internal} = \text{Average of percentage attainment of all Internal Assessment tools}$$

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 + x percentage attainment of CO forSummative 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

CO	Level of Attainment
Above 70%	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 = $\frac{\text{Weighted Percentage of contribution of the course in attainment of each PO}}{\text{average course attainment}} \times 100$

Expected Level of Attainment for each of the Programme Outcomes

PO	Level of Attainment
Above 70%	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

PEO	Level of Attainment
Above 70%	Excellent
60 -70 %	Very good
50-60 %	Good
40 – 50 %	Satisfactory
Below 40%	Not Satisfactory

SRI KALISWARI COLLEGE (AUTONOMOUS), Sivakasi
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
CURRICULUM STRUCTURE
OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM
(From 2021-2022 Batch onwards)

Courses	Sem I	Sem II	Sem III	Sem IV	Credits
Core Courses	5(4) 5(4) 5(4) 5P(3) 5P(3)	5(5) 5(4) 5 (4) 4P(2) 5P(3)	5(5) 5(4) 5(3) 5P(3) 5P(3)	5(5) 5(5) 5(5)	69
Elective Courses	5(4)	-	5(4)	-	8
Non -Major Elective	-	6(4)	-	-	4
Swayam Course			(3)		3
Project	-	-	-	15P(6)	6
Total Hours (Per Week)/Credits	30(22)	30(22)	30(25)	30(21)	120 / 90

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 2021-2022 Batch onwards)
PROGRAMME CODE – PCS

Semester	Course Code	Course Name	Hours	Credits
I	21PCSC11	**Core Course – I:** Design and Analysis of Algorithms	5	4
	21PCSC12	**Core Course – II:** Advanced DBMS	5	4
	21PCSC13	**Core Course – III:** Distributed Operating System	5	4
	21PCSO11 21PCSO12 21PCSO13	**Elective Course – I:** 1. Data Science and Big Data 2. Data Mining 3. Embedded System	5	4
	21PCSC1P	**Core Course – IV:** Practical: Algorithm & OS	5	3
	21PCSC1Q	**Core Course – V:** Practical: DBMS	5	3
		Total	**30**	**22**
II	21PCSC21	**Core Course – VI:** Advanced Computer Networks	5	5
	21PCSC22	**Core Course – VII:** Advanced Java Programming	5	4
	21PCSC23	**Core Course – VIII:** Compiler Design	5	4
	21PCSC2P	**Core Course – IX:** Practical: Advanced Java Programming	5	3
	21PCSC2Q	**Core Course – X:** Practical: Python Programming	4	2
	21PCSN21	**Non-Major Elective Course – I:** Web Designing	6	4
		Total	**30**	**22**
III	21PCSC31	**Core Course – XI :** Machine Learning	5	5
	21PCSC32	**Core Course – XII:** Advanced Web Technology	5	4
	21PCSC33	**Core Course – XIII:** Digital Image Processing	5	3
	21PCSO31 21PCSO32 21PCSO33	**Elective Course – II:** 1. Cryptography and Network Security 2. Mobile Computing 3. Wireless Network	5	4
	21PCSC3P	**Core Course – XIV:** Practical : Advanced Web Technology	5	3
	21PCSC3Q	**Core Course – XV:** Practical : Open Source Tools	5	3
	21PCSM31 21PCSM32	**Swayam Course:** 1. Computer Architecture and Organization 2. Computer Organization and Architecture : A Pedagogical Aspect	-	3

		Total	**30**	**25**
IV	21PCSC41	**Core Course – XVI:** Internet Of Things	5	5
	21PCSC42	**Core Course – XVII:** Software Project Management	5	5
	21PCSC43	**Core Course – XVIII:** Research Methodology	5	5
	21PCSJ41	**Core Course –X IX:** Project	15	6
		Total	**30**	**21**

SRI KALISWARI COLLEGE (AUTONOMOUS), Sivakasi
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
(From 2021-2022 Batch onwards)

PROGRAMME ARTICULATION MATRIX (PAM)

Semester	Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	21PCSC11	**Core Course – I:** Design and Analysis of Algorithms	15	12	10	7	2	5	5
	21PCSC12	**Core Course – II:** Advanced DBMS	15	11	9	5	2	6	5
	21PCSC13	**Core Course – III:** Distributed Operating System	14	12	9	7	2	5	5
	21PCSO11 21PCSO12 21PCSO13	**Elective Course – I:** 1. Data Science and Big Data 2. Data Mining 3. Embedded System	15	10	10	7	2	5	5
	21PCSC1P	**Core Course – IV:** Practical: Algorithm & OS	15	10	8	5	2	7	5
	21PCSC1Q	**Core Course – V:** Practical: DBMS	15	10	10	7	2	5	5
II	21PCSC21	**Core Course – VI:** Advanced Computer Networks	15	10	10	8	2	5	5
	21PCSC22	**Core Course – VII:** Advanced Java Programming	15	11	10	5	2	7	5
	21PCSC23	**Core Course – VIII:** Compiler Design	15	12	8	6	2	5	5
	21PCSC2P	**Core Course – IX:** Practical: Advanced Java Programming	15	14	8	5	2	7	5
	21PCSC2Q	**Core Course – X:** Practical: Python Programming	15	10	8	6	2	8	5
	21PCSN21	**Non-Major Elective Course – I:** Web Designing	12	8	2	10	0	7	5
III	21PCSC31	**Core Course – XI :** Machine Learning	15	10	11	5	2	7	5
	21PCSC32	**Core Course – XII:** Advanced Web Technology	15	11	8	7	2	7	5
	21PCSC33	**Core Course – XIII:** Digital Image Processing	15	13	12	5	2	5	5

	21PCSO31 21PCSO32 21PCSO33	**Elective Course – II:** 1. Cryptography and Network Security 2. Mobile Computing 3. Wireless Network	13	9	8	3	9	7	5
	21PCSC3P	**Core Course – XIV:** Practical : Advanced Web Technology	15	10	8	5	2	8	6
	21PCSC3Q	**Core Course – XV:** Practical : Open Source Tools	15	9	6	7	2	7	6
	21PCSM31 21PCSM32	**Swayam Course:** 1. Computer Architecture and Organization 2. Computer Organization and Architecture : A Pedagogical Aspect	13	10	10	9	3	2	8
IV	21PCSC41	**Core Course – XVI:** Internet Of Things	13	9	10	7	2	6	5
	21PCSC42	**Core Course – XVII:** Software Project Management	15	10	10	8	5	5	5
	21PCSC43	**Core Course – XVIII:** Research Methodology	7	7	11	5	10	8	6
	21PCSJ41	**Core Course –X IX:** Project	15	10	13	7	5	5	5
Total Weightage of all Courses Contributing to PO			**327**	**238**	**209**	**146**	**66**	**139**	**121**

SRI KALISWARI COLLEGE (AUTONOMOUS), Sivakasi
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
(From 2021-2022 Batch onwards)

PROGRAMME ARTICULATION MATRIX – WEIGHTED PERCENTAGE

Semester	Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	21PCSC11	**Core Course – I:** Design and Analysis of Algorithms	4.59	5.04	4.78	4.79	3.03	3.6	4.13
	21PCSC12	**Core Course – II:** Advanced DBMS	4.59	4.62	4.31	3.42	3.03	4.32	4.13
	21PCSC13	**Core Course – III:** Distributed Operating System	4.28	5.04	4.31	4.79	3.03	3.6	4.13
	21PCSO11 21PCSO12 21PCSO13	**Elective Course – I:** 1. Data Science and Big Data 2. Data Mining 3. Embedded System	4.59	4.2	4.78	4.79	3.03	3.6	4.13
	21PCSC1P	**Core Course – IV:** Practical: Algorithm & OS	4.59	4.2	3.83	3.42	3.03	5.04	4.13
	21PCSC1Q	**Core Course – V:** Practical: DBMS	4.59	4.2	4.78	4.79	3.03	3.6	4.13
II	21PCSC21	**Core Course – VI:** Advanced Computer Networks	4.59	4.2	4.78	5.48	3.03	3.6	4.13
	21PCSC22	**Core Course – VII:** Advanced Java Programming	4.59	4.62	4.78	3.42	3.03	5.04	4.13
	21PCSC23	**Core Course – VIII:** Compiler Design	4.59	5.04	3.83	4.11	3.03	3.6	4.13
	21PCSC2P	**Core Course – IX:** Practical: Advanced Java Programming	4.59	5.88	3.83	3.42	3.03	5.04	4.13
	21PCSC2Q	**Core Course – X:** Practical: Python Programming	4.59	4.2	3.83	4.11	3.03	5.76	4.13
	21PCSN21	**Non-Major Elective Course – I:** Web Designing	3.67	3.36	0.96	6.85	0	5.04	4.13
III	21PCSC31	**Core Course – XI :** Machine Learning	4.59	4.2	5.26	3.42	3.03	5.04	4.13
	21PCSC32	**Core Course – XII:** Advanced Web Technology	4.59	4.62	3.83	4.79	3.03	5.04	4.13
	21PCSC33	**Core Course – XIII:** Digital Image Processing	4.59	5.46	5.74	3.42	3.03	3.6	4.13

	21PCSO31 21PCSO32 21PCSO33	**Elective Course – II:** 1. Cryptography and Network Security 2. Mobile Computing 3. Wireless Network	3.98	3.78	3.83	2.05	13.64	5.04	4.13
	21PCSC3P	**Core Course – XIV:** Practical : Advanced Web Technology	4.59	4.2	3.83	3.42	3.03	5.76	4.96
	21PCSC3Q	**Core Course – XV:** Practical : Open Source Tools	4.59	3.78	2.87	4.79	3.03	5.04	4.96
	21PCSM31 21PCSM32	**Swayam Course:** 1. Computer Architecture and Organization 2. Computer Organization and Architecture : A Pedagogical Aspect	3.98	4.2	4.78	6.16	4.55	1.44	6.61
IV	21PCSC41	**Core Course – XVI:** Internet Of Things	3.98	3.78	4.78	4.79	3.03	4.32	4.13
	21PCSC42	**Core Course – XVII:** Software Project Management	4.59	4.2	4.78	5.48	7.58	3.6	4.13
	21PCSC43	**Core Course – XVIII:** Research Methodology	2.14	2.94	5.26	3.42	15.15	5.76	4.96
	21PCSJ41	**Core Course –X IX:** Project	4.59	4.2	6.22	4.79	7.58	3.6	4.13
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: DESIGN AND ANALYSIS OF ALGORITHMS (21PCSC11)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 4 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course introduces the learners to design algorithms from basic to an advanced level and gives various algorithmic approaches to solve a problem.

Course Outcomes (CO)

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

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

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

CO3 [K3]: use binary search, merge & quick sort, minimum cost spanning trees, 0/1 knapsack to solve simple sorting & searching problem

CO4 [K4]: analyse 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	07	02	05	05
Weighted percentage of Course contribution to POs	**4.59**	**5.04**	**4.78**	**4.79**	**3.03**	**3.6**	**4.13**

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

UNIT I **(15 hrs)**

Introduction: Algorithm Definition – Algorithm Specification – Performance Analysis-Asymptotic Notations. **Elementary Data Structures:** Stacks and Queues – Trees – Dictionaries – Priority Queues – Sets and Disjoint Set Union – Graphs.

UNIT II **(15 hrs)**

Divide and Conquer: The General Method – Binary Search – Finding the Maximum and Minimum – Merge Sort – Quick Sort – Selection - Strassen's Matrix Multiplication.

UNIT III **(15 hrs)**

The Greedy Method: General Method - Knapsack Problem - Tree Vertex Splitting – Job Sequencing With Deadlines - Minimum Cost Spanning Trees.

UNIT IV **(15 hrs)**

Dynamic Programming: The General Method – Multistage Graphs – All-Pairs Shortest Paths – Single-Source Shortest Paths - Optimal Binary Search Trees - String Editing - 0/1 Knapsack - Reliability Design - The Traveling Salesperson Problem - Flow Shop Scheduling. **Basic Traversal and Search Techniques:** Techniques for Binary Trees – Techniques for Graphs – Connected Components and Spanning Trees.

UNIT V **(15 hrs)**

Backtracking: The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem.

TEXTBOOK

1. Ellis Horowitz, Satraj Sahni. Sanguthevar Rajasekaran. *Fundamentals of Computer Algorithms,* Universities Press, Second Edition, Reprint 2009.

   UNIT I : 1.1, 1.2, 1.3.3, 2.1-2.6
   UNIT II : 3.1-3.7
   UNIT III: 4.1-4.5
   UNIT IV : 5.1-5.10, 6.1-6.3
   UNIT V : 7.1-7.6

REFERENCES

Books

1. Thomas H.Cormen,Charles E.Leiserson,Ronald L.Rivest,Clifford Stein. *Introduction to Algorithms.* The MIT Press, Cambridge, 2009.
2. Langsam, Augenstien, Tenenbaum. *Data Structures Using C.* PHI.
3. V.Aho, Hopcropft, Ullman. *Data structures and Algorithms*. LPE.

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1. https://www.geeksforgeeks.org/data-structures/
2. https://www.javatpoint.com/data-structure-tutorial

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- I
CORE COURSE - II: ADVANCED DBMS (21PCSC12)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 4 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This Course introduces the learners to the definition of database and the concepts and techniques related to query processing.

Course Outcomes (CO)

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

CO1[K1]: describe DBMS architecture, Data Models, ER Models, Relational Model, Functional Dependency, Transactions and Recovery.

CO2[K2]: explain database architecture, relational algebra, structure of relational database, advanced SQL Concepts, normalization, transaction model and concurrency control

CO3[K3]: apply structured query language (SQL) for database definition and database manipulation.

CO4[K4]: analyze query languages, relational algebra and SQL query language and differentiate keys, normal forms and various concurrency mechanisms

CO5[K6]: design the ER Model for given database requirements and to develop database tables.

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	2	2	1	1	1	1
CO3[K3]	3	2	2	1	-	1	1
CO4[K4]	3	2	2	1	-	1	1
CO5[K6]	3	2	1	1	-	2	1
Weightage of the course	15	11	9	5	2	6	5
Weighted percentage of Course contribution to POs	**4.59**	**4.62**	**4.31**	**3.42**	**3.03**	**4.32**	**4.13**

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

UNIT I (**15 hrs)**

Introduction: Purpose of Database Systems – View of Data – Database Languages -Database Design – Database and Application Architecture - Database Users and Administrators. **Database Design using the E-R Model:** Entity Relationship Model – Mapping Cardinalities – Primary Key – Reducing E-R Diagrams to Relational Schemas – Extended E-R Features.

UNIT II **(15 hrs)**

Introduction to the Relational Model: Structure of Relational Databases – Database Schema Keys – Schema Diagrams – Relational Query Languages - The Relational Algebra

UNIT III **(15 hrs)**

Introduction to SQL: Overview of SQL Query Language – SQL Data Definition – Basic Structure of SQL Queries –Additional Basic Operations - Set Operations – Null values - Aggregate Functions – Nested Subqueries. **Intermediate SQL:** Join Expressions – Views – Transaction - Integrity Constraints –Authorization. **Advanced SQL:** Functions and Procedures – Triggers.

UNIT IV **(15 hrs)**

Relational Database Design: Decomposition using Functional Dependencies – Normal Forms – Functional Dependency Theory – Algorithm for Decomposition using Functional Dependencies – Decomposition using Multivalued Dependencies – More Normal Forms – Atomic Domains and First Normal Form.

UNIT V **(15 hrs)**

Transactions: Transaction Concept – A Simple Transaction Model – Storage Structure – Transaction Atomocity and Durability – Serializability. **Concurrency Control:** Lock Based Protocols – Deadlock Handling – Time Stamp Based Protocols – Validation Based Protocols. **Recovery System:** Failure Classification – Storage – Recovery and Atomicity – Recovery Algorithm.

TEXTBOOK

1. Abraham Silberschatz, Henry F Korth, S. Sudharshan. *Database System Concepts*. McGraw Hill, Seventh Edition, 2020.

UNIT I : 1.2-1.5,1.7,1.8,6.2,6.4,6.5,6.7,6.8
UNIT II : 2.1-2.6
UNIT III: 3.1-3.8,4.1-4.4,4.7,5.2,5.3
UNIT IV : 7.2-7.8
UNIT V : 17.1-17.4,17.6,18.1,18.2,18.5,18.6,19.1-19.4

REFERENCES

Books

1. R. Elmasri, S.B. Navathe. *Fundamentals of Database Systems*, Pearson Education Addison Wesley, 2014.
2. Frad R.McFadden, Jeffrey A.Hofferand Mary. B. Prescott. *Modern Database Management*. Pearson Education Asia, 2015
3. Raghu Ramakrishnan, *Database Management Systems*. McGraw-Hill College Publications, 2015.

Web Sources

1. https://www.javatpoint.com/dbms-er-model-concept
2. https://www.javatpoint.com/dbms-relational-algebra
3. https://www.javatpoint.com/dbms-normalization
4. https://www.javatpoint.com/dbms-transaction-property
5. https://www.tutorialspoint.com/dbms/sql_overview.htm

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- I
CORE COURSE - III: DISTRIBUTED OPERATING SYSTEM (21PCSC13)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 4 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course introduces the learners to the distributed architecture, synchronization, concurrency in data processing and resource sharing.

Course Outcomes (CO)

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

CO1[K1]: describe functions of operating system, distributed resource management, failure recovery and fault tolerance, multiprocessor and database operating systems

CO2[K2]: explain functions of operating system, distributed resource management, failure recovery and fault tolerance, multiprocessor and database operating systems

CO3[K3]: determine mutual exclusion algorithms, resoruce required for distributed OS

CO4[K4]: examine failure recovery and fault tolerance protocols and multiprocessor design issues

CO5[K5]: justify distributed deadlock detection algorithms, agreement protocols, Non Token based algorithms and Lamport's algorithm, Token Based algorithms in resource sharing , Two-Phase and Non blocking commit Protocols in fault tolerance

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	2	2	1	1	1
CO2[K2]	3	2	2	2	1	1	1
CO3[K3]	2	2	1	1	-	1	1
CO4[K4]	3	3	2	1	-	1	1
CO5[K5]	3	2	2	1	-	1	1
Weightage of the course	14	12	09	07	02	05	05
Weighted percentage of Course contribution to POs	**4.28**	**5.04**	**4.31**	**4.79**	**3.03**	**3.6**	**4.13**

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

UNIT I **(15 hrs)**

Introduction: Overview – Introduction – Functions of Operating System – Design Approaches - Types of Advanced Operating System Synchronization Mechanisms– Concepts of a Process – Critical Section Problem – Process Deadlock – Models of Deadlock – Conditions for Deadlock – System with Single-Unit Requests, Consumable Resources , Reusable Resources.

UNIT II **(15 hrs)**

Distributed Operating Systems : Distributed Operating Systems - Introduction- Issues – Communication Primitives – Inherent Limitations – Lamport's Logical Clock, Vector Clock, Global State , Cuts – Termination Detection – Distributed Mutual Exclusion – Non Token Based Algorithms – Lamport's Algorithm - Token Based Algorithms – Distributed Deadlock Detection – Distributed Deadlock Detection Algorithms – Agreement Protocols.

UNIT III **(15 hrs)**

Distributed Resource Management : Distributed File Systems – Architecture – Mechanisms – Design Issues – Distributed Shared Memory – Architecture – Algorithm – Protocols – Design Issues – Distributed Scheduling – Issues – Components – Algorithms.

UNIT IV **(15 hrs)**

Failure Recovery and Fault Tolerance: Concepts – Failure Classifications – Approaches to Recovery – Recovery in Concurrent Systems – Synchronous and Asynchronous Check pointing and Recovery –Check Pointing in Distributed Database Systems – Fault Tolerance Issues – Two-Phase and Nonblocking Commit Protocols – Voting Protocols – Dynamic Voting Protocols.

UNIT V **(15 hrs)**

Multiprocessor and Database Operating Systems: Structures – Design Issues – Threads – Process Synchronization – Processor Scheduling – Memory management – Reliability/Fault Tolerance – Database Operating Systems.

TEXTBOOK

1. Mukesh Singhal, N.G.Shivaratri. *Advanced Concepts in Operating Systems*. McGraw Hill, 2003.

   UNIT I : 1.1-1.3,1.5,2.2,2.4,3.3,3.6,3.7,3.8,3.9
   UNIT II : 4.1, 4.5, 4.7, 5.2,5.3,5.4,5.6,5.7,5.8,6.5,6.6,6.10, 7.7,8
   UNIT III: 9.2,9.3, 9.4,10.2,10.3,10.5,10.6,11.3,11.4,11.6
   UNIT IV : 12.2,12.3,12.5,12.6,12.8,12.9,12.10,13.2,13.4,13.5, 13.6, 13.7
   UNIT V : 17.2, 17.3, 17.4, 17.5, 17.6, 11.7,17.8

REFERENCES

Books

1. Andrew S. Tanenbaum. *Distributed Operating System.* PHI
2. Abraham Silberschatz, Peter B.Galvin and G.Gagne. *Operating System Concepts*. Addison Wesley publications, Sixth Edition, 2003.
3. Andrew S.Tanenbaum. *Modern Operating Systems*. Addison Wesley, Second Edition, 2001

Web Sources

1. https://www.tutorialspoint.com/distributed-operating-system
2. https://www.geeksforgeeks.org/types-of-operating-systems/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- I
ELECTIVE COURSE - I: DATA SCIENCE AND BIG DATA (21PCSO11)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 4 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course introduces the learners to the basic and advanced methods of map reduce and hadoop methods and its ecosystem.

Course Outcomes (CO)

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

CO1[K1]: describe the concepts and technologies of big data, basic and advanced analytic theory ,methods, technologies and tools in data science

CO2[K2]: explain the basics of analytics, analytic methods using R, clustering, regression, classification, time series analysis and text analysis in R

CO3[K3]: apply R techniques for mining, analytical methods, classification, time series analysis and text analysis

CO4[K4]: compare analytical theory and methods, classification, clustering, association rules and regression techniques ,time series and text analysis in R.

CO5[K4]: examine clustering and classification concepts, statistical methods, tools and technologies used in data science analytics

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	2	-	1	1
CO2[K2]	3	2	2	2	-	1	1
CO3[K3]	3	2	2	1	-	1	1
CO4[K4]	3	2	2	1	1	1	1
CO5[K4]	3	2	2	1	1	1	1
Weightage of the course	15	10	10	07	02	05	05
Weighted percentage of Course contribution to POs	**4.59**	**4.2**	**4.78**	**4.79**	**3.03**	**3.6**	**4.13**

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

UNIT I **(15 hrs)**

Introduction to Big Data Analytics: Big Data Overview – Data Structures – Analyst Perspective on Data Repositories - State of the Practice in Analytics – BI Versus Data Science - Current Analytical Architecture – Drivers of Big Data – Big Data Ecosystem - Data Analytics Lifecycle – Data Discovery – Data Preparation – Model Planning –Model Building – Communicate Results – Operationalize.

UNIT II **(15 hrs)**

Basic Data Analytic Methods Using R : Introduction to R programming – 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. **Statistical Methods of Evaluation:** Hypothesis Testing – Difference of Means – Wilcox on Rank-Sum Test – Type I and Type II Errors – Power and Sample Size – ANOVA.

UNIT III **(15 hrs)**

Advanced Analytical Theory and Methods: Clustering – K Means –Use Cases – Overview – Determining Number of Clusters – Diagnostics – Reasons to Choose and Cautions – Additional Algorithms. **Association Rules:** Apriori Algorithm – Evaluation of Candidate Rules – Applications of Association Rules – Validation and Testing – Diagnostics. **Regression:** Linear Regression and Logistic Regression. **Use Cases:** Model Description – Diagnostics - Additional Regression Models.

UNIT IV **(15 hrs)**

Classification: Decision Trees – Overview – Genetic Algorithm –Decision Tree Algorithms – Evaluating Decision Tree – Decision Trees in R - Na'ive Bayes – Bayes Theorem – Naive Bayes Classifier –Smoothing – Diagnostics – Naive Bayes in R – Diagnostics of Classifiers – Additional Classification Methods. **Time Series Analysis:** Overview – Box – Jenkins Methodology – ARIMA Model –Autocorrelation Function – Autoregressive Models – Moving Average Models – ARMA and ARIMA Models – Building and Evaluating and ARIMA Model. **Text Analysis:** Text Analysis Steps – Example –Collecting – Representing Term Frequency – Categorizing –Determining Sentiments – Gaining Insights.

UNIT V **(15 hrs)**

Advanced Analytics - Technology and Tools: Map Reduce and Hadoop: Analytics for Unstructured Data .- Use Cases - Map Reduce - Apache Hadoop – The Hadoop Ecosystem – pig – Hive – Hbase – Manout –NoSQL . **Tools in Database Analytics:** SQL Essentials – Joins – Set operations – Grouping Extensions – In Database Text Analysis -Advanced SQL – Windows Functions – User Defined Functions and Aggregates – Ordered Aggregates- MADiib - Analytics Reports Consolidation – Communicating and operationalzing and Analytics Project . **Creating the Final Deliverables:** Developing Core Material for Multiple Audiences – Project Goals – Main Findings – Approach Model Description – Key Points Support with Data - Model Details – Recommendations – Data Visualization.

TEXTBOOK

1. *Data Science & Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data*. John Wiley & Sons, Inc. 2015

   UNIT I : 1, 2
   UNIT II : 3
   UNIT III: 4, 5
   UNIT IV : 7, 8, 9
   UNIT V : 10, 11, 12

REFERENCES

Books

1. Noreen Burlingame. *The little book on Big Data*. New Street publishers, 2012.
2. Anil Maheshwari. *Data Analytics*. McGraw Hill Education, 2017.
3. Norman Matloff. *The Art of R Programming: A Tour of Statistical Software Design.* Starch Press, First Edition, 2011.
4. Sandip Rakshit. *R for Beginners*. McGraw Hill Education, 2017.

Web Sources

1. http://www.johndcook.com/R_language_for_programmers.html.
2. http://bigdatauniversity.com/.
3. http://home.ubalt.edu/ntsbarsh/stat-data/topics.htm#rintroduction.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- I
ELECTIVE COURSE - I: DATA MINING (21PCSO12)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 4 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course introduces the learners to the fundamental concepts of Data Mining Techniques and various Algorithms used for Information Retrieval from Datasets.

Course Outcomes (CO)

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

CO1[K1]: describe data mining, association pattern mining, cluster analysis, classification and text, time series and web data mining
CO2[K2]: explain the algorithms of data mining, text, time series and web data mining and social network analysis
CO3[K3]: use various kinds of data, Data preparation, association, clustering and classification techniques in mining
CO4[K4]: examine association mining, clustering and classification concepts and algorithms
CO5[K5]: choose appropriate data mining concepts required to solve real world problems.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	2	-	1	1
CO2[K2]	3	2	2	2	-	1	1
CO3[K3]	3	2	2	1	-	1	1
CO4[K4]	3	2	2	1	1	1	1
CO5[K5]	3	2	2	1	1	1	1
Weightage of the course	15	10	10	07	02	05	05
Weighted percentage of Course contribution to POs	**4.59**	**4.2**	**4.78**	**4.79**	**3.03**	**3.6**	**4.13**

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

UNIT I **(15 hrs)**

An Introduction to Data Mining: Introduction - The Data Mining Process - The Basic Data Types - The major building blocks - Scalability Issues and the Streaming Scenario - A Stroll through Some Application Scenarios. **Data Preparation:** Feature Extraction and Portability - Data Cleaning - Data Reduction and Transformation.

UNIT II **(15 hrs)**

Similarity and distances: Introduction - Multi dimensional data - Text Similarity Measures - Temporal Similarity Measures - Graph Similarity Measures - Supervised Similarity Functions. **Association Pattern Mining:** Introduction -The Frequent Pattern Mining Model - Association Rule Generation Framework -Frequent Itemset Mining Algorithms. **Alternative Models:** Interesting Patterns - Useful Meta - Algorithms.

UNIT III **(15 hrs)**

Association Pattern Mining: Advanced Concepts: Introduction -Pattern Summarization- Pattern Querying. **Putting Associations to Work:** Applications. **Cluster Analysis:** Introduction - Feature Selection for Clustering -Representative-Based Algorithm - Hierarchical Clustering Algorithms -Probabilistic Model-Based Algorithms - Grid-Based and Density-Based Algorithms - Graph-Based Algorithms - Non-Negative Matrix Factorization - Cluster Validation.

UNIT IV **(15 hrs)**

Cluster Analysis: Advanced Concepts: Introduction - Clustering Categorical Data - Scalable Data Clustering - High-Dimensional Clustering – Semi-Supervised Clustering - Human and Visually Supervised Clustering - Cluster Ensembles. **Putting Clustering to Work:** Applications. **Data Classification:** Introduction - Feature Selection for Classification - Decision Trees - Rule-Based Classifiers - Probabilistic Classifiers - Support Vector Machines - Neural Networks - Instance-Based Learning - Classifier Evaluation - Scalable Classification - Regression Modeling with Numeric Classes – Semi-Supervised Learning - Active Learning.

UNIT V **(15 hrs)**

Mining Text Data: Introduction - Document Preparation and Similarity Computation - Topic Modeling - Specialized Classification Methods for Text. **Mining Time Series Data:** Time Series Forecasting - Time Series Motifs - Time Series Clustering. **Mining Discrete Sequences:** Outlier Detection in Sequences - Hidden Markov Models - Sequence Classification. **Mining Web Data:** Web Crawling and Resource Discovery - Search Engine Indexing and Query Processing - Ranking Algorithms. **Social Network Analysis:** Social Networks: Preliminaries and Properties - Community Detection - Collective Classification - Link Prediction - Social Influence Analysis.

TEXTBOOK

1. Charu C.Aggarawal. *Data Mining the textbook.* Switzerland:Springer International Publishing, 2015.

   UNIT I : 1.1, 1.6, 2.2, 2.3, 2.4
   UNIT II : 3.1-3.6, 4.1-4.6
   UNIT III: 5.1-5.4, 6.1-6.9
   UNIT IV : 7.1-7.8, 10.1-10.9, 11.4, 11.5, 11.6, 11.7
   UNIT V : 13.1-13.5, 14.3, 14.4, 14.5, 15.4, 15.5, 15.6, 18.2, 18.3, 18.4, 19.2, 19.3, 19.4, 19.5

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1. Margret H. Dunham. *Data Mining: Introductory and Advanced Topics*. Pearson Education, 2003.
2. M. Awad, Latifur Khan, Bhavani Thuraisingham and Lei Wang. *Design and Implementation of Data Mining Tools*. CRC Press-Taylor & Francis Group, 2015.
3. Pang-Ning Tan, Michael Steinbach and Vipin Kumar. *Introduction to Data Mining-Instructor's Solution Manual*. Pearson Education, First Edition, 2016.
4. Mohammed J.Zaki, Wagner Meira JR. *Data Mining and Analysis: Fundamental Concepts and Algorithms*. Cambridge India, 2016.
5. Jiawei Han and Micheline Kamber. *Data Mining: Concepts and Techniques (The Morgan Kaufmann Series in Data Management Systems)*. Third Edition, 2011.
6. Ian H. Witten, Eibe Frank, Mark A. Hall. *Data Mining: Practical Machine Learning Tools and Techniques*. Elsevier, Third Edition, 2014

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1. https://www.talend.com/resources/what-is-data-mining/
2. https://www.guru99.com/data-mining-tutorial.html
3. https://www.javatpoint.com/data-mining-techniques

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- I
ELECTIVE COURSE - I: EMBEDDED SYSTEM (21PCSO13)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 4 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course introduces the learners to the architecture and programming of embedded processors, developing applications using Embedded/Real-Time Operating Systems.

Course Outcomes (CO)

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

CO1[K1]: describe embedded system, core elements, RTOS based design and components
CO2[K2]: explain purpose and characteristics and elements in embedded system
CO3[K4]: analyze application and domain specific embedded system.
CO4[K5]: choose processors, sensors and computational models for a specific domain.
CO5[K6]: design simple real time embedded systems using the concepts of RTOS.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	2	-	1	1
CO2[K2]	3	2	2	2	-	1	1
CO3[K4]	3	2	2	1	-	1	1
CO4[K5]	3	2	2	1	1	1	1
CO5[K6]	3	2	2	1	1	1	1
Weightage of the course	15	10	10	07	02	05	05
Weighted percentage of Course contribution to POs	**4.59**	**4.2**	**4.78**	**4.79**	**3.03**	**3.6**	**4.13**

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

UNIT I **(15 hrs)**

Introduction: Introduction to Embedded System - Embedded System vs. General Computing Systems - History - Classification - Major Application Areas - Purpose of Embedded Systems - **Smart Running Shoes:** The Innovative Bonding of Lifestyle with Embedded Technology. Characteristics and Quality Attributes of Embedded Systems.

UNIT II **(15 hrs)**

Elements of an Embedded System - Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, COTS - Memory - Sensors and Actuators - Communication Interface: Onboard and External Communication Interfaces - Embedded Firmware - Reset Circuit, Brown-Out Protection Circuit, Oscillator Unit, Real-Time Clock and Watchdog Timer - PCB And Passive Components.

UNIT III **(15 hrs)**

Embedded Systems : Washing machine: Application-specific -Automotive: Domain specific. Hardware Software Co-Design - Computational Models - Embedded Firmware Design Approaches - Embedded Firmware Development Languages - Integration and Testing of Embedded Hardware and Firmware.

UNIT IV **(15 hrs)**

RTOS based Embedded System Design: Operating System Basics - Types of operating Systems - Tasks, process and Threads -Multiprocessing and Multitasking - Task Scheduling- Task Communication - Task Synchronization - Device Drivers - Choosing an RTOS.

UNIT V **(15 hrs)**

Components: Components in Embedded System Development Environment, Files Generated During Compilation, Simulators, Emulators and Debugging -Objectives of Embedded Product Development Life Cycle - Different Phases Of EDLC - EDLC Approaches - Trends in Embedded Industry. **Case Study:** Digital Clock.

TEXTBOOK

1. K. V. Shibu. *Introduction to embedded systems*. TMH education Pvt. Ltd. 2009.

   UNIT I : 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7
   UNIT II : 2.1-2.7
   UNIT III: 4
   UNIT IV : 10

UNIT V : 13.2, 13.4, 15.3, 15.4, 15.5

REFERENCES

Books

1. Raj Kamal. *Embedded Systems: Architecture, Programming and Design*. TMH, Second Edition, 2009
2. Frank Vahid, Tony Givargis. *Embedded System Design*. JohnWiley, Third Edition, 2006
3. Cliff Young, Faraboschi Paolo, and Joseph A. Fisher. *Embedded Computing: A VLIW Approach to Architecture, Compilers and Tools*, Morgan Kaufmann Publishers, An imprint of Elsevier, 2005.
4. David E. Simon. *An Embedded Software Primer*. Pearson Education, 1999

Web Sources

1. https://entrancetutorials.com/embedded-systems-by-rajkamal-pdf
2. https://www.tutorialspoint.com/embedded_systems/es_overview.htm

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- I
CORE COURSE - IV: PRACTICAL: ALGORITHM & OS (21PCSC1P)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 50**
CREDITS : 3 **EXT. MARKS : 50**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course introduces the learners to the usage of simple linear and non linear data structures and various algorithmic approaches to the students.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1[K2]: demonstrate data structure and OS algorithms
CO2[K3]: use data structure and OS algorithms
CO3[K3]: apply different sorting and searching method
CO4[K4]: simplify the development of solution using the OS & Data structure algorithm.
CO5[K6]: design simple program using data structure and OS algorithms

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	1	1	-	1	1
CO2[K3]	3	2	1	1	-	1	1
CO3[K3]	3	2	2	1	-	1	1
CO4[K4]	3	2	2	1	1	2	1
CO5[K6]	3	2	2	1	1	2	1
Weightage of the course	15	10	08	05	02	07	05
Weighted percentage of Course contribution to POs	**4.59**	**4.2**	**3.83**	**3.42**	**3.03**	**5.04**	**4.13**

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

ALGORITHM

1. Write a program to reverse a stack using recursion
2. Write a program to find maximum width of Binary tree
3. Write a program to implement Depth First Traversal for a graph
4. Write a program to sort a given set of elements using Quick sort method and determine the time required to sort the elements
5. Write a program to implement 0/1 Knapsack problem using Dynamic Programming
6. Write a program to find Minimum Cost Spanning Tree of a given undirected graph
7. Write a program to implement N Queen's problem using Back Tracking
8. Write a program to implement Floyd's algorithm for the All-Pairs- Shortest-Paths problem

OPERATING SYSTEM

9. Write a program to perform the FCFS CPU scheduling algorithm
10. Write a program to perform the priority CPU scheduling algorithm
11. Write a program to perform the Round Robin CPU scheduling algorithm
12. Write a program to perform the Bankers Algorithm for Deadlock Avoidance.
13. Write a program to perform FIFO Page Replacement Algorithm

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- I
CORE COURSE - V: PRACTICAL: DBMS (21PCSC1Q)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 50**
CREDITS : 3 **EXT. MARKS : 50**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course enables the learners to the Implementation of SQL Query, Aggregate Functions, Views, Cursors, Triggers and Procedure.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1[K2]: demonstrate SQL queries and PL/SQL constructs
CO2[K3]: apply limit, range queries and use string, aggregate and date function
CO3[K3]: perform sub-queries and exception handling
CO4[K5]: choose among Procedures, stored Functions and Cursor to construct a PL/SQL
CO5[K6]: construct PL/SQL program to execute procedure, function and cursor

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	1	1	-	1	1
CO2[K3]	3	2	1	1	-	1	1
CO3[K3]	3	2	2	1	-	1	1
CO4[K5]	3	2	3	2	1	1	1
CO5[K6]	3	2	3	2	1	1	1
Weightage of the course	15	10	10	07	02	05	05
Weighted percentage of Course contribution to POs	**4.59**	**4.2**	**4.78**	**4.79**	**3.03**	**3.6**	**4.13**

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

SQL PROGRAMS

1. Program to implement DDL and DML Commands.
2. Program to implement check constraints.
3. Program to implement relationship between tables.(Make Primary and Foreign Key Relation)
4. Program to implement unique, Not Null and integrity constraints.
5. Program to implement string, numeric and date functions in SQL.
6. Program to implement aggregate functions.
7. Program to implement view and sequences.
8. Program to implement sub query. (Create minimum Three tables relation)
9. Demonstrate limit and range queries in large table
10. Demonstrate import and export data into and from database

PL/ SQL PROGRAMS

11. Write a PL/SQL program for Salary Updation for employees.
12. Write a PL/SQL program to calculate the EB Bill amount and store in EB Bill Table.
13. Write a program to insert the records from the PL/SQL program and raise the Built-in exception (dup_val_on_index), if the register number is duplicated.
14. Write a PL/SQL program to raise the Built-in exception.(too many-rows).
15. Write a PL/SQL program to raise the User Defined Exception.
16. Write a PL/SQL cursor program to calculate total & average for each student.
17. Program to implement the Trigger.
18. Write a program to implement procedure
19. Write a program to implement function
20. Create the Procedure & Function into a Package.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF COMPUTER SCIENCE

PG Programme - M.Sc. Computer Science

SEMESTER- II

CORE COURSE – VI: ADVANCED COMPUTER NETWORKS (21PCSC21)

(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 5 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course introduces the learners to the network architecture of networks, performance and security issues of various algorithms.

Course Outcomes (CO)

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

CO1[K1]: describe the functions of each layer in OSI and TCP/IP model, Encoding, Wireless, Internetworking, End to End protocols, Congestion Control mechanism, Network security, Applications and Infrastructure services

CO2[K2]: explain the framing, internetworking, RBC, resource allocation, security issues and applications

CO3[K3]: determine the usage of ethernet, routing, congestion control and internetworking

CO4[K4]: examine types of network architecture, encoding and applications

CO5[K5]: choose appropriate protocols for framing, reliable transmission, congestion control and internetworking.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	2	-	1	1
CO2[K2]	3	2	2	2	-	1	1
CO3[K3]	3	2	2	2	-	1	1
CO4[K4]	3	2	2	1	1	1	1
CO5[K5]	3	2	2	1	1	1	1
Weightage of the course	15	10	10	08	02	05	05
Weighted percentage of Course contribution to POs	**4.59**	**4.2**	**4.78**	**5.48**	**3.03**	**3.6**	**4.13**

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

UNIT I **(15 hrs)**

Foundation Problem: Building a Network – Applications – Requirements - Network Architecture - Implementation Network Software - Performance. **Getting Connected:** Connecting to a Network - Perspectives on Connecting-Encoding (NRZ,NRZI,Manchester,4B/5B).

UNIT II **(15 hrs)**

Framing - Error Detection - Reliable Transmission - Ethernet and Multiple Access Networks(802.3) - Wireless. **Internetworking:** Switching and Bridging - Basic Internetworking – Routing - Implementation and Performance.

UNIT III **(15 hrs)**

Advanced Internetworking: The Global Internet – Multicast -Multiprotocol Label Switching - Routing Among Mobile Devices. **End To End Protocols:** Simple Demultiplexer - Reliable Byte Stream - Remote Procedure Call- Transport for Real-Time Applications.

UNIT IV **(15 hrs)**

Allocating Resources: Issues in Resource Allocation - Queuing Disciplines - TCP Congestion Control – Congestion - Avoidance Mechanisms -Quality of Service. **End-to-End data:** Presentation Formatting - Multimedia data.

UNIT V **(15 hrs)**

Security Attacks: Cryptographic Building Blocks - Key Pre-distribution - Authentication Protocols - Example Systems - Firewalls. **Applications:** Traditional Applications - Multimedia Applications - Infrastructure Services -Overlay Networks.

TEXTBOOK

1. Larry L.Peterson, Bruce S.Davie. *Computer Networks a systems approach.* Noida: Saurabh Printers Pvt,Ltd, Fifth Edition.
   UNIT I : 1.1-1.5, 2.1, 2.2
   UNIT II : 2.3-2.6, 3.1-3.4
   UNIT III: 4.1-4.4, 5.1-5.4
   UNIT IV : 6.1-6.5, 7.1, 7.2
   UNIT V : 8.1-8.5, 9.1-9.4

REFERENCES

Books

1. B. Frozen. *Introduction to Data Communications in Networking.* New Delhi. Tata McGraw Hill, 1998
2. F. Halsall, *Data Communications, Computer Networks and Tamilnadu State Council for Higher Education,* 1995
3. Open Systems, Addison Wessley.D. Bertsekas and R. Gallagher, *Data Networks,* New Delhi: Prentice hall of India, 1992
4. Lamarca, *Communication Networks,* New Delhi: Tata McGraw Hill,. 2002
5. Teresa C.Piliouras, *Network Design Management and Technical Perspectives.* Auerbach Publishers, Second Edition, 2015.

Web Sources

1. http://peasonhighered.com/tanenbaum
2. http://www.tcpipguide.com/free/index.htm

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- II
CORE COURSE - VII: ADVANCED JAVA PROGRAMMING (21PCSC22)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 4 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course introduces the learners to the advanced concepts of exception handling, Multithreading, GUI Components, Web Services and Struts 2 in Java to the learners

Course Outcomes (CO)

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

CO1[K1]: describe exception handling, multithreading, web services and concepts of struts 2
CO2[K2]: illustrate the creation of GUI components, networking using TCP/IP and datagram, Connecting DB using JDBC
CO3[K3]: apply Thread Synchronization, Creation of User Defined Exception and basic event handling in GUI Components.
CO4[K4]: examine the application of built-in exceptions, usage of JDBC and working of SOAP web services
CO5[K5]: choose corresponding GUI components to design a GUI based Java Application

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	2	1	-	1	1
CO3[K3]	3	2	2	1	-	1	1
CO4[K4]	3	2	2	1	1	2	1
CO5[K5]	3	2	2	1	1	2	1
Weightage of the course	15	11	10	05	02	07	05
Weighted percentage of Course contribution to POs	**4.59**	**4.62**	**4.78**	**3.42**	**3.03**	**5.04**	**4.13**

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

UNIT I **(15 Hrs)**

Generic Collections: Introduction – Collections overview – Type Wrapper Classes for Primitive types – Auto-boxing and Auto-unboxing – Lists – Collections Methods – Stack Class. **Exception Handling:** Introduction – Divide by Zero Without Exception- Handling Arithmetic Exceptions and InputMismatchExceptions – Java Exception Hierarchy – finally Block – Declaring New Exception Types. **Multithreading:** Introduction – Threaded States – Creating Using Executor Framework – Thread Synchronization – Producer / Customer without Synchronization – Producer / Customer: Array Blocking Queue – Producer / Customer with Synchronization.

UNIT II **(15 Hrs)**

GUI Components: Part I: Overview of Swing Components – Displaying Text and Images – Text Fields – JButton – JCheckBox – JRadioButton – JComboBox – JList – Multiple Selection Lists – JPanel – Introduction to Layout Managers – Using Panels to Manage Layouts – JTextArea. **GUI Components: Part II:** JSlider – Using Menus with frames – JPopupMenu – JDesktopPane and JInternalFrame – JTabbedPane – BoxLayout and GridBag Layout.

UNIT III **(15 Hrs)**

Networking: Introduction – Manipulating URLs – Reading a file on a web server – Establishing Simple Server – Establishing Simple Client – Client / Server Interaction – Datagrams. **Accessing DB Using JDBC:** Introduction – Manipulating DB with JDBC – Rowset Interface – Prepared Statements – Stored Procedures – Transaction Processing.

UNIT IV **(15 Hrs)**

Web Services: Introduction – Web Service Basics – SOAP – REST – SSON – Publishing and Consuming SOAP based Web Services. **Struts 2:** Frameworks for Web Applications – Struts2 Framework – Saying Hello to Struts2. **Working with Struts2 actions:** Introducing – Packaging – Implementing.

UNIT V **(15 Hrs)**

Adding Workflow with Interceptors: Why Intercept requests – Interceptors in action – Built-in Interceptors – Declaring Interceptors. **Building a View :** An Overview of Struts tags – Data Tags – Control Tags. **UI Component Tags:** Why we Need UI Component Tags – Tags, Templates and Themes – UI Component Tag Reference.

TEXTBOOKS

1. Paul Deital, Harvey Deital. *Java How to Programs.* Ninth Edition.
   UNIT I : 20.1-20.8, 11.1-11.6, 11.9, 26.01-26.07
   UNIT II : 14.4-14.5, 14.6, 14.9-14.13,14.18-14.20,25.2, 25.4,25.5, 25.7-25.9
   UNIT III: 27.1-27.7, 28.8, 28.9, 28.11, 28.12, 28.13
   UNIT IV : 31.1-31.6
2. Donald Brown, Chad Michael Davis, Scott Stanlick, *Struts2 in Action.* Manning Publications Co., 2008.
   UNIT IV : 1.2, 1.3, 2, 3.1, 3.2, 3.3
   UNIT V : 4.1-4.4, 6.2,6.3, 6.4, 7.1-7.3

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Books

1. Cay S. Horstmann, Gary Cornell. *Core Java Volume I & II – Fundamentals.* Prentice Hall, Ninth Edition.
2. Herbert Schildt. *Java - The Complete Reference*. Oracle Press, Ninth Edition.
3. Dave Newton. *Apache Struts2 Web Application Development.* Packt Publishing, 2009.

Web Sources

1. https://www.javatpoint.com
2. https://www.ntu.edu.sg/home/ehchua/programming/java/JDBC_Basic.html
3. https://docs.oracle.com/javaee/6/tutorial/doc/gijti.html
4. https://www.tutorialspoint.com/struts_2/index.htm

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- II
CORE COURSE - VIII: COMPILER DESIGN (21PCSC23)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 4 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course familiarizes the learners with the design and implementation of Compilers for high level languages which includes Scanning, Parsing, Semantic Analysis, Intermediate Code Generation, Code Generation and Code Optimization.

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[K4]: examine 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	2	-	1	1
CO2[K2]	3	3	1	1	-	1	1
CO3[K3]	3	2	2	1	1	1	1
CO4[K4]	3	2	2	1	-	1	1
CO5[K4]	3	2	2	1	1	1	1
Weightage of the course	15	12	08	06	02	05	05
Weighted percentage of Course contribution to POs	**4.59**	**5.04**	**3.83**	**4.11**	**3.03**	**3.6**	**4.13**

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

UNIT I **(15 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 - Specification of 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 **(15 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 **(15 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 **(15 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 **(15 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

   UNIT I : 1.2, 1.3, 1.5, 1.6, 3
   UNIT II : 4
   UNIT III: 5
   UNIT IV: 6
   UNIT V : 8

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
   http://www.penguin.cz/~radek/book/lets_build_a_compiler.pdf
2. https://www.geeksforgeeks.org/last-minute-notes-compiler-design-gq/
3. https://www.tutorialspoint.com/automata_theory/deterministic_finite_automaton.htm
4. 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- II
CORE COURSE - IX: PRACTICAL: ADVANCED JAVA PROGRAMMING (21PCSC2P)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 50**
CREDITS : 3 **EXT. MARKS : 50**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course introduces the learners to the advanced concepts of exception handling, Multithreading, GUI Components, Web Services and Struts 2 in Java to the learners

Course Outcomes(CO)

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

CO1[K1]: describe Collection Classes, exception handling, multithreading,Swing Components, Networking using java, connecting DB using JDBC, web services and concepts of struts 2

CO2[K2]: illustrate Collection classes, Handling Exceptions & Multithreading, creation of GUI components, networking using TCP/IP & UDP, creating and accessing DB, SOAP based web services, simple struts2 applications.

CO3[K4]: apply the concepts of Collection Methods, Exception Handling, Multithreading, Swings, Networking, DB accessing, simple SOAP Applications.

CO4[K5]: examine various Collection classes, the working of try,catch,throw and throws, Thread handling concepts, accessing DB using Rowset and prepared statement and the concepts of Webservices and Struts2.

CO5[K6]: choose exception handling methods, GUI components to design an GUI Application and justify the networking methods and DB handling methods

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	3	2	1	-	1	1
CO3[K4]	3	3	2	1	-	1	1
CO4[K5]	3	3	1	1	1	2	1
CO5[K6]	3	2	1	1	1	2	1
Weightage of the course	15	14	08	05	02	07	05
Weighted percentage of Course contribution to POs	**4.59**	**5.88**	**3.83**	**3.42**	**3.03**	**5.04**	**4.13**

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

BASIC PROGRAMS

1. Programs implementing the concepts of Lists and Collection Classes
2. Program to handle a Built-in defined Exception
3. Program to handle an User Defined Exception
4. Program to implement the concept of Simple Multithreading.
5. Program to implement the concept of Multithreading with Synchronization

ADVANCED PROGRAMS USING NETBEANS / ECLIPSE

6. Programs to demonstrate the concept of Basic Swing Controls
7. Programs to demonstrate the concept of Advanced Swing Controls and Layouts
8. Program to demonstrate Networking Program with TCP/IP Client and Server
9. Program to demonstrate JDBC for connecting Database
10. Program to demonstrate SOAP Web services
11. Programs to demonstrate simple Java Struts concepts
12. Programs to demonstrate Java Struts Interceptors and UI Component Tags.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme – M.Sc. Computer Science
SEMESTER- II
CORE COURSE – X: PRACTICAL: PYTHON PROGRAMMING (21PCSC2Q)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS : 50**
CREDITS : 2 **EXT. MARKS : 50**
DURATION : 60 hrs **MAX. MARKS: 100**

Preamble

This course familiarizes the learners with an overview of programming concepts like conditionals, loops, functions, modules, files and additional data types like list, tuple and dictionary in python.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1[K2]: demonstrate python programming constructs
CO2[K3]: perform operations using list, tuples, arrays, dataframes and dictionaries**.**
CO3[K4]: examine the working of list, tuples, dataframes and dictionaries.
CO4[K5]: choose the appropriate python modules/libraries to solve a problem.
CO5[K6]: develop a solution for a basic data science problems

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	2	2	-	1	1
CO2[K3]	3	2	1	1	-	1	1
CO3[K4]	3	2	1	1	-	2	1
CO4[K5]	3	2	1	1	1	2	1
CO5[K6]	3	2	3	1	1	2	1
Weightage of the course	15	10	08	06	02	08	05
Weighted percentage of Course contribution to POs	**4.59**	**4.2**	**3.83**	**4.11**	**3.03**	**5.76**	**4.13**

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

1. Write a program to read the numbers until -1 is encountered. Find the average of positive numbers and negative numbers entered by the user.
2. Write a program to generate calendar of any given year.
3. Write a program to implement tower of Hanoi.
4. Write a program to shuffle a deck of cards.
5. Write a python program to find the most frequent words in a text read from a file.
6. Write a python program to check whether an element exist within a tuple.
7. Write a Python program to store a given dictionary in a json file.
8. Write a python program to find the resolution of an image.
9. Create array and check the following:
    a. Types of Array
    b. Axes of Array
    c. Shape of Array
    d. Type of elements in Array
    e. Reshape 3x4 array to 2x2x3 array
    f. Flatten Array
10. Write a python program to concatenate the data frames with two different objects.
11. Write a python program to read a CSV File and print the first and last line of files.
12. Write a python program to plot a list data.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- II
NON-MAJOR ELECTIVE COURSE - I: WEB DESIGNING (21PCSN21)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 6 **INT. MARKS : 40**
CREDITS : 4 **EXT. MARKS : 60**
DURATION : 90 hrs **MAX. MARKS: 100**

Preamble

This course introduces the learners to markup language, and formatting using HTML and CSS.

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 , elements of CSS and javascript constructs
CO3[K3]: develop a HTML page using text, images, tables, lists and links
CO4[K4]: simplify a webpage using CSS
CO5[K4]: examine HTML tags 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[K4]	2	1	-	2	-	2	1
Weightage of the course	12	08	02	10	00	07	05
Weighted percentage of Course contribution to POs	**3.67**	**3.36**	**0.96**	**6.85**	**0**	**5.04**	**4.13**

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

UNIT I **(18 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 **(18 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 **(18 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 **(18 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 **(18 hrs)**

Conditional Statements And Loops: Defining Conditional Statements – Using Conditional Statements – Using if/else Statement Blocks – Using the Switch Statement – 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.* BPB Publications, New Delhi

   UNIT I : 3,4,5
   UNIT II : 6,9,12
   UNIT III: 7

2. John Pollock. *JavaScript A Beginner's Guide.* McGraw Hill Education, Third Edition

UNIT IV: 1,2
UNIT V : 6

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
CORE COURSE – XI: MACHINE LEARNING (21PCSC31)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 5 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course familiarizes the learners with the significance of machine learning in data-driven modeling, prediction and decision making.

Course Outcomes (CO)

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

CO1[K1]: describe classification, regression, support vector machine, decision tree, dimensionality reduction and clustering.

CO2[K2]: explain machine learning approaches, feature extraction, dimensionality reduction, training model, testing model and performance measurement.

CO3[K3]: choose the appropriate machine learning algorithm based on the nature of the dataset.

CO4[K4]: compare different machine learning algorithms like classification, regression, support vector machine, decision tree, random forest and clustering.

CO5[K5]: choose supervised, unsupervised and semi supervised machine learning models to solve problems.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	3	1	-	1	1
CO2[K2]	3	2	3	1	-	1	1
CO3[K3]	3	2	2	1	1	1	1
CO4[K4]	3	2	1	1	-	2	1
CO5[K5]	3	2	2	1	1	2	1
Weightage of the course	15	10	11	05	02	07	05
Weighted percentage of Course contribution to POs	**4.59**	**4.2**	**5.26**	**3.42**	**3.03**	**5.04**	**4.13**

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

UNIT I **(15 hrs)**

What is Machine Learning – Why Use Machine Learning – Examples of Applications – Types of Machine Learning Systems – Supervised and Unsupervised Learning – Batch and Online Learning – Instance-Based Versus Model-Based Learning - Main Challenges of Machine Learning – Testing and Validating. **Case Study:** Working with Real Data – Get the Data – Discover and Visualize the Data to Gain Insights – Prepare Data For Machine Learning Algorithms – Select and Train a Model – Fine Tune Your Model.

UNIT II **(15 hrs)**

Classification: MNIST – Training Binary Classifier – Performance Measures – Multiclass Classification – Error Analysis - Multilevel Classification – Multioutput Classification. **Training Models:** Liner Regression – Gradient Descent – Polynomial Regression – Learning Curves – Regularized Linear Models – Logistic Regression. **Case Study:** Build a Spam Classifier.

UNIT III **(15 hrs)**

Support Vector Machines: Linear SVM Classification – Nonlinear SVM Classification – SVM Regression – Decision Function and Predictions – Training Objective – Quadratic Programming – The Dual Problem – Kernelized SVMs – Online SVMs. **Decision Trees:** Training and Visualizing a Decision Tree – Making Predictions – Estimating Class Probabilities – The CART Training Algorithm – Computational Complexity – Gini Impurity or Entropy – Regularization Hyper Parameters – Regression – Instability. **Case Study:** Train an SVM regression on the California housing dataset.

UNIT IV **(15 hrs)**

Voting Classifiers – Bagging and Pasting – Out of Bag Evaluation - Random Patches and Random Subspaces – Random Forests – Extra Trees – Feature Importance - Boosting – AdaBoost – Gradient Boosting – Stacking. **Case Study:** The Difference between Hard and Soft Voting Classifiers – The Benefit of Out-Of-Bag Evaluation – What Makes Extra-Trees More Random Than Regular Random Forests - How Can This Extra Randomness Help - Are Extra Trees Slower or Faster Than Regular Random Forests.

UNIT V **(15 hrs)**

Dimensionality Reduction: The Curse of Dimensionality – Main Approaches for Dimensionality Reduction – PCA – Kernel PCA – Other Dimensionality Reduction Techniques. **Unsupervised Learning Techniques:** Clustering – K-Means-Using Clustering for Image Segmentation – Using Clustering for Preprocessing – Using Clustering for Semi-Supervised Learning – DBSCAN – Other Clustering Algorithms – Gaussian Mixtures. **Case Study:** The Application of Clustering Algorithms

TEXTBOOKS

1. Aurelien Geron. *Hands-On Machine Learning with Scikit-Learn, Keras and TensorFlo.,* O'reilly, Second Edition, 2019.
   UNIT I : 1, 2
   UNIT II : 3, 4
   UNIT III: 5, 6
   UNIT IV : 7
   UNIT V : 8, 9
2. Judith Hurwitz, Daniel Kirsch. *Machine Learning for dummie.,* John Wiley & Sons, 2018.
   UNIT I: 1, 3

REFERENCES

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1. James G, Witten D, Hastie T, Tibshirani R. *An Introduction to Statistical Learning*, Springer. 2013.
2. John Paul Mueller, Luca Massaron. *Machine Learning for dummies.* WILEY, 2016.
3. Kevin Murphy. *Machine Learning: A Probabilistic Perspective*.MIT Press, 2012.

Web Sources

1. https://www.coursera.org/learn/machine-learning
2. https://www.geeksforgeeks.org/machine-learning/
3. https://machinelearningmastery.com/types-of-learning-in-machine-learning/
4. https://monkeylearn.com/machine-learning/
5. https://www.toptal.com/machine-learning/machine-learning-theory-an-introductory-primer

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- III
CORE COURSE - XII: ADVANCED WEB TECHNOLOGY (21PCSC32)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 4 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course introduces the learners to Html, Bootstrap and PHP to do server side and client side scripting in websites.

Course Outcomes (CO)

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

CO1[K1]: describe HTML tags, CSS, syntaxes in Bootstrap and PHP constructs
CO2[K2]: illustrate the working of HTML tags, CSS, PHP constructs used for server side scripting
CO3[K3]: apply the appropriate HTML tags, Bootstrap classes and PHP statements to develop a user friendly server side and client side scripting
CO4[K4]: examine the application of HTML tags, CSS and PHP statements for server side coding
CO5[K5]: choose corresponding HTML tags, CSS and PHP statements to design a responsive website

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	2	3	1	1	1
CO2[K2]	3	2	2	1	-	1	1
CO3[K3]	3	2	2	1	-	2	1
CO4[K4]	3	2	1	1	-	1	1
CO5[K5]	3	2	1	1	1	2	1
Weightage of the course	15	11	08	07	02	07	05
Weighted percentage of Course contribution to POs	**4.59**	**4.62**	**3.83**	**4.79**	**3.03**	**5.04**	**4.13**

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

UNIT I **(15 hrs)**

HTML: Introduction – Headings – Linking – Images – Special Characters and Horizontal Rules – Lists – Tables – Forms – Internal Linking – HTML5 Form Input Types – Input and Data List Elements and Auto Complete Attribute – Page Structure Elements. **CSS:** Inline Styles – Embedded Style Sheets – Conflicting Styles – Linking External Style Sheets.

UNIT II **(15 hrs)**

Bootstrap: The Evolution of CSS and Bootstrap – Responsive Design Basics – What Bootstrap Includes – Bootstrap File Structure – How to use Bootstrap – Basic HTML Structure for Bootstrap – Basic HTML Elements – Responsive Classes – Rendering Images – Grid System – Constructing Data Entry Forms – Other Utility Classes – Encapsulating Everything – Packaged Components in Bootstrap – Compiling and Building Bootstrap.

UNIT III **(15 hrs)**

Introduction to PHP: Basic Syntax – Sending Data to the Browser – Writing Comments – What are Variables – Strings – Numbers – Constants – Single vs Double Quotation Marks – Debugging Steps. Programming with PHP: Creating HTML Forms – Handling an HTML Form – Conditionals and Operators – Validating Form Data – Arrays – for and while Loops.

UNIT IV **(15 hrs)**

Creating Dynamic Web Site: Including Multiple Files – Handling HTML Forms Revisited – Making Sticky Forms – Creating Your Own Functions. Error Handling and Debugging: Error Types and Basic Debugging – Displaying PHP Errors. **Using PHP and MySQL:** Modifying the Template – Connecting to MySQL – Executing simple Queries – Retrieving Query Results – Ensuring Secure SQL – Counting Returned Records – Updating Records with PHP.

UNIT V **(15 hrs)**

Common Programming Techniques: Sending Values to a Script – Using Hidden Form Inputs – Editing Existing Records – Paginating Query Results – Making Sortable Displays. **Web Application Development:** Sending Email – Handling File Uploads – PHP and JavaScript – Understanding HTTP Headers – Date and Time Functions. **Cookies and Sessions:** Making a Login Page – Making the Login Functions – Using Cookies – Using Sessions – Improving Sessions Security.

TEXTBOOKS

1. Paul Dietel, Harvey Deitel, Abbey Deitel. *Internet and World Wide Web How to Program.* England, Pearson Education Limited, Fifth Edition, 2012.
   UNIT I : 2.1, 2.5-2.12, 3.2-3.4, 4.2-4.5

2. Snig Bhaumik. *Bootstrap Essentials.* Packt Publishing Ltd, Birmingham, London, 2015.
   UNIT II : 1, 2, 3, 4, 6
3. Larry Ullman. *PHP and MySQL for Dynamic Web Sites: Visual QuickPro Guide.* PEARSON Education, Noida, India, Fourth Edition, 2014.
   UNIT III: 1, 2
   UNIT IV : 4, 8, 9
   UNIT V : 10, 11, 12

REFERENCES

Books

1. Elizabeth Castro, Bruce Hyslop. *HTML and CSS.* USA, Peachpit Press, 8th Edition, USA.
2. Matt Doyle. *Beginning PHP 5.3*. Indiana, Wiley Publishing Inc Indianapolis, 2010.
3. Jennifer Kyrnin, Sams. *Teach Yourself Bootstrap in 24 Hours.* Indiana, Pearson Education Inc, 2016.

Web Sources

1. https://www.tutorialspoint.com/html/index.htm
2. https://www.tutorialspoint.com/php/index.htm
3. https://www.tutorialrepublic.com/php-tutorial/
4. https://www.tutorialrepublic.com/twitter-bootstrap-tutorial/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- III
CORE COURSE - XIII: DIGITAL IMAGE PROCESSING (21PCSC33)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 3 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

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	3	3	1	-	1	1
CO2[K2]	3	2	3	1	-	1	1
CO3[K3]	3	2	2	1	-	1	1
CO4[K4]	3	3	2	1	1	1	1
CO5[K5]	3	3	2	1	1	1	1
Weightage of the course	15	13	12	05	02	05	05
Weighted percentage of Course contribution to POs	**4.59**	**5.46**	**5.74**	**3.42**	**3.03**	**3.6**	**4.13**

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

   UNIT I : 1.4,1.5,2
   UNIT II : 3.2-3.7, 4.3-4.5
   UNIT III: 5.1-5.4,5.7-5.10
   UNIT IV : 8,9.1-9.5
   UNIT V : 10

2. A.K Jain. *Fundamentals of Image Processing*. New Delhi: PHI Private Limited, 2001

   UNIT V : 9.4

REFERENCES

Books

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- III
ELECTIVE COURSE - II: CRYPTOGRAPHY AND NETWORK SECURITY
(21PCSO31)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 4 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course introduces the learners to the Cryptography Concepts of DES, AES, RSA, Diffie-hellman key exchange and Elliptic Curve Cipher algorithms.

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 encryption techniques, block ciphers, public key cryptography and IP Security
CO3[K3]: apply simple encryption and decryption techniques
CO4[K4]: examine DES, AES, RSA, Diffie-hellman key exchange and Elliptic Curve Cipher algorithms.
CO5[K5]: choose suitable cryptography algorithms among DES, AES, RSA, Diffie-hellman key exchange and Elliptic Curve cryptography.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	2	1	1
CO2[K2]	3	2	2	1	2	1	1
CO3[K3]	2	1	1	1	2	2	1
CO4[K4]	3	2	2	-	1	2	1
CO5[K5]	2	2	1	-	2	1	1
Weightage of the course	13	09	08	03	09	07	05
Weighted percentage of Course contribution to POs	**3.98**	**3.78**	**3.83**	**2.05**	**13.64**	**5.04**	**4.13**

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

UNIT I **(15 hrs)**

Classical Encryption Techniques: Symmetric Cipher model – Substitution Techniques – Transposition techniques –Rotor Machines - Steganography.

UNIT II **(15 hrs)**

Block cipher and Data Encryption Standard: Traditional Block Ciphers Structure – The Data Encryption Standard – A DES Example – The Strength of DES – Block Ciphers Principles.

UNIT III **(15 hrs)**

Advanced Encryption Standard: Finite Field Arithmetic – AES Structure – AES Transformation Functions – AES Key Expansion – An AES Example – AES Implementation.

UNIT IV **(15 hrs)**

Public Key Cryptography and RSA: Principles of Public-key Crypto Systems – The RSA Algorithm. **Other Public-Key Cryptosystems:** Diffie-Hellman Key Exchange – Elliptic Curve Cryptography.

UNIT V **(15 hrs)**

IP Security: IP Security overview – IP Security Policy – Encapsulating Security Payload – Combining Security Associations – Internet Key Exchange – Cryptographic Suites

TEXTBOOK

1. William Stallings. *Cryptography and Network Security: Principles and Practice.* Pearson, Sixth Edition, 2014.

   UNIT I : 1
   UNIT II : 2
   UNIT III: 4
   UNIT IV : 8, 9.1, 9.4
   UNIT V : 18

REFERENCES

Books

1. Charlie Kaufman, Radia Perlman, and Mike Speciner. *Network Security: PRIVATE Communication in a PUBLIC World*. Prentice Hall, 1995.
2. Behrouz A.Foruzan. *Cryptography and Network Security.* Tata McGraw Hill, 2007.
3. C K Shyamala, N Harini and Dr. T R Padmanabhan. *Cryptography and Network Security.* Wiley India Pvt.Ltd, 2011.

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1. https://www.javatpoint.com/mobile-computing
2. https://www.geeksforgeeks.org/cryptography-introduction/
3. https://www.csoonline.com/article/3583976/what-is-cryptography-how-algorithms-keep-information-secret-and-safe.html
4. https://www.csoonline.com/article/3583976/what-is-cryptography-how-algorithms-keep-information-secret-and-safe.html

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme – M.Sc. Computer Science
SEMESTER- III
ELECTIVE COURSE - II: MOBILE COMPUTING (21PCSO32)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 4 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course introduces the learners to the Mobile Computing concepts of Wireless LAN, WIMAX, BLUETOOTH, GPRS, HSPA, LTE GSM and CDMA .

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, WIMAX and 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[K4]: compare 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	2	2	1	2	1	1
CO2[K2]	3	2	2	1	2	1	1
CO3[K2]	2	1	1	1	2	2	1
CO4[K4]	3	2	2	-	1	2	1
CO5[K4]	2	2	1	-	2	1	1
Weightage of the course	13	09	08	03	09	07	05
Weighted percentage of Course contribution to POs	**3.98**	**3.78**	**3.83**	**2.05**	**13.64**	**5.04**	**4.13**

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

UNIT I **(15 hrs)**

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

UNIT II **(15 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 **(15 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 **(15 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 **(15 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.
   UNIT I : 1.1-1.6
   UNIT II : 2
   UNIT III: 3
   UNIT IV : 4.1-4.3, 4.7-4.8,4.11-4.18
   UNIT V : 12

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_overview.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- III
ELECTIVE COURSE - II: WIRELESS NETWORK (21PCSO33)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 4 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

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.

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[K2]: illustrate 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[K4]: differentiate 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	2	2	1	2	1	1
CO2[K2]	3	2	2	1	2	1	1
CO3[K2]	2	1	1	1	2	2	1
CO4[K4]	3	2	2	-	1	2	1
CO5[K4]	2	2	1	-	2	1	1
Weightage of the course	13	09	08	03	09	07	05
Weighted percentage of Course contribution to POs	**3.98**	**3.78**	**3.83**	**2.05**	**13.64**	**5.04**	**4.13**

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

UNIT I **(15 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 **(15 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 **(15 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 **(15 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 **(15 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.

   UNIT I : 2,3
   UNIT II : 4.1 – 4.3, 9
   UNIT III: 11.2 – 11.8
   UNIT IV : 12
   UNIT V : 14.2 – 14.8

REFERENCES

Books

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- III
CORE COURSE - XIV: PRACTICAL: ADVANCED WEB TECHNOLOGY (21PCSC3P)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 50**
CREDITS : 3 **EXT. MARKS : 50**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course enables the learners to understand Html, Bootstrap and PHP to implement server side and client side scripting in websites.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1[K2]: demonstrate HTML tag, classes in Bootstrap and PHP statements
CO2[K3]: apply appropriate HTML tags, Bootstrap classes and PHP constructs to develop a user friendly server side and client side scripting
CO3[K4]: examine the working of formatting, table tags and PHP statements
CO4[K5]: choose corresponding tags, responsive classes and PHP statements for designing a responsive website
CO5[K6]: design an user friendly website using HTML, Bootstrap and PHP

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	2	1	-	1	1
CO2[K3]	3	2	2	1	-	1	1
CO3[K4]	3	2	2	1	-	2	2
CO4[K5]	3	2	1	1	1	2	1
CO5[K6]	3	2	1	1	1	2	1
Weightage of the course	15	10	08	05	02	08	06
Weighted percentage of Course contribution to POs	**4.59**	**4.2**	**3.83**	**3.42**	**3.03**	**5.76**	**4.96**

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

1. Design Websites using HTML and Bootstrap
2. Develop a PHP server side script to design a HTML Form
3. Develop a PHP server side script to handle HTML form
4. Develop a PHP server side script to apply sticky forms
5. Develop PHP program to connect and retrieve record from database
6. Develop a PHP program to insert, edit and update records in database
7. Develop a PHP program to display data from a table using paginating query results.
8. Develop a PHP program to display data from table in sorted order
9. Develop a PHP program to handle File uploads
10. Develop a PHP program to handle Cookies
11. Develop a PHP Program to handle Sessions

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- III
CORE COURSE – XV: PRACTICAL: OPEN SOURCE TOOLS (21PCSC3Q)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 50**
CREDITS : 3 **EXT. MARKS : 50**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course enables the learners to hands-on practice using free open source software tools and expose students to the open source environment.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1[K2]: explain the looping and functions in R,UML diagrams and linux commands
CO2[K3]: draw use case, state transition, deployment, activity and component design notations
CO3[K4]: examine the working of vectors, factors, arrays and list in R, linux commands
CO4[K6]: construct simple plots for given statistical problems in R,UML diagrams
CO5[K6]: develop R code and design UML diagrams

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	1	1	1	-	1	1
CO2[K3]	3	2	-	2	-	1	1
CO3[K4]	3	1	-	1	-	1	1
CO4[K6]	3	2	2	2	1	2	1
CO5[K6]	3	3	3	1	1	2	2
Weightage of the course	15	09	06	07	02	07	06
Weighted percentage of Course contribution to POs	4.59	3.78	2.87	4.79	3.03	5.04	4.96

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

Exercises may be based on

R PROGRAMMING

1. Vectors
2. Factors
3. Arrays and Matrices
4. List and Data frame
5. Functions
6. Loops
7. Data Visualization

UNIFIED MODELING LANGUAGE

8. Class Diagram
9. State Transition Diagram
10. Activity Diagram
11. Deployment Diagram
12. Use Case Diagram
13. Component Diagram
14. Sequence Diagram

LINUX

15. General Purpose Utilities Commands
16. User & Session Management Commands
17. File System Communication Commands
18. Text Processing and Scripting Commands
19. System Information Commands
20. File Management Commands
21. Process and System Utility Commands

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- III
SWAYAM COURSE: COMPUTER ARCHITECTURE AND ORGANIZATION
(21PCSM31)
(From 2021-2022 Batch onwards)

CREDITS : 3 **EXT. MARKS : 100**
DURATION: 12 weeks **MAX. MARKS: 100**

Preamble

This course provides the learners with an opportunity for a lifelong learning by meeting the demand in terms of knowledge, skills, and competencies.

Course Outcomes (CO)

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

CO1[K1]: identify the background and the key words in Computer Architecture and Organization.
CO2[K2]: demonstrate independent and self-paced learning for clear understanding of the concept
CO3[K3]: develop computer and communication skills to broaden their knowledge in the course
CO4[K3]: use high quality reading resources, communication tools and technology to send assignments and to take up test
CO5[K4]: analyse critically and apply technical skills to comprehend the ideas or theories in the video lectures

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	2	-	-	2
CO2[K2]	3	2	2	2	-	-	2
CO3[K3]	3	2	2	2	1	1	2
CO4[K3]	2	2	2	1	1	1	1
CO5[K4]	2	2	2	2	1	-	1
Weightage of the course	13	10	10	09	03	02	08
Weighted percentage of Course contribution to POs	**3.98**	**4.2**	**4.78**	**6.16**	**4.55**	**1.44**	**6.61**

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

WEEK 1: Evolution of Computer Systems
WEEK 2: Instruction Set Architecture
WEEK 3: Quantitative Principles of Computer Design
WEEK 4: Control Unit Design
WEEK 5: Memory System Design
WEEK 6: Design of Cache Memory Systems
WEEK 7: Design of Arithmetic Unit
WEEK 8: Design of Arithmetic Unit (contd.)
WEEK 9: Input-Output System Design
WEEK 10: Input-Output System Design (contd.)
WEEK 11: Instruction Set Pipelining
WEEK 12: Parallel Processing Architectures

REFERENCES

Books

1. D.A. Patterson and J.L. Hennessy. *Computer Architecture: A Quantitative Approach.* Morgan Koffman, Fifth Edition ,2011.
2. D.A. Patterson and J.L. Hennessy. *Computer Organization and Design: The Hardware/Software Interface.* Elsevier India, Fifth Edition, 2016.
3. W. Stallings. *Computer Organization and Architecture: Designing for Performance.* Pearson, 2015.
4. C. Hamvtacher, Z. Vranesic and S. Zaky. *Computer Organization.* McGraw Hill, Fifth Edition,2011.
5. J.P. Hayes. *Computer Architecture and Organization.* McGraw Hill, Third Edition,1998.

SRI KALISWARI COLLEGE(AUTONOMOUS),SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- III
SWAYAM COURSE: COMPUTER ORGANIZATION AND ARCHITECTURE : A PEDAGOGICAL ASPECT (21PCSM32)
(From 2021-2022 Batch onwards)

CREDITS : 3 **EXT. MARKS : 100**
DURATION: 12 weeks **MAX. MARKS: 100**

Preamble

This course provides the learners with an opportunity for a lifelong learning by meeting the demand in terms of knowledge, skills and competencies.

Course Outcomes (CO)

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

CO1[K1]: identify the background and the key words in Computer Organization and Architecture.
CO2[K2]: demonstrate independent and self-paced learning for clear understanding of the concept
CO3[K3]: develop computer and communication skills to broaden their knowledge in the course
CO4[K3]: use high quality reading resources, communication tools and technology to send assignments and to take up test
CO5[K4]: analyse critically and apply technical skills to comprehend the ideas or theories in the video lectures

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	2	-	-	2
CO2[K2]	3	2	2	2	-	-	2
CO3[K3]	3	2	2	2	1	1	2
CO4[K3]	2	2	2	1	1	1	1
CO5[K4]	2	2	2	2	1	-	1
Weightage of the course	13	10	10	09	03	02	08
Weighted percentage of Course contribution to POs	**3.98**	**4.2**	**4.78**	**6.16**	**4.55**	**1.44**	**6.61**

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

MODULE 1: Basics: Functional Blocks in a Computer System, Number system and Computer Arithmetic **(Week 1)**

MODULE 2: Addressing Modes, Instruction Set and Instruction Execution Flow **(Weeks 2, 3 and 4)**

MODULE 3: Hardware and Micro-program based control Unit Design (Week 5, 6 and 7)

MODULE 4: Memory Architecture **(Weeks 8, 9)**

MODULE 5: Peripherals and Input-Output **(Weeks 10, 11)**

MODULE 6: Performance Enhancement of Processor **(Weeks 12)**

REFERENCES

Books

1. M.Morris Mano. *Computer System Architecture.* Pearson Education,1992
2. David Patterson, John L Hennessy. *Computer Organization and Design : The Hardware/Software Interface.* Morgan Kaufmann,2020

SRI KALISWARI COLLEGE(AUTONOMOUS),SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- IV
CORE COURSE - XVI: INTERNET OF THINGS (21PCSC41)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 5 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course introduces the learners to the basic concepts of Internet of things (IoT) with interconnection and integration of the physical world and the cyber space.

Course Outcomes (CO)

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

CO1[K1]: describe IoT, internet principles, prototyping for embedded devices ,four pillars of IoT and connecting IoT to cloud

CO2[K2]: explain the principles of IoT and applications

CO3[K2]: illustrate the usage of connected devices, MAC addresses, Non-digital methods,3D printing , four pillars of IoT and connecting IoT to cloud

CO4[K4]: examine internet principles and embedded devices required for IoT and real time applications of IoT

CO5[K5]: choose the IoT connected devices, internet principles and Embedded devices to solve real time applications

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	1	-	-	1
CO2[K2]	3	3	3	1	-	1	1
CO3[K2]	3	1	1	1	-	1	1
CO4[K4]	2	1	2	2	1	2	1
CO5[K5]	2	2	3	2	1	2	1
Weightage of the course	13	09	10	07	02	06	05
Weighted percentage of Course contribution to POs	**3.98**	**3.78**	**4.78**	**4.79**	**3.03**	**4.32**	**4.13**

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

UNIT I **(12 hrs)**

IoT An Overview: The Flavour of the Internet of Things – The "Internet" of "Things" – The Technology of the Internet of Things - Design Principles for Connected Devices – Calm and Ambient Technology – Web Thinking for Connected Devices.

UNIT II **(12 hrs)**

Internet Principles: Internet Communications and IP Addresses – MAC Addresses – TCP and UDP Ports – Thinking about Prototyping – Sketching – Prototypes and Production - Open Source Versus Cloud Source.

UNIT III **(12 hrs)**

Prototyping for Embedded Devices: Electronics – Embedded Computing Basics – Arduino – Raspberry Pi – Prototyping the Physical Design – Preparation – Sketch, Iterate and Explore – Non Digital Methods – 3D Printing – Laser Cutting.

UNIT IV **(12 hrs)**

IoT Applications: The ICT Wave – Ubiquitous IoT Applications – A Panoramic View of IoT Applications – Important Vertical IoT Applications.

UNIT V **(12 hrs)**

Four Pillars of IoT: The Horizontal, Vertical and Four Pillars – M2M, RFID, WSN and SCADA – DNA of IOT – DCM, Device, Connect – Wired and Wireless networks. **Case Studies:** Real Time Applications of IoT. **Connecting IoT to Cloud:** Smart Lighting- Home Security Intrusion Detection – Weather Reporting Bot – Smart Irrigation.

TEXTBOOKS

1. Adrian McEwen and Hakim Cassimally. *Designing the Internet of Things*. Wiley,2014.

   UNIT I : 1,2
   UNIT II : 3,4
   UNIT III: 5,6

2. Honbo Zhou. *The Internet of things in the cloud a middleware perspective*. CRC Press, Taylor and Francis Group, 2013.

   UNIT IV : 1,2
   UNIT V : 3,4,6

REFERENCES

Books

1. Francis da Costa. *Rethinking the Internet of Things: A Scalable Approach to Connecting Everything*. Apress Publications, First Edition, 2013.
2. Honbo Zhou. *The Internet of Things in the Cloud: A Middleware Perspective*. CRC Press,2012.
3. DieterUckelmann, Mark Harrison, Michahelles, Florian (Eds). *Architecting the Internet ofThings.* Springer, 2011.
4. David Easley and Jon Kleinberg. *Networks, Crowds, and Markets: Reasoning About a Highly Connected World.* Cambridge University Press, 2010.
5. Dr.OvidiuVermesan, Dr.PeterFriess. *Internet of Things- From Research and Innovation to Market Deployment.* River Publishers, 2014.

Web Sources

1. https://www.wired.co.uk/article/internet-of-things-what-is-explained-iot
2. https://www.ibm.com/blogs/internet-of-things/what-is-the-iot/
3. https://www.networkworld.com/article/3207535/what-is-iot-the-internet-of-things-explained.html

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme – M.Sc. Computer Science
SEMESTER- IV
CORE COURSE - XVII: SOFTWARE PROJECT MANAGEMENT (21PCSC42)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 5 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

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[K4]: analyze 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	2	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	2	1	1	1	1
CO5[K4]	3	2	2	1	1	1	1
Weightage of the course	15	10	10	08	05	05	05
Weighted percentage of Course contribution to POs	**4.59**	**4.2**	**4.78**	**5.48**	**7.58**	**3.6**	**4.13**

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

UNIT I **(15 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 **(15 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 **(15 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 **(15 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 **(15 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.

   UNIT I : 1,2.2-2.4,2.7-2.9
   UNIT II : 3,4.1-4.9
   UNIT III: 6.1-6.8,6.10-6.15,7.1-7.3,7.5,7.7,7.9-7.12
   UNIT IV : 9,10
   UNIT V : 11.4-11.10,12

REFERENCES

Books

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

Web Sources

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- IV
CORE COURSE – XVIII: RESEARCH METHODOLOGY (21PCSC43)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS : 40**
CREDITS : 5 **EXT. MARKS : 60**
DURATION : 75 hrs **MAX. MARKS: 100**

Preamble

This course gives an outline of the procedures and techniques adopted by the researcher while conducting the study and the method of data accumulation.

Course Outcomes (CO)

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

CO1[K1]: describe research, research problem, research design, sampling design, measurement and scaling techniques, methods of data collection, processing and analysis of data and plagiarism.

CO2[K2]: explain types of research, research process, research problem, research design, steps in sampling, measurement and scaling techniques, interpretation, research reports and plagiarism

CO3[K3]: choose the appropriate research problem, research design, method of data collection, sampling design, measurement and scaling technique

CO4[K4]: examine research methods and methodologies, research process, research problem, research design, research reports.

CO5[K6]: design a data collection method for their research problem & create plagiarism free research reports.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	-	2	1	2	1	1
CO2[K2]	2	1	2	1	2	1	1
CO3[K3]	1	1	2	1	2	2	1
CO4[K4]	1	2	2	1	2	2	1
CO5[K6]	1	3	3	1	2	2	2
Weightage of the course	07	07	11	05	10	08	06
Weighted percentage of Course contribution to POs	**2.14**	**2.94**	**5.26**	**3.42**	**15.15**	**5.76**	**4.96**

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

UNIT I **(15 hrs)**

Introduction: Meaning of Research – Objectives of Research – Motivations in Research – Types of Research – Research Approaches – Significance of Research – Research Methods Versus Methodology - Research and Scientific Method – Importance of Knowing How Research is done – Research Process – Criteria of Good Research – Problems Encountered by Researchers in India. **Research Problem:** What is a Research Problem? – Selecting the problem – Necessity of Defining the Problem – Technique Involved in Defining a Problem. **Research Design: -** Meaning of Research Design – Need for Research Design – Features of a Good Design – Important Concepts Relating to Research Design – Different Research Design – Basic Principles of Experimental Designs.

UNIT II **(15 hrs)**

Sampling Design: Steps in Sampling Design – Criteria of Selecting a Sampling Procedure – Characteristics of a Good sample design – Different Types of Sample Designs – How to Select Random Sample? – Random Sample from an Infinite Universe – Complex Random Sampling Designs. **Measurement and Scaling Techniques:** Measurement in Research – Measurement Scales – Sources of Error in Measurement – Test of Sound Measurement – Technique of Developing Measurement Tools – Scaling – Meaning of Scaling – Scale Classification Bases – Important Scaling Techniques – Scale Construction Techniques.

UNIT III **(15 hrs)**

Methods of Data Collection: Collection of Primary Data – Observation Method – Interview Method – Collection of Data through Questionnaires – Collection Data Through Schedules – Difference between Questionnaires and Schedules – Some other methods of Data Collection – Collection of Secondary Data. **Processing and Analysis of Data:** Processing Operations – Some Problems in Processing – Elements/Types of Analysis – Statistics in Research – Measures of Central Tendency – Measures of Dispersion – Measures of Asymmetry – Measure of Relationship – Simple Regression Analysis – Multiple Correlation and Regression – Partial Correlation – Association in Case of Attributes- other Measures.

UNIT IV **(15 hrs)**

Interpretation and Research Report: Meaning of Interpretation – Why Interpretation? – Technique of Interpretation – Precaution in Interpretation – Significance of Report Writing – Different Steps in Writing Report – Layout of the Research Report – Layout of the Research Report – Types of Reports – Oral Presentation – Mechanics of Writing a Research Report – Precautions for Writing Research Reports.

UNIT V **(15 hrs)**

Plagiarism: The Plagiarism Continuum – The Birth of Plagiarism – The Six Elements of Plagiarism – Plagiarism-A Global Issue – The Plagiarism and the Internet.

TEXTBOOKS

1. C.R. Kothari. *Research Methodology Methods and Techniques. New Age International(P) Ltd,* Second Edition, 2004.
   UNIT I : 1,2,3
   UNIT II: 4,5
   UNIT III: 6,7
   UNIT IV : 14
2. Wendy Sutherland-Smith. *Plagiarism the internet and Student Learning.* Routledge, 2008.
   UNIT V : 1,2,3,4,5

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Books

1. Ranjit Kumar. *Research Methodology: A Step-by-Step Guide for Beginners*. SAGE Publication Ltd, 2014.
2. John W. Creswell, J. David Creswell. *Research Design*, SAGE Publication Ltd, 2017.
3. Geoffrey R. Marczyk, David DeMatteo, David Festinger. *Essentials of Research Design and Mehodology*, WILEY, 2005.

Web Sources

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2. https://gradcoach.com/what-is-research-methodology/
3. https://www.guide2research.com/research/how-to-write-research-methodology
4. https://www.scribbr.com/dissertation/methodology/

SRI KALISWARI COLLEGE(AUTONOMOUS), SIVAKASI
DEPARTMENT OF COMPUTER SCIENCE
PG Programme - M.Sc. Computer Science
SEMESTER- IV
CORE COURSE - XIX: PROJECT (21PCSJ41)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 15 **INT. MARKS : 50**
CREDITS : 6 **EXT. MARKS : 50**
DURATION : 6 Months **MAX. MARKS: 100**

Preamble

This course provides the opportunity to implement the knowledge and skills acquired through various courses in the field of computer science to solve the existing problems with new ideas.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1[K2]: demonstrate the skills in handling latest technologies
CO2[K3]: use appropriate software and hardware tools to solve the problem
CO3[K3]: apply the skills acquired throughout the programme to propose a solution
CO4[K4]: analyze existing problem in their selected domain and present new ideas
CO5[K6]: design a simple system to meet the requirements for the given constraints

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	3	1	1	1	1
CO2[K3]	3	2	2	2	1	1	1
CO3[K3]	3	2	2	2	1	1	1
CO4[K4]	3	2	3	1	1	1	1
CO5[K6]	3	2	3	1	1	1	1
Weightage of the course	15	10	13	07	05	05	05
Weighted percentage of Course contribution to POs	**4.59**	**4.2**	**6.22**	**4.79**	**7.58**	**3.6**	**4.13**

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 50 marks for Internal Assessment and 50 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/her Project work.
7. A draft of the final project report should be submitted to the Project Guide for review atleast three weeks prior to the end of the semester.
8. The project report should be of minimum 50 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 (50 Marks)		**External Examination (50 Marks)**	
Project Report & Review	: 40 Marks	Project Report	: 20 Marks
Powerpoint Presentation	: 5 Marks	viva-voce /Demo	: 30 Marks
Participation/Publications in Conferences or Seminars	: 5 Marks		

Courses offered to Other Departments

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
PG Programme – M.A. Tamil
SEMESTER- IV
CORE COURSE XV: PRACTICAL: DTP AND MULTIMEDIA(21PTAC43)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 6 **INT. MARKS : 50**
CREDITS : 4 **EXT. MARKS : 50**
DURATION : 90 hrs **MAX. MARKS: 100**

Preamble

khzth;fSf;F epygLk;> gjhif> Gj;jf mL;iL Nghd;wtw;iw tbtikg;gjw;Fk; khw;wpaikf;Fk tpjj;jpYk; ,j;jhs; mikf;fg;gL;Ls;sJ.

Course Outcomes (CO)

ghLnewp ntw;wpfukhf Kbe;j gpd; fw;gth;fshy;>

CO1[K1]: fzpdpahy; gad;gLj;jg;gLk; nkd;nghUs;fis miLahsk; fhz;gh;.
CO2[K2]: gy;NtW tbtikg;G fUtpfisg; gw;wp tpsf;Fth;.
CO3[K3]: gy;NtW fUtpfisg; gad;gLj;jp gLj;ij khw;wTk; kw;Wk; gLj;ij tiue;Jk fhL;rpg;gLj;Jth;.
CO4[K4]: Image editor, API kw;Wk; GUI fUtpfis NtWgLj;jpf; fhz;gh;.
CO5[K6]: Image editor kw;Wk; GUI fUtpfis gad;gLj;jp fijfs; kw;Wk; logo cUthf;Fth;

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	2	1	-	3	1
CO2 [K2]	3	2	2	1	-	3	1
CO3 [K3]	3	2	2	1	-	3	1
CO4 [K4]	3	2	2	1	-	3	1
CO5 [K6]	3	2	2	1	-	3	1
Weightage of the course	15	10	10	05		15	05
Weighted percentage of Course contribution to POs	**6.05**	**4.65**	**7.87**	**2.63**	**0**	**11.36**	**4.76**

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

RASTER GRAPHICS EDITOR TOOL

1. RtnuhL;b tbtikj;jy;(Poster Design)
2. khu;Ld; Mu;L xd;W tbtikj;jy;(Modern Art)
3. vOj;J tiy gpd;dy;fis tbtikj;jy; (Text in Stitches)
4. ePu;epw tpisTfis tbtikj;jy; (Water Color Effect)

5. tz;zkakhd xspUk; thu;j;ijfis tbtikj;jy (Colorful glowing text)
6. ntf;nry; gLk; tbtikj;jy; (Create a basic Vexel Image)
7. mw;Gjkhd tpsk;guk tbtikj;jy; (Amazing Advertisement)
8. Nfg;Ld; mnkupf;fh #oy;L tbtikj;jy; (Captain America Shield)
9. mupf;fg;gLL gLj;ij GJg;gpj;jy; (Eroded Fashion Portraits)
10. mr;Rf;fiy thy;Ngg;gu; tbtikj;jy; (Typography wallpaper)

VECTOR IMAGE EDITOR TOOL

11. tbtq;fs; kw;Wk; fpuhgpf;]; tiujy; (Drawing Shapes & Graphics)
12. Logos & Artistic Text
13. gy tz;z tbtikg;Gfs; (Multi-Colour Designs)
    a. Visiting / Greeting Cards
    b. Book Covers, Brouchers
    c. Advertisements
    d. Banner
14. Importing / exporting files
15. Using CorelDraw Special Effects (Envelope, Extrude, Contour, Lens)

VECTOR GRAPHICS EDITOR TOOL

16. eLf;Fk kdpjidg; Nghy; fhL;rpg;gLj;Jjy;
    (A Simple walk cycle animation using pencil)
17. FLk;g My;gk; xd;W cUthf;Fjy; (Create a family Album)
18. kio nghoptJ Nghy fhL;rpg;gLj;Jjy; (Make a Rainfall occurrence)
19. tpy; kw;Wk; mk;G itj;J ,yf;if miLtJ Nghy; cUthf;Fjy;
    (Bow and arrow to hit the target)
20. gpypg;Gf; cUthf;Fjy; (Make a flipbook)