CSC3CJ201- Software Project Management

Programme	**B. Sc. Computer Science**				
Course Code	**CSC3CJ201**				
Course Title	**Software Project Management**				
Type of Course	**Major**				
Semester	**III**				
Academic Level	**200 - 299**				
Course Details	**Credit**	**Lecture per week**	**Tutorial per week**	**Practical per week**	**Total Hours**
	4	**4**	**-**	**-**	**60**
Pre-requisites	1. **Computer Science knowledge** 2. **Understanding fundamental computer science concepts, data structures, and algorithms** 3. **Basic knowledge of project planning and scheduling**				
Course Summary	**Students are introduced to the concepts, procedures, and resources of software project management in this course. Project scheduling, budgeting, quality assurance, risk management, and teamwork are among the subjects covered. The goal of the course is to equip students with the skills necessary for efficient project management in software development settings.**				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Define and explain the fundamental concepts, principles, terminologies and various models related to software project management.	Understand	C	Instructor-created exams / Quiz

CO2	Describe various design concepts and explain their roles in different phases of the project development life cycle	Understand	C	Assignments/ Test papers/ Viva Voce
CO3	Explain various Software Project Management (SPM) techniques and describe how project plans and schedules are developed using tools	Understand	C	Seminar Presentation / Group Tutorial Work/ Viva Voce
CO4	Understand the importance of quality in software development by mastering quality assurance processes,methodologies, and testing strategies	Understand	v	Instructor-created exams / Home Assignments
CO5	Prepare and deliver effective project presentations.	Create	M	Writing assignments/ Exams
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Detailed Syllabus:

Module	Unit	Content	Hrs (48+12)	Marks (70)
I	**Introduction to Software Engineering and Process Models**		**10**	**12**
	1	Software and Software Engineering- nature of software, Software Engineering, Software Process	2	

	2	Software Development Life Cycle (SDLC)	2	
	3	Prescriptive Process Model- Water fall model, Incremental Model, Evolutionary Process Model	2	
	4	Agile Development- What is Agility, What is agile Process?	2	
	5	Extreme Programming	2	
II	**Software requirements and Design Concepts**		**16**	**22**
	6	Understanding requirements- requirement engineering process	3	
	7	Feasibility studies	1	
	8	Design Concepts- Design process, Design Concepts	2	
	9	Design Model Elements- Data design elements, Architectural design elements, Interface Design Elements, Component-Level Design Elements, Deployment-Level Design Elements	2	
	10	Architectural design using DFD	2	
	11	Component level design guidelines	2	
	12	Modelling with UML – Class diagram Use Case Diagram, State chart Diagram, Activity Diagram,	4	
III	**Software Project Management**		**11**	**18**
	13	Introduction to Software Project Management- Overview of software project management, Importance of project management in software engineering, Role of a project manager	2	
	14	Project Planning and Scope Management- Work breakdown structure (WBS) and project estimation techniques	2	
	15	Project Scheduling and Resource Allocation- Gantt charts and network diagrams,	2	
	16	Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT)	2	
	17	Risk Management-reactive vs proactive risk strategies, Risk identification, risk projection, RMMMM plan	3	
IV		**Software Quality Assurance**	**11**	**18**
	18	Quality Concepts- Software quality, Achieving Software quality,	2	
	19	Testing Strategies	2	
	20	Software testing- levels of software testing	1	

	21	Types of software test- Unit testing, Integration testing, Black box testing, white box testing, System testing	4	
	22	Art of debugging	2	
V	**Open Ended Module- Trends in Software Engineering**		**12**	
	1	• Case study of CASE tools • Prepare a project report • Analysis of real-world software project management case studies • Group project presentations		

References

- Roger S, "Software Engineering – A Practitioner's Approach", seventh edition, Pressman, 2010.
- Pearson Education, "Software Engineering by Ian Sommerville", 9th edition, 2010.
- Pankaj Jalote, An Integrated Approach to Software Engineering, 3rd Edition, Narosa Publishing House.

Mapping of COs with PSOs and POs :

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO 1	3	3	3	3	3	3	3	2	2	3	3	1	3
CO 2	3	3	3	3	3	3	3	2	2	3	3	1	3
CO 3	3	3	3	3	3	3	3	2	2	3	3	1	3
CO 4	3	3	3	3	3	3	3	2	2	3	3	1	3
CO 5	3	3	3	3	3	3	3	2	2	3	3	3	3

Correlation Levels:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments (20%)

- Final Exam (70%)

Mapping of COs to Assessment Rubrics :

	Internal Exam	Assignment	End Semester Examinations
CO 1	✓		✓
CO 2	✓		✓
CO 3	✓		✓
CO 4		✓	✓
CO 5		✓	✓
CO 6	✓	✓	

.

CSC3CJ202/CSC3MN200- Data Structures and Algorithm(Major/Minor)

Programme	B. Sc. Computer Science				
Course Code	**CSC3CJ202/CSC3MN200**				
Course Title	**Data Structures and Algorithm**				
Type of Course	**Major/Minor**				
Semester	III				
Academic Level	200 - 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	1. Fundamental Mathematics Concepts: Set, Functions, Logic 2. CSC2CJ101 – Fundamentals of Programming				
Course Summary	This course explores implementations of linked list and array-based data structures, delving into the inner workings of basic data structures including lists, stacks, queues, trees, and graphs.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Categrize basic data structures (arrays, linked lists, stacks, queues) based on their characteristics, operations and real-world applications,perform basic operations on Array and Linked list .	Understand	C	Instructor-created exams / Quiz
CO2	Carryout basic operations and implementation of stack and queue datastructures using choosen programming language	Apply	P	Practical Assignment / Observation of Practical Skills
CO3	Demonstrate the properties and applications of advanced data structures (Trees and Graphs).	Apply	P	Seminar Presentation / Group Tutorial Work
CO4	Extend and clarify the properties of various searching and sorting techniques and hashing.	Understand	C	Practical Assignment / Seminar
CO5	Demonstrate critical thinking and problem solving skill by implement and analyse different data structure algorithms to address practical problems.	Apply	P	Viva Voce/ Observation of Practical Skills

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
# - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

Detailed Syllabus:

Module	Unit	Content	Hrs (45+30)	Marks (70)
I	**Introduction to Data Structures and Basic Algorithms**		**9**	**15**
	1	Overview of Data Structures: Data type Vs. Data structure, ADT, Definition of Data structure, Data structure Classification – Linear, Non- Linear (Array, Linked List, Stack, Queue, Tree, Graph)	1	
	2	Introduction to Arrays: Definition, Types (1 Dimensional, 2 Dimensional, Multi-Dimensional, Sparse matrix), Different Array Operations with Algorithm (insertion, deletion, traversal)	3	
	3	Structures and Self-referential structures	1	
	4	Introduction to Linked list: Definition, Types (Single linked list, Doublelinked list, Circular linked list- concept only).	2	
	5	Singly Linked List Operations with Algorithm (insertion, deletion, traversal)	2	
II	**Stack and Queue**		**10**	**20**
	6	Introduction to Stack: Definition, stack operations with Algorithm, Applications: recursion, infix to postfix - example and Algorithm	3	
	7	Implementation of Stack: using array (overflow & underflow) and Linkedlist (with algorithm)	2	
	8	Introduction to Queue: Definition, queue operations with Algorithm, Types: Double ended queue (Input Restricted and Output restricted), Circular queue, Applications	2	
	9	Implementation of Queue: using array and Linked list (with algorithm)	3	
III	**Non- Linear Data Structures**		**16**	**20**
	10	Introduction to Trees: Basic terminology, Types (Binary tree-complete,full, skewed etc., Expression Tree)	2	
	11	Properties of Binary tree, Applications.	2	
	12	Binary tree representations- using array and linked list	2	
	13	Operations on Binary tree- Insertion, Deletion, Traversal- inorder, preorder, postorder - (concepts with examples)	3	
	14	Algorithm of non-recursive Binary tree traversal	3	
	15	Introduction to Graph: Definition, Basic terminology, Types (Directed, Undirected, Weighted).	2	
	16	Graph representation –Adjacency list and Adjacency Matrix, Applications.	2	
IV	**Sorting and Searching**		**10**	**15**
	17	Introduction to Sorting: Definition, Classification (Internal, External)	1	
	18	Internal Sorting Algorithms: Selection sort- Selection sort algorithm, Exchange sort- Bubble sort algorithm	2	
	19	External Sorting Algorithms: Merge sort- Demonstrate with example.(NoAlgorithm needed)	1	
	20	Advanced sorting Algorithm-: Quick sort- Demonstrate with example. (NoAlgorithm needed)	1	

	21	Introduction to Searching: Linear search and Binary search(Algorithm needed) with example.	2	
	22	Hashing: Hash Tables, Hash Functions, Different Hash Functions – Division method, Multiplication method, Mid square method, Folding Method, Collision and Collision resolution Techniques: Open hashing- Chaining, Closed hashing- Probing	2	
V	**Hands-on Programming in Data Structures: Practical Applications, Case Study and Course Project**		**30**	
	1	**Implement the following:** **1.** Basic Operations in a single linked list (Menu driven) **2.** Sort the elements in given singly linked list **3.** Stack using array. **4.** Stack using Linked list **5.** Queue using Array **6.** Queue using Linked list **7.** Sorting algorithms- Selection, Bubble Sort **8.** Searching Algorithms- Linear and Binary search	25	
	2	Project/ Case study	5	

REFERENCES

1. Seymour Lipschutz, "Data Structures with C", McGraw Hill Education (Schaum's Outline Series)
2. Reema Thareja, " Data Structures Using C", Oxford University Press

Mapping of COs with PSOs and POs :

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6	**PO7**
CO 1	2	1	1	3	-	-	3	1	2	2	2	1	1
CO 2	2	1	2	3	-	-	3	1	3	2	2	1	1
CO 3	2	1	2	3	1	1	3	1	3	3	2	1	2
CO 4	2	0	2	3	1	-	3	1	3	3	2	1	2
CO 5	1	1	3	3	1	1	3	3	3	3	3	1	3

Correlation Levels:

Level	Correlation
-	Nil

1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments (20%)
- Final Exam (70%)

Mapping of COs to Assessment Rubrics :

	InternalExam	Assignment	Practical Evaluation	End Semester Examinations
CO 1	✓			✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓		✓
CO 6			✓	

Programme	B. Sc. Computer Science				
Course Code	CSC3FM106				
Course Title	Digital Empowerment through Ethical Standards				
Type of Course	**MDC**				
Semester	III				
Academic Level	100 – 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	3	3	-	-	45
Pre-requisites	Basic understanding of computers				
Course Summary	This course explores the evolution from pre-digital challenges to the current digital landscape, covering historical milestones, key technologies, and the vision of Digital India. It emphasizes the benefits and importance of digital revolution while addressing ethical and security considerations. Participants engage with digital tools for personal and professional growth and examine case studies on digital infrastructure, missions, and services to understand real-world applications.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Analyse the challenges of pre digital world and understand the importance of digitalization	An	F	Instructor-created exams / Quiz
CO2	Identifying the applications of Cloud Computing, IoT, AI and Blockchain	U	C	Instructor-created exams/ Home Assignments
CO3	Understanding digital india initiatives	U	C	Instructor-created exams
CO4	Enhance the digital literacy by using ideration l tools for online data sharing, online learning, and content creation with awareness of ethical and security considerations in the digital age.	Ap	P	Instructor-

CO5	Analyze the real-world case studies of digital infrastructure and digital technologies.	An	C	Instructor-created exams

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
# - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

Detailed Syllabus:

Module	Unit	Content	Hrs 36+9	Marks (50)
I	**Transition to Digital World**		**7**	**8**
	1	Challenges of Pre-Digital Age	1	
	2	Importance and Benefits of Digital Revolution	2	
	3	Key concepts: digitization, digitalization, digital transformation	1	
	4	Introduction to Key Digital Technologies: Cloud Computing, IoT, AI, Block Chain	3	
II	**Perspective of Digital India & Digital Innovations in Kerala**		**11**	**15**
	5	Understanding Digital India: Concept, Objectives, and Evolution	1	
	6	Overview of Digital Infrastructure: Broadband Connectivity, Digital Literacy, and Access to Information	2	
	7	Vision of Digital India: DigiLocker, E-Hospitals, e-Pathshala, BHIM, , e-Health Campaigns	3	
	8	Kerala-Emergence as Digital Society : Internet & Mobile Penetration in Kerala, 4 Pillars of Digital Emergence in Kerala (Akshaya Project, IT@School Project, Digital Infrastructure Availability, State Data Centre & allied Applications),	2	
	9	Role of K-DISC in Digital Empowerment	1	
	10	Kerala State IT Mission: Core IT Infrastructure, e-Governance Applications, Service Delivery Platforms,	2	
III	**Digital Tools for Personal and Professional Growth**		**9**	**12**

	11	Digital Tools for Data Sharing: Google Drive, Google Sheets	2	
	12	Digital Tools for Data Sharing: Google Docs, Google Classroom	3	
	13	Online learning platforms and resources (e.g., Coursera, Khan Academy, MOOCs, Duolingo)	2	
	14	Networking Tools: LinkedIn	1	
	15	Content Creation and Management: Canva	1	
IV	**Ethical and Security Considerations in the Digital Age**		**9**	**15**
	16	Understanding privacy in the digital age	1	
	17	Legal and ethical considerations in data collection and processing: Intellectual Property Rights (IPR)	2	
	18	Key Terminologies: Cyber Security, Cyber Crime, Cyber Attack, Cyber Espionage, Cyber Warfare	2	
	19	Authentication, Authorisation	1	
	20	Cyber Crimes and Classification	2	
	21	Introduction to Cyber Laws in India	1	
V	**Open Ended Module: Case Study (One from each set)**		**9**	
	1	Case Study on Digital Infrastructure Projects: (Bharat Broadband Network (BBNL) , Submarine Cable Project, Google Data Center)	3	
	2	Case Study on Digital Mission:	3	
		(Digital Literacy Missions in Kerala, SmartDubai Project, China's Digital Silk Road)		
	3	Case Study on Digital Services: (MyGov.in , Moodle LMS, Digital Payment Services)	3	

References

1. "Digital India Importance Needs and Values" by S K Kaushal
2. "Cyber Security in India: Government, Law Enforcement and Corporate Sector" by Vipin M. Chaturvedi and Shivani Kapoor
3. "Information Security: Principles and Practices in Indian Context" by R.S. Pressman, G. Sharma, and G. Sridhar
4. "Introduction to Computer Security" by Michael Goodrich and Roberto Tamassia
5. https://kdisc.kerala.gov.in/
6. https://itmission.kerala.gov.in/

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar

- Midterm Exam
- Final Exam