E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.

(*An Autonomous Institution – Affiliated to Madurai Kamaraj University*)

Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC

DEPARTMENT OF INFORMATION TECHNOLOGY

TANSCHE-CBCS with OBE

MASTER OF SCIENCE

PROGRAMME CODE - PI

COURSE STRUCTURE

(w.e.f. 2023 – 2024 Batch onwards)

CRITERION - I

1.2.2 Details of Programmes offered through Choice Based Credit System (CBCS) / Elective Course System

Syllabus copies with highlights of contents focusing on Elective Course System

To be Noted:

HIGHLIGHTED	COURSE
	Elective

Annexure - 2

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TANSCHE - CBCS with OBE

DEPARTMENT OF INFORMATION TECHNOLOGY–PG

(w.e.f. 2023 –2024 Batch onwards)

VISION

To create the most favorable environment for quality academic oriented undergraduate and postgraduate education in information technology.

To develop the programming skills and to meet the current trends of information technology.

Prepare the students for a technological society and orient them towards serving the society.

MISSION

To impart high quality professional training at the postgraduate and undergraduate level with an emphasis on basic principles of information technology.

To produce technologically competent and ethically responsible graduates through balanced and dynamic curriculum.

To take up creative project work in collaboration with IT Industries and professional societies to make the nation as a knowledge-power.

Programme Educational Objectives (PEOs)

M.Sc. Information Technology

S. No.	On completion of the Programme, the student will
PEO1	Identify, design, and analyze complex computer systems and implement and interpret the results from those systems.
PEO2	Design, implement and evaluate a computer-based system, or process component, to meet the desired needs within the realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
PEO3	Review literature and indulge in research using research based knowledge and methods to design new experiments, analyze, and interpret data to draw valid conclusions.
PEO4	Select and apply current techniques, skills, and tools necessary for computing practice and integrate IT-based solutions into the user environment effectively.
PEO5	Apply contextual knowledge to assess professional, legal, health, social and cultural issues during profession practice.
PEO6	Analyze the local and global impact of computing on individuals, organizations, and society.

Annexure - 2

Programme Outcomes: Program Outcomes (POs)

S.No.	Graduate Attribute	On Completion of the Programme, the student will
PO1	**Knowledge Base**	Provides technology-oriented students with the knowledge and ability to develop creative solutions.
PO2	**Problem Analysis & Investigation**	Get ability to apply knowledge of new technologies to the real-world issues.
PO3	**Design/development of solutions**	Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, cloud computing, Artificial Intelligence, Mobile applications.
PO4	**Conduct investigations of complex problems**	Get some development experience within a specific field of Information Technology through project work.
PO5	**Communication Skills & Design**	Be familiar with current research within various fields of Information Technology.
PO6	**Life-long learning**	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Annexure - 2

Programme Specific Outcomes (PSOs) with Graduate Attributes

S. No.	Graduate Attribute	On Completion of the Programme, the student will
PSO1	**Knowledge Base**	At the end of the programme, the student should be able to Understand the concepts and applications in the field of Information Technology like Web designing and development, Mobile application development, and Network and communication technologies.
PSO2	**Problem Analysis & Investigation**	Competent and complete software professional to meet the requirement of corporate world and Industry standard to provide solutions to industry, society and business.
PSO3	**Design/development of solutions**	Understand the technological developments in the usage of modern design and development tools to analyze and design for a variety of applications.
PSO4	**Conduct investigations of complex problems**	Apply the learning from the courses and develop applications for real world problems.
PSO5	**Communication Skills & Design**	Analyst who can apply latest technologies who can analyze and synthesize computing systems through quantitative and qualitative techniques to solve problems in the areas of Information Technology.
PSO6:	**Life-long learning**	Develop strong skills in systematic planning, developing, testing, implementing and providing IT solutions for different domains which helps in the betterment of life.

Annexure - 2

Eligibility for Admission

Candidates should have passed with minimum 55% in B.Sc. Computer Science / Information Technology / Computer Application of Madurai Kamaraj University or an Examination of any other University accepted by the Syndicate as equivalent there to shall be eligible for admission to M.Sc. Degree Course in Computer Science.

Duration of the Course

The students shall undergo prescribed course of study for the period of two academic years consists of four semesters under CBCS semester pattern with Outcome Based Education.

Medium of Instruction: English

System: Choice Based Credit System with Outcome Based Education Model.

Nature of the Course

Courses are classified according to the following nature

1. Knowledge Oriented Skill
3. Employability Oriented
3. Entrepreneurship Oriented

Outcome Based Education (OBE) & Assessment

Students understanding must be built on and assessed for wide range of learning activities, which includes different approaches and are classified along several bases, such as

Based on purpose:

Formative (Internal tests, Assignment, Seminar, Quiz, Documentation, Case lets, ICT based Assignment, Mini Projects administered during the learning process)

Summative (Evaluation of students learning at the end of instructional unit)

Based on Domain knowledge: (Post Graduate Up to K5 Levels)

Assessment through K1, K2, K3, K4, K5

Evaluation

Continuous Internal Assessment Test: 25 marks

Summative (External) : 75 marks

Total **: 100 marks**

CIA-Continuous Internal Assessment: 25 Marks

Components	Marks
Test (Average of two tests) (Conduct for 120 marks and converted into 12 marks)	12
Creative Assignment	3
Assignment	5
Seminar	5
Total	**25**

- Centralized system of Internal Assessment Tests
- There will be a two Internal Assessment Tests
- Duration of Internal Assessment Test I and II will be 2 1/2 hours.
- Students shall write retest on the genuine grounds if they are absent in either Test I & Test II with the approval of Head of the Department.

Question Paper Pattern for Continuous Internal Assessment Test I and Test II

Section	Marks
A – Multiple Choice Questions (8x1Mark)	8
B – Short Answer (6 x 2 Marks)	12
C – Either Or type (4/8 x 5 Marks)	20
D – Open Choice type (2/4 x 10 Marks)	20
Total	**60**

Conducted for 120 marks and converted into 15 marks

Annexure - 2

Question Paper Pattern for Summative Examination

Section	Marks
A – Multiple Choice Questions without choice (10x 1Mark)	10
B – Short Answer Questions without choice (5 x 2 Marks)	10
C – Either Or type (5/10 X 5Marks)	25
D – Open Choice type(3out of 5 X 10Marks)	30
Total	**75**

- In respect of external examinations passing minimum is **45%** for Post Graduate Courses and in total, aggregate of **50%.**

Latest amendments and revisions as per UGC and TANSCHE Norms are taken into consideration in curriculum preparation.

Distribution of Marks in % with K levels CIA I, II & External Assessment

Blooms Taxonomy	Internal Assessment		External Assessment
	I	II	
Knowledge (K1)	8 %	8 %	5 %
Understanding (K2)	8 %	8 %	14 %
Apply (K3)	24 %	24 %	27%
Analyze (K4)	30 %	30 %	27%
Evaluate (K5)	30%	30%	27%

Annexure - 2

BLUE PRINT FOR INTERNAL ASSESSMENT–I
Articulation Mapping –K Levels with Course Learning Outcomes (CLOs)

Sl.No	CLOs	K-Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice		Short Answers (No Choice)		(Either or Type)	(Open Choice)	
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO1	Upto K5	1 2	K1 K2	1 1	K1 K3	1(K3) 1(K5)	1(K4)	
2	CLO2	Upto K5	2 1	K1 K2	1 1	K1 K2	1(K3) (Each set of questions must be in the same level)	1(K4) 1(K5)	
3.	CLO3	Upto K5	1 1	K1 K2	1 1	K2 K3	1(K4)	1(K4)	
No. of Questions to be asked			8		6		8	4	26
No .of Questions to Be answered			8		6		4	2	20
Marks for each question			1		2		5	10	
Total Marks for each section			8		12		40	40	100

BLUE PRINT FOR INTERNAL ASSESSMENT– II

Annexure - 2

Articulation Mapping –K Levels with Course Learning Outcomes (CLOs)

Sl	CLO's	K-Level	Section A		Section B		Section C	Section D	Total
			MCQs (No Choice)		Short Answers (No Choice)		(Either or Type)	(Open Choice)	
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO3	Upto K5	1 2	K1 K2	1 1	K1 K3	1(K3) 1(K5)	1(K4)	
2	CLO4	Upto K5	2 1	K1 K2	1 1	K1 K2	1(K3) (Each set of questions must be in The same level)	1(K4) 1(K5)	
3.	CLO5	Upto K5	1 1	K1 K2	1 1	K2 K3	1(K4)	1(K5)	
No. of Questions to be asked			8		6		8	4	26
No. of Questions to Be answered			8		6		4	2	20
Marks for each question			1		2		5	10	
Total Marks for each section			8		12		40	40	100

Annexure - 2

Distribution of Marks with choice K Levels CIA - I and CIA - II

CIA	K Levels	Section- A MCQ (No choice)	Section –B (Short Answer (No choice)	Section- C (Either or Type)	Section-D (Open Choice)	Total Marks	% of Marks
I	K1	4	4			8	**8**
	K2	4	4			8	**8**
	K3		4	20		24	**24**
	K4			10	20	30	**30**
	K5			10	20	30	**30**
	Marks	**8**	**12**	**40**	**40**	**100**	**100**
II	K1	4	4			8	**8**
	K2	4	4			8	**8**
	K3		4	20		24	**24**
	K4			10	20	30	**30**
	K5			10	20	30	**30**
	Marks	**8**	**12**	**40**	**40**	**100**	**100**

Annexure - 2

SKILL ENHANCEMENT COURSE

Articulation Mapping –K Levels with Course Learning Outcomes (CLOs) for Internal Assessment (SEC)

Sl.No	CLOs	K-Level	Section A		Section B		Section C	Section D	Total
			MCQs (No choice)		Short Answers (No choice)		(Either/ or Type)	(open choice)	
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO1	Upto K4	2	K1			2(K3&K3)	1(K3)	
2	CLO2	Upto K4	2	K1			2(K3&K3	1(K4)	
3	CLO3	Upto K4			2	K2	2(K4&K4)	1(K4)	
4	CLO4	Upto K5			2	K2	2(K5&K5)	1(K5)	
5	CLO5	Upto K5			2	K2		1(K5)	
No. of Questions to be asked			4		3		8	5	20
No. of Questions to be answered			4		3		4	2	13
Marks for each question			1		2		5	10	
Total Marks for each section			4		6		20	20	**50 (Marks)**

Distribution of Section-wise Marks with K Levels for Internal Assessment (SEC)

K Levels	Section A (MCQ'S) (No choice)	Section B(Short Answer) (No choice)	Section C(Either or Type)	Section D (Open Choice)	Total Marks	% of Marks
K1	4				**4**	**4**
K2		6			**6**	**6**
K3			20	10	**30**	**30**
K4			10	20	**30**	**30**
K5			10	20	**30**	**30**
Total Marks	**4**	**6**	**40**	**50**	**100**	

K1-Rememberingandrecallingfactswithspecificanswers.
K2- Basic understanding off acts and stating main ideas with general answers.
K3-Application oriented Solving Problems, Justifying the statement and deriving inferences
K4- Examining, analyzing, presentation and make inferences with evidences.
K5-Evaluating, making Judgments based on criteria

Annexure - 2

SUMMATIVE EXAMINATION -BLUE PRINT

Articulation Mapping –K Levels with Course Learning Outcomes (CLOs) for External Assessment

Sl.No	CLOs	K-Level	Section A		Section B		Section C	Section D	Total
			MCQs (No choice)		Short Answers (No choice)		(Either/ or Type)	(open choice)	
			No. of Questions	K-Level	No. of Questions	K-Level			
1	CLO1	Upto K4	2	K1&K2	1	K1	2(K2&K2)	1(K3)	
2	CLO2	Upto K4	2	K1&K2	1	K2	2(K3&K3)	1(K4)	
3	CLO3	Upto K4	2	K1&K2	1	K3	2(K3&K3)	1(K4)	
4	CLO4	Upto K5	2	K1&K2	1	K4	2(K4 &K4)	1(K5)	
5	CLO5	Upto K5	2	K1&K2	1	K5	2(K5 &K5)	1(K5)	
No. of Questions to be asked			10		5		1 0	5	30
No. of Questions to be answered			10		5		5	3	23
Marks for each question			1		2		5	10	
Total Marks for each section			10		10		2 5	30	**75 (Marks)**

Distribution of Section-wise Marks with K Levels for External Assessment

K Levels	Section A (MCQ'S) (No choice)	Section B (Short Answer) (No choice)	Section C (Either or Type)	Section D (Open Choice)	Total Marks	% of Marks
K1	5	2	-	-	**7**	**5**
K2	5	2	10	-	**17**	**14**
K3	-	2	20	10	**32**	**27**
K4	-	2	10	20	**32**	**27**
K5	-	2	10	20	**32**	**27**
Total Marks	**10**	**10**	**50**	**50**	**120**	**100**

K1-Remembering and recalling facts with specific answers.
K2- Basic understanding of facts and stating main ideas with general answers.
K3-Application oriented Solving Problems, Justifying the statement and deriving inferences
K4- Examining, analyzing, presentation and make inferences with evidences.
K5-Evaluating, making Judgments based on criteria

Annexure - 2

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DEPARTMENTOFINFORMATIONTECHNOLOGY–PG

TANSCHE – CBCS with OBE

COURSE STRUCTURE

(w.e.f. 2023 –2024 Batch onwards)

Semester	Part	Course Code	Course Title	Teaching hrs. (per week)	Duration of Exam (hrs.)	Marks Allotted			CREDITS
						CIA	SE	Total	
I	Part A	23OPIT11	**Core Course – 1** Python Programming	7	3	25	75	100	5
		23OPIT11P	**Core Course – 2** Practical : Python Programming Lab	7	3	40	60	100	5
		23OPIT12P	**Core Course – 3** Practical : Web Development using Word Press Lab	6	3	40	60	100	4
		23OPITDSE1A	**Elective - I** Computer System Architecture	5	3	25	75	100	4
		23OPITDSE1C	**Elective – II** Data Structures and Algorithms	5	3	25	75	100	4
II	Part A	23OPIT21	**Core Course – 4** Database Systems	6	3	25	75	100	4
		23OPIT21P	**Core Course – 5** Practical: RDBMS Lab	6	3	40	60	100	4
		23OPIT22P	**Core Course – 6** Practical: Open Source Technologies Lab	6	3	40	60	100	4
		23OPITDSE2B	**Elective - III** Operating Systems	5	3	25	75	100	4
		23OPITDSE2D	**Elective - IV** Advanced Software Engineering	5	3	25	75	100	4
	Part B	23OPITSEC21	**Skill Enhancement Course – SEC 1** Multimedia	2	3	25	75	100	2

Annexure - 2

Semester I: Elective I and Elective II

Elective I to be chosen from **Group A** and **Elective II** to be chosen from **Group B**

Group A:

1. Computer System Architecture - 23OPITDSE1A
2. Principles of Compiler Design - 23OPITDSE1B

Group B:

1. Data Structures and Algorithms - 23OPITDSE1C
2. Object Oriented Analysis and Design - 23OPITDSE1D

Semester II: Elective III & Elective IV

Elective III to be chosen from **Group C** and **Elective IV** to be chosen from **Group D**

Group C:

1. Digital Image Processing - 23OPITDSE2A
2. Operating Systems - 23OPITDSE2B

Group D:

1. Human Computer Interaction - 23OPITDSE2C
2. Advanced Software Engineering - 23OPITDSE2D

DEPARTMENT OF INFORMATION TECHNOLOGY					Class: I M.Sc.			
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I	Elective - I	23OPITDSE1A	Computer System Architecture	4	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives:

1. To understand the structure, function and characteristics of computer systems.
2. To learn the design of the various functional units and operations of computers.
3. To identify the elements of modern instructions sets and impact on processor design.
4. To identify and compare different methods for computer I/O.
5. To gain the knowledge on functions of each element of a memory hierarchy.

Course Content:

UNIT	Course Content	No. of Hours	K Level	Course Objectives
I	**UNIT I** BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction Codes – Stored Program Organization – Indirect Address – Computer Registers – Computer Instructions – Timing and Control – Instruction Cycle – Memory Reference Instructions.	15	Up to K4	CO1
II	**UNIT II** PROGRAMMING THE BASIC COMPUTER: Instruction – Machine Language – Assembly Language – The Assembler – Program Loops – Programming Arithmetic and Logic Operations – Subroutines – Input/output Programming.	15	Up to K4	CO2
III	**UNIT III** CENTRAL PROCESSING UNIT: Introduction – General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data Transfer and Manipulation – Program Control – Reduced Instruction Set Computer.	15	Up to K4	CO3

IV	**UNIT IV** INPUT/OUTPUT ORGANIZATION: Peripheral Devices – I/O Interface – Priority Interrupt – Direct Memory Access – DMA Controller – DMA Transfer.	15	Up to K5	CO4
V	**UNIT V** MEMORY ORGANIZATION: Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory.	15	Up to K5	CO5

Text Book:

1. Morris Mano. M. (2008). *Computer System Architecture.* Prentice Hall of India.PEARSON. 3rd Edition.

Reference Books:

1. Carl Hamacher. *Computer System Architecture.* (2002). 5th Edition. TATA McGRAW Hill.
2. John P. Hayes. (1996) .*Computer Architecture and Organization*. Tata McGraw Hill.
3. Hamatcher.V.C. (1996).*Computer Organization*. Tata McGraw Hill.

Websites and e-Learning resources

1. http://www.labri.fr/perso/strandh/Teaching/AMP/Common/Strandh-Tutorial/Dir.html
2. http://www.computer-pdf.com/architecture/
3. http://www.uotechnology.edu.iq/depcse/lectures/3/
4. http://www.csie.nuk.edu.tw/~kcf/course/ComputerArchitecture/
5. http://www.ecs.csun.edu/~cputnam/Comp546/Putnam/Cache%20Memory.pdf(Un itV: Cache Memory)

Rationale for nature of Course:

- **Knowledge and Skill:** To Student to make the Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill.
- **Activities to be given:** Students to make architecture is the design and construction of buildings, combining art, mathematics, science and logistics. During an architecture degree, you will learn how to draw accurate designs of buildings either by hand or with computer software.

COURSE OUTCOMES:

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

COs	CLO Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CO1	Demonstrate the fundamental concept of Computer Organization and Design.	K1 to K4
CO2	Explain the various types of Programming Arithmetic and Logic Operations.	K1 to K4
CO3	Apply the various Instruction Formats and Addressing Modes	K1 to K4
CO4	Analyze the various design of Peripheral Devices and I/O Interface.	K1 to K5
CO5	Distinguish the major components of a computer memory and storage.	K1 to K5

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	**3**	**2**	**2**	**3**	**3**	**2**
CO2	**3**	**2**	**2**	**3**	**3**	**2**
CO3	**3**	**2**	**3**	**3**	**3**	**3**
CO4	**3**	**2**	**3**	**3**	**3**	**3**
CO5	**3**	**2**	**2**	**3**	**3**	**3**

LESSON PLAN

UNIT	Course Content	No. of Hours	Course Objectives	Mode of Teaching
I	**UNIT I** BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction Codes – Stored Program Organization – Indirect Address – Computer Registers – Computer Instructions – Timing and Control – Instruction Cycle – Memory Reference Instructions.	15	CO1	Chalk and Talk, PPT
II	**UNIT II** PROGRAMMING THE BASIC COMPUTER: Instruction – Machine Language – Assembly Language – The Assembler – Program Loops – Programming Arithmetic and Logic Operations – Subroutines – Input/output Programming.	15	CO2	Chalk and Talk, PPT

III	**UNIT III** CENTRAL PROCESSING UNIT: Introduction – General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data Transfer and Manipulation – Program Control – Reduced Instruction Set Computer.	15	CO3	Chalk and Talk, PPT
IV	**UNIT IV** INPUT/OUTPUT ORGANIZATION: Peripheral Devices – I/O Interface – Priority Interrupt – Direct Memory Access – DMA Controller – DMA Transfer.	15	CO4	Chalk and Talk, PPT
V	**UNIT V** MEMORY ORGANIZATION: Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory.	15	CO5	Seminar, PPT presentation
	Total	**75**		

Course Designer
Mrs.G.Amudha

DEPARTMENT OF INFORMATION TECHNOLOGY					Class: I M.Sc.			
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I	Elective - I	23OPITDSE1B	Principles of Compiler Design	4	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives:

1. To acquire knowledge Structure of Compiler design, Lexical Analysis and Syntax Analysis.
2. To learn the Finite Automata from regular expression.
3. To classify the derivation and parse trees.
4. To acquire knowledge on constructing SLR parsing tables, gain various algorithm techniques like Backtracking and Branch and Bound.
5. To analyze the Representing Scope information of Code Optimization.

Course Content:

UNIT	Course Content	No. of Hours	K Level	Course Objectives
I	Compilers and Translators-Why Do We Need Translators?-The Structure of A Compiler- Lexical Analysis-Syntax Analysis-Intermediate Code Generation-Optimization Code Generation-Book Keeping-Error Handling-Compiler-Writing Tools-Getting started.	15	Up to K4	CO1
II	The role of the lexical analyzer-Simple approach to design of a lexical analyzer Regular Expressions-Finite Automata-From regular expression to finite automata-Minimizing the number of states of a DFA-A language for specifying lexical analyzer-Implementing a lexical analyzer.	15	Up to K4	CO2
III	The Syntactic Specification of Programming Languages- Context free grammars - Derivation and Parse Trees – Parsers-Shift-reduce Parsing-Operator-precedence parsing-Top down parsing Predictive Parsers.	15	Up to K4	CO3

IV	LR parsers-The canonical collection of LR(0) items-constructing SLR parsing tables - constructing canonical LR parsing tables-constructing SLR parsing tables-constructing LALR parsing tables. Syntax directed translation schemes - Implementation of syntax directed schemes-Intermediate Code-Parse Tree and Syntax Trees -Three Address code, quadruples, and triples-Translation of assignment statements.	15	Up to K5	CO4
V	The contents of a symbol tables-Data structure for a symbol table-Representing Scope information. Code Optimization -The principal sources of optimization-Loop optimization -The DAG representation of basic blocks-Peephole Optimization.	15	Up to K5	CO5

TEXT BOOK(S):

1. AlfredV.Aho,& Jeffrey D.Ullman.(2002). *Principles of Compiler Design*.

   UNIT I : Chapter 1

   UNIT II : Chapter 3(Except 3.9)

   UNIT III : Chapter 4 (4.1,4.2),5

   UNIT IV : Chapter 6(6.1 – 6.5), 7(7.1 – 7.7)

   UNIT V : Chapter 9,12(12.1,12.2,12.3), 15.7

REFERENCE BOOK(S):

1. Allen I. Holub. (2003) .*Compiler Design in .C* Prentice Hall of India.
2. Fischer.C.N & LeBlanc.R.J.(2003). *Crafting a compiler with C* . Pearson publish
3. Bennet.J.P. (2003) *Introduction to Compiler Techniques.* Second Edition. Tata McGraw Hill.

Websites and e-Learning resources

1. https://www3.nd.edu/~dthain/compilerbook/compilerbook.pdf
2. https://core.ac.uk/download/pdf/214452802.pdf
3. http://160592857366.free.fr/joe/ebooks/ShareData/Modern%20Compiler%20Design%202e.pdf
4. https://www.tutorialspoint.com/compiler_design/compiler_design_tutorial.pdf

COURSE OUTCOMES:

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

COs	CLO Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CO1	Demonstrate to design and implement a compiler for lexical rules and grammars for a programming language.	K1 to K4
CO2	Explain the use design of a lexical analyzer and regular expressions.	K1 to K4
CO3	Apply the parser such as a bottom-up SLR parser without using Yacc/Bison or any other compiler-generation tools.	K1 to K4
CO4	Analyze the design and implement LL and LR parsers.	K1 to K5
CO5	Distinguish the design algorithms to generate machine code.	K1 to K5

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CO/PSO	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	**3**	**1**	**2**	**2**	**1**	**2**
CLO2	**3**	**2**	**2**	**2**	**2**	**3**
CLO3	**3**	**2**	**3**	**3**	**3**	**2**
CLO4	**3**	**3**	**2**	**3**	**3**	**3**
CLO5	**3**	**3**	**3**	**3**	**3**	**2**

LESSON PLAN:

UNIT	Course Content	No. of Hours	Course Objectives	Mode of Teaching
I	Compilers and Translators-Why Do We Need Translators?-The Structure of A Compiler- Lexical Analysis-Syntax Analysis-Intermediate Code Generation-Optimization Code Generation-Book Keeping-Error Handling-Compiler-Writing Tools-Getting started.	15	CO1	Chalk and Talk, PPT
II	The role of the lexical analyzer-Simple approach to design of a lexical analyzer Regular Expressions-	15	CO2	Chalk and Talk, PPT

	Finite Automata-From regular expression to finite automata-Minimizing the number of states of a DFA-A language for specifying lexical analyzer-Implementing a lexical analyzer.			
III	The Syntactic Specification of Programming Languages- Context free grammars - Derivation and Parse Trees – Parsers-Shift-reduce Parsing-Operator-precedence parsing-Top down parsing Predictive Parsers.	15	CO3	Chalk and Talk, PPT
IV	LR parsers-The canonical collection of LR(0) items-constructing SLR parsing tables - constructing canonical LR parsing tables-constructing SLR parsing tables-constructing LALR parsing tables. Syntax directed translation schemes - Implementation of syntax directed schemes-Intermediate Code-Parse Tree and Syntax Trees -Three Address code, quadruples, and triples-Translation of assignment statements.	15	CO4	Chalk and Talk, PPT
V	The contents of a symbol tables-Data structure for a symbol table-Representing Scope information. Code Optimization -The principal sources of optimization-Loop optimization -The DAG representation of basic blocks-Peephole Optimization.	15	CO5	Seminar, PPT presentation

Course Designer
Mrs.R.Rajasangeetha

DEPARTMENT OF INFORMATION TECHNOLOGY					Class: I M.Sc.			
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I	Elective - II	23OPITDSE1C	Data Structures and Algorithms	4	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives:

1. To understand the concept of Trees and Graphs.
2. To learn the various Hashing Techniques and Priority Queues.
3. To differentiate and classify the various Binary Search Trees.
4. To acquire knowledge on dynamic Programming and basic Traversal and Search.
5. To gain various algorithm techniques like Backtracking and Branch and Bound.

Course Content:

UNIT	Course Content	No. of Hours	K Level	Course Objectives
I	**Trees:** Heaps–Binary Search Trees–Selection Trees–Forests– Representation of Disjoint Sets – Counting Binary Trees. **Graphs:** The Graph Abstract Data type – Elementary Graph Operations – Minimum Cost Spanning Trees –Shortest Paths and Transitive Closure–Activity Networks.	15	Up to K4	CO1
II	**Hashing:** Introduction – Static hashing – Dynamic hashing – Bloom filters. **Priority Queues:** Single and Double ended priority queues – Leftist Trees – Binomial Heaps– Fibonacci Heaps–Pairing Heaps –Symmetric Min-Max Heaps –Interval Heaps.	15	Up to K4	CO2
III	**Efficient binary search trees:** Optimal Binary Search Trees–AVL Trees– Red Black Trees– Splay Trees. **Multiway Search Trees:** m-way Search Trees–B-Trees –B+-Trees.	15	Up to K4	CO3

IV	**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 Travelling Salesperson problem – flow shop scheduling. **Basic Traversal and Search Techniques:** Techniques for Binary Trees –Techniques for Graphs – Connected Components and Spanning Trees – Bi connected Components and DFS.	15	Up to K5	CO4
V	**Backtracking:** The General Method–The 8-Queens Problem–Sum of subsets –Graph coloring – Hamiltonian cycles–Knapsack problem. **Branch and Bound:** The Method–0/1 Knapsack problem–Traveling Salesperson (*)– Efficiency considerations.	15	Up to K5	CO5
	Total	**75**		

Text Books:

1. EllisHorowitz. Dinesh Meht .& SartajSahni. (2017) *Fundamentals of Data Structures in C++* . University Press(India) Private Limited, Second Edition.

2. EllisHorowitz. SartajSahni. Sanguthevar. & Rajasekaran.(2017).*Fundamentals of Computer Algorithms*. University Press(India) Private Limited, Second Edition.

Reference Book(s)

1. AlfredV. Aho,JohnE.Hopcraft & JeffreyD.Ullman. (2013) *DataStructuresandAlgorithms*, Pearson Education,Fourteenth Impression.

2. TimothyA.Budd-Addison & Wesley. (1994) *Classic DataStructures in C++*, PublishingCo.,FirstEdition.

3. MarkAllenWeiss.(1997) *DataStructure and Algorithm Analysis in C* ,Second Edition, PublishingCompany.

4. SaraBaase. &AllenVanGelder.(2000) *ComputerAlgorithms Introductionto Design & Analysis* , Third Edition, Pearson Education,New Delhi,

5. A.Chitra.P.T.Rajan.&Vijay Nicol (2006) *DataStructures,* ImprintsPvt. Ltd,McGrawHill Education of India Pvt.Ltd.,

6. S.Sridhar.(2015)*DesignandAnalysisofAlgorithms*–,OxfordUniversityPress.

Websites and e-Learning resources

1.http://www.cs.sunysb.edu/~skiena/214/lectures/

2.http://datastructures.itgo.com/graphs/dfsbfs.htm

3.http://oopweb.com/Algorithms/Documents/PLDS210/VolumeFrames.html

4.http://discuss.codechef.com/questions/48877/data-structures-and-algorithms

5. http://code.tutsplus.com/tutorials/algorithms-and-data-structures--cms-20437

Rationale for nature of Course:

- **Knowledge and Skill:** To make students aware of the Data Structures, Arrays and stacks.
- **Activities to be given:** Students shall be asked to analyze upcoming or recent development in data structures.

COURSE OUTCOMES:

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

COs	CLO Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CO1	Outline the data structures of Trees and Graphs.	K1 to K4
CO2	Identify the different operations and memory representations using Heaps.	K1 to K4
CO3	Interpret different techniques with Efficient binary search trees and Multiway Search Trees.	K1 to K4
CO4	Analyze the various algorithm techniques Dynamic Programming and Basic Traversal and Search Techniques.	K1 to K5
CO5	Choose an algorithm to solve simple problems suited for appropriate situations using Backtracking and Branch and Bound techniques.	K1 to K5

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CO/PSO	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	3	1	2	2	1	2
CLO2	3	2	2	2	2	3
CLO3	3	2	3	3	3	2
CLO4	3	3	2	3	3	3
CLO5	3	3	3	3	3	2

LESSON PLAN:

UNIT	Course Content	No. of Hours	Course Objectives	Mode of Teaching
I	**Trees:** Heaps–Binary Search Trees–Selection Trees–Forests– Representation of Disjoint Sets –Counting Binary Trees. **Graphs:** The Graph Abstract Data type – Elementary Graph Operations – Minimum Cost Spanning Trees – Shortest Paths and Transitive Closure–Activity Networks.	15	CO1	Chalk and Talk, PPT
II	**Hashing:** Introduction – Static hashing – Dynamic hashing – Bloom filters. **Priority Queues:** Single and Double ended priority queues – Leftist Trees – Binomial Heaps–Fibonacci Heaps–Pairing Heaps –Symmetric Min-Max Heaps – Interval Heaps.	15	CO2	Chalk and Talk, PPT
III	**Efficient binary search trees:** Optimal Binary Search Trees–AVL Trees– Red Black Trees–Splay Trees. **Multiway Search Trees:** m-way Search Trees–B-Trees –B+-Trees.	15	CO3	Chalk and Talk, PPT
IV	**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 Travelling Salesperson problem – flow shop scheduling. **Basic Traversal and Search**	15	CO4	Chalk and Talk, PPT

	Techniques: Techniques for Binary Trees – Techniques for Graphs – Connected Components and Spanning Trees – Bi connected Components and DFS.			
V	**Backtracking:** The General Method–The 8-Queens Problem–Sum of subsets –Graph coloring – Hamiltonian cycles–Knapsack problem. **Branch and Bound:** The Method–0/1 Knapsack problem–Traveling Salesperson (*)– Efficiency considerations.	15	CO5	Seminar, PPT presentation

Course Designer
Ms.B.Yuvashree

DEPARTMENT OF INFORMATION TECHNOLOGY					Class: I M.Sc.			
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I	Elective II	23OPITDSE1D	Object Oriented Analysis and Design	4	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives:

1. To understand the concept of object oriented Systems development Methodology.
2. To learn the various Object oriented system development life cycle (SDLC).
3. To Identify UML dynamic modeling, model management, OOA process
4. To acquire knowledge on Object oriented design process a design axioms.
5. To Know various object oriented design philosophy and UML object constraint.

Course Content:

UNIT	Course Content	No. of Hours	K Level	Course Objectives
I	**Introduction**–Two Orthogonal views–object oriented Systems development Methodology – Object orientation – unified approach – Object Basics –object oriented philosophy – objects – classes – attributes – behavior and methods – Message passing - Encapsulation and information hiding – hierarchy – polymorphism –object relationship and associations– aggregation – a case study– advanced 36 topics.	15	Up to K4	CO1
II	Object oriented system development life cycle (SDLC) – development process – building high quality software – use-case driven approach – reusability –Object oriented methodologies– introduction–Booch methodology –Jacobson methodologies–patterns–frameworks–unified approach.	15	Up to K4	CO2

III	Unified modeling language – introduction – static and dynamic models –modeling – unified modeling language - UML diagrams – UML class diagrams – Use-casediagram–UMLdynamicmodeling-modelmanagement–OOAprocess–introduction – difficulty in analysis - business object analysis – use-case driven objectorientedanalysis–businessprocessingmodeling–use-casemodel–developingeffective documentation.	15	Up to K4	CO3
IV	Object analysis – classification – common class patterns approach – use-case driven approach – CRC – naming classes – object relationships – associations –Super-Subclass relationships–aggregation–class responsibility–object responsibility –Object oriented design process an design axioms–introduction–design process–design axioms-design patterns.	15	Up to K5	CO4
V	Designing classes –introduction -object oriented design philosophy –UML object constraint–designing classes – class visibility – defining attributes –designing methods and protocols – Packages and managing classes – Access layer – Object storage and object interoperability – introduction – object store and persistence – Database management systems – database organization and access control – distributed databases.	15	Up to K5	CO5

Text Books:

1. Ali Bahrami.(2017).*Object Oriented Systems Development* –McGraw Hill Publications. (Chapters1to11)

Reference Book(s)

1. GradyBooch.(2007).*Object Oriented Analysis and Design.* Pearson Publication.

Websites and e-Learning resources

1.https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=7b343ac98d60498a0041ec6a470b872c76c0f87c 2.https://friendkvvk.files.wordpress.com/2015/08/friendkvvk-ooad.pdf

Rationale for nature of Course:

Knowledge and Skill: To make students aware of the UML dynamic modeling, OOAprocess

Activities to be given: Students shall be asked to analyze upcoming or recent development in business object analysis

COURSE OUTCOMES:

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

COs	CLO Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CO1	Understanding the OOPS concept.	K1 to K4
CO2	Describe the various Object oriented system methodologies.	K1 to K4
CO3	Identify UML dynamic modeling and OOAprocess	K1 to K4
CO4	Acquire knowledge on Object oriented design process an design axioms.	K1 to K5
CO5	Analyze Database management systems and distributing database.	K1 to K5

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CO/PSO	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	**3**	**1**	**2**	**2**	**1**	**2**
CLO2	**3**	**2**	**2**	**2**	**2**	**3**
CLO3	**3**	**2**	**3**	**3**	**3**	**2**
CLO4	**3**	**3**	**2**	**3**	**3**	**3**
CLO5	**3**	**3**	**3**	**3**	**3**	**2**

LESSON PLAN

UNIT	Course Content	No. of Hours	Course Objectives	Mode of Teaching
I	Introduction–Two Orthogonal views–object oriented Systems development Methodology – Object orientation – unified approach – Object Basics –object oriented philosophy – objects – classes – attributes – behavior and methods – Message passing - Encapsulation and information hiding – hierarchy – polymorphism –object relationship and associations– aggregation – a case study– advanced 36 topics.	15	CO1	Chalk and Talk, PPT, quiz, on the spot test
II	Object oriented system development life cycle (SDLC) – development process – building high quality software – use-case driven approach – reusability –Object oriented methodologies– introduction–Booch methodology –Jacobson methodologies–patterns–frameworks–unified approach.	15	CO2	Chalk and Talk, PPT, quiz, on the spot test
III	Unified modeling language – introduction – static and dynamic models –modeling – unified modeling language - UML diagrams – UML class diagrams – Use-casediagram– UMLdynamicmodeling-modelmanagement– OOAprocess–introduction – difficulty in analysis - business object analysis – use-case driven objectorientedanalysis– businessprocessingmodeling–use-casemodel– developingeffective documentation.	15	CO3	Chalk and Talk, PPT, quiz, on the spot test
IV	Object analysis – classification – common class patterns approach – use-case driven approach – CRC – naming classes – object relationships – associations –Super-Subclass relationships– aggregation–class responsibility–object	15	CO4	Chalk and Talk, PPT, quiz, on the spot test

	responsibility –Object oriented design process an design axioms–introduction–design process– design axioms-design patterns.			
V	Designing classes –introduction -object oriented design philosophy –UML object constraint– designing classes – class visibility – defining attributes –designing methods and protocols – Packages and managing classes – Access layer – Object storage and object interoperability – introduction – object store and persistence – Database management systems – database organization and access control – distributed databases.	15	CO5	Seminar, PPT presentation.
	Total	**75**		

Course Designer
Mrs.R.Raja Sangeetha

DEPARTMENT OF INFORMATION TECHNOLOGY					Class: I M.Sc.			
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
II	Elective III	23OPITDSE2A	Digital Image Processing	4	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	Entrepreneurship oriented
✔	✔	

Course Objectives:

1. Identify the image fundamentals and mathematical transforms necessary for image processing
2. Learn the functionalities of spatial and frequency filters for image enhancement.
3. To identify the requirements of various image segmentation methods and object recognitionmodels for various real-time applications.
4. Get broad exposure to and understanding of color image processing models.
5. To analyze the functionalities of Morphological Image processing method.

Course Content:

UNIT	Course Content	No. of Hours	K Level	Course Objectives
I	**UNIT I : Introduction to Image Processing** Overview of Image Processing - Nature of Image Processing - Digital Image Representation-Types of Images-Based on Nature - Based on Attributes - Based on 40 Colour - Based on Dimensions-Based on Data Types-Domain Specific Images - Digital Image Processing Operations-Fundamental Steps In Image Processing – Image Enhancement-Image Restoration - Image Compression - Image Analysis – Image Synthesis. **Digital Imaging Systems**: Overview of Digital Imaging Systems-Image Sensors-Image Storage-Image processors-Output Devices-Networking Components-Image Processing Software-Physical Aspects of Image Acquisition-Nature of Light-Simple Image	15	Up to K4	CO1

	Model - Colour Fundamentals -Lighting System Design-Simple Image Formation Process - Biological Aspects of Image Acquisition - Human Visual System - Properties of Human Visual System - Monochrome andColourImage-ReviewofDigitalCameras-SamplingandQuantization-Sampling-Resampling - Image Quantization - Image Display Devices and Device Resolution – Digital Halftone Process - Random Dithering - Ordered Dithering - Non - periodic Dithering – Image Storage and File Formats - Need for File Formats -Types of File Formats - Structures of File Formats.			
II	**UNIT II: Digital Image Processing Operations** Basic Relationships and Distance Metrics - Image Coordinate System - Image Topology - Connectivity-Relations-DistanceMeasures-ImportantImageCharacteristics-Classificationof Image Processing Operations - Arithmetic Operations. Logical Operations – Geometrical Operations - Image Interpolation Techniques - Set Operations. **Digital Image Transforms:** Need for Image Transforms-Spatial Frequencies in Image Processing-Introduction to Fourier Transform-Discrete Fourier Transform – Fast Fourier Transform-Discrete Cosine Transform.	15	Up to K4	CO2
III	**UNIT III: Image Enhancement** Image Quality and Need for Image Enhancement - Image Quality Factors - Image QualityAssessmentToll-ImageQualityMetrics-	15	Up to K4	CO3

	Image Enhancement operations-Image Enhancement in Spatial Domain-Linear Point Transformations-Non-Linear Transformations–Square Function-Square root-Logarithmic Function–Exponential Function - Power Function - Gamma Correction - Histogram - Based techniques – Histogram Stretching–Histogram Sliding-Histogram Equalization-Histogram Specification-Local and Adaptive Contrast Enhancement –Spatial Filtering Concepts-Image Smoothing Spatial Filters- Box Filters - Gaussian Filters - Image Sharpening Spatial Filters - Gradient and Laplacian Filters-High-boost Filters-Unsharp Masking. **Image Restoration** : Introduction to Degradation - Types of Image Degradations - Image Degradation Model - Noise Modelling -Noise Categories Based on Distribution - Noise Categories Based on Correlation – Noise Categories Based on Nature-Noise Categories Based onSource-EstimationbyObservation-EstimationbyExperimentation-EstimationbyModelling-ImageRestorationTechniques-UnconstrainedMethod-InverseFilters-WienerFilters.			
IV	**UNIT IV : Image Compression** Image Compression Model-Compression-Measures-Compression Algorithm and its Types 41 – Entropy Coding - Predictive Coding - Transform Coding - Layered Coding - Types of Redundancy - Coding Redundancy - Inter pixel Redundancy – Psycho visual Redundancy -Chromatic Redundancy - Lossless	15	Up to K5	CO4

	Compression Algorithms - Run - length Coding – Huffman Coding - Bit plane Coding - Arithmetic Coding - Dictionary - based Coding – Lossless Predictive Coding - Lossy Predictive Coding - Vector Quantization – Codebook design –Generalized Lloyd algorithm.			
V	**UNIT V: Image Segmentation:** Introduction-Formal Definition of Image Segmentation-Classification of Image Segmentation Algorithms - Detection of Discontinuities –Point Detection-Line Detection - Edge Detection –Stages in Edge Detection-Types of Edge detectors-First order Edge Detection-Edge operator performance - Edge linking Algorithms - Principle of Thresholding - Principle of Region –growing. **Colour Image Processing** - Introduction - Colour Image Storage and Processing -Colour Models - RGB Colour Model - HIS Colour Model - HSV Colour Model - HLS Colour Model - Printing Colour Models - Colour Quantization - Popularity or Populosity Algorithm –Median cut Algorithm-Octree based Algorithm-Pseudo colour Image Processing-Full colour Processing-Colour Transformations –Image Filters for Colour Image – Colour image Segmentation.	15	Up to K5	CO5

TEXTBOOK(S):

Sridhar. S.(2016). DIGITAL IMAGE PROCESSING. OXFPRD University Press. Second Edition,

Unit I: Chapter1(1.1to1.2,1.4-1.7) Chapter 2(2.1to2.8)

Unit II: Chapter3(Except3.2.6 &3.2.7) Chapter 4(4.1and4.3)

Unit III: Chapter 5(5.1and 5.7Except5.3.3) Chapter 6(6.1to6.2, 6.4 to 6.6 and 6.9.1 to 6.9.4)

Unit IV: Chapter 7(7.1and 7.5Except7.4.3and7.5.3)

Unit V: Chapter 9(9.1to9.4 Except9.4.4) and (9.7to9.8) Chapter11(11.1to11.2 and11.5)

REFERENCE BOOK(S):

1. Rafael .C.Gonzalez .& Richard.E.Woods. (2002).*Digital Image Processing using MATLAB*.Prentice Hall of India. 2ndEdition.
2. A.Jain. (2010). *Fundamentals of Digital Image Processing.* Prentice Hall of India,
3. WillliamKPratt .& JohnWilley.(2002). *Digital Image Processing*.

Websites and e-Learning resources

1. https://en.wikipedia.org/wiki/Digital_image_processing
2. https://www.sciencedirect.com/topics/engineering/image-processing
3. https://www.intechopen.com/chapters/71817
4. https://content.kopykitab.com/ebooks/2016/03/6189/sample/sample_6189.pdf
5. https://preetikale.files.wordpress.com/2018/07/fundmentals-of-digital-image-processing-ak- jain.pdf

Rationale for nature of Course:

- **Knowledge and Skill:** These include a good understanding of Digital Image Processing.
- **Activities to be given:** Create, test and deploy new image techniques in a timely and efficient manner, while concurrently working with others to meet data acquisition requirements.

COURSE OUTCOMES:

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

COs	CLO Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CO1	Understand the basic concepts of digital image fundamentals.	K1 to K4
CO2	Describe concepts of Image Transformation & Filters.	K1 to K4
CO3	Identify various design alternatives in image restoration and Segmentation techniques.	K1 to K4
CO4	Implement the principles of Color Image Processing.	K1 to K5
CO5	Illustrate the Morphological Image Processing Techniques.	K1 to K5

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	**2**	**3**	**1**	**1**	**2**	**2**
CO2	**3**	**3**	**2**	**2**	**2**	**2**
CO3	**3**	**2**	**2**	**3**	**2**	**2**
CO4	**3**	**2**	**2**	**2**	**2**	**3**
CO5	**3**	**3**	**2**	**3**	**2**	**3**

LESSON PLAN:

UNIT	Course Content	No. of Hours	Course Objectives	Mode of Teaching
I	**UNIT I : Introduction to Image Processing** Overview of Image Processing - Nature of Image Processing - Digital Image Representation-Types of Images-Based on Nature - Based on Attributes - Based on 40 Colour - Based on Dimensions-Based on Data Types-Domain Specific Images - Digital Image Processing Operations-Fundamental Steps In Image Processing – Image Enhancement-Image Restoration - Image Compression - Image Analysis – Image Synthesis. **Digital Imaging Systems**: Overview of Digital Imaging Systems-Image Sensors-Image Storage-Image processors-Output Devices-Networking Components-Image Processing Software-Physical Aspects of Image Acquisition-Nature of Light-Simple Image Model - Colour Fundamentals -Lighting System Design-Simple Image Formation Process - Biological Aspects of Image Acquisition - Human Visual System - Properties of Human Visual System - Monochrome andColourImage-ReviewofDigitalCameras-SamplingandQuantization-Sampling-Resampling - Image Quantization - Image Display Devices and Device Resolution – Digital Halftone Process - Random Dithering - Ordered Dithering - Non - periodic Dithering – Image Storage and File Formats - Need for File Formats -Types of File Formats - Structures of File Formats.	15	CO1	Chalk and Talk, PPT, quiz, on the spot test

II	**UNIT II: Digital Image Processing Operations** Basic Relationships and Distance Metrics - Image Coordinate System - Image Topology - Connectivity-Relations-DistanceMeasures-ImportantImageCharacteristics-Classificationof Image Processing Operations - Arithmetic Operations. Logical Operations – Geometrical Operations - Image Interpolation Techniques - Set Operations. **Digital Image Transforms:** Need for Image Transforms-Spatial Frequencies in Image Processing-Introduction to Fourier Transform-Discrete Fourier Transform – Fast Fourier Transform-Discrete Cosine Transform.	15	CO2	Chalk and Talk, PPT, quiz, on the spot test
III	**UNIT III: Image Enhancement** Image Quality and Need for Image Enhancement - Image Quality Factors - Image QualityAssessmentToll-ImageQualityMetrics-Image Enhancement operations-Image Enhancement in Spatial Domain-Linear Point Transformations-Non-Linear Transformations–Square Function-Square root-Logarithmic Function–Exponential Function - Power Function - Gamma Correction - Histogram - Based techniques – Histogram Stretching–Histogram Sliding-Histogram Equalization-Histogram Specification-Local and Adaptive Contrast Enhancement –Spatial Filtering Concepts-Image Smoothing Spatial Filters- Box Filters - Gaussian Filters - Image Sharpening Spatial Filters - Gradient and Laplacian Filters-High-boost Filters-Unsharp Masking. **Image Restoration** : Introduction to Degradation -	15	CO3	Chalk and Talk, PPT, quiz, on the spot test

	Types of Image Degradations - Image Degradation Model - Noise Modelling -Noise Categories Based on Distribution - Noise Categories Based on Correlation – Noise Categories Based on Nature-Noise Categories Based onSource-EstimationbyObservation-EstimationbyExperimentation-EstimationbyModelling-ImageRestorationTechniques-UnconstrainedMethod-InverseFilters-WienerFilters.			
IV	**UNIT IV : Image Compression** Image Compression Model-Compression-Measures-Compression Algorithm and its Types 41 – Entropy Coding - Predictive Coding - Transform Coding - Layered Coding - Types of Redundancy - Coding Redundancy - Inter pixel Redundancy – Psycho visual Redundancy -Chromatic Redundancy - Lossless Compression Algorithms - Run - length Coding – Huffman Coding - Bit plane Coding - Arithmetic Coding - Dictionary - based Coding – Lossless Predictive Coding - Lossy Predictive Coding - Vector Quantization – Codebook design –Generalized Lloyd algorithm.	15	CO4	Chalk and Talk, PPT, quiz, on the spot test
V	**UNIT V: Image Segmentation:** Introduction-Formal Definition of Image Segmentation-Classification of Image Segmentation Algorithms - Detection of Discontinuities –Point Detection-Line Detection - Edge Detection –Stages in Edge Detection-Types of Edge detectors-First order Edge Detection-Edge operator performance - Edge linking Algorithms - Principle of	15	CO5	Seminar, PPT , Group discussion

	Thresholding - Principle of Region –growing. **Colour Image Processing -** Introduction - Colour Image Storage and Processing -Colour Models - RGB Colour Model - HIS Colour Model - HSV Colour Model - HLS Colour Model - Printing Colour Models - Colour Quantization - Popularity or Populosity Algorithm –Median cut Algorithm-Octree based Algorithm-Pseudo colour Image Processing-Full colour Processing-Colour Transformations –Image Filters for Colour Image – Colour image Segmentation.			

Course Designer
Mrs.R.Lakshmi

DEPARTMENT OF INFORMATION TECHNOLOGY					Class: I M.Sc.			
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
II	Elective III	23OPITDSE2B	Operating Systems	4	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives:

1. To give an overview of the many types of computing environments.
2. To introduce CPU scheduling and basis of multi- programmed operating system.
3. To develop a description of deadlocks, which prevent sets of concurrent processes fromcompleting their tasks.
4. To have an understanding of the main memory and secondary memory Managementtechniques.
5. To discuss file system design tradeoffs, including access methods, file sharing, file locking,and directory structures.

UNIT	Course Content	No. of Hours	K Level	Course Objectives
I	**Process, Thread, SMP and Concurrency Control** Process description and control-what is a process? – process states- process description – process control-execution of operating system-security issues. Threads, SMP , Micro kernels: Processes and threads-symmetric multiprocessing-microkernels–Linux process and thread management. Concurrency: Mutual exclusion and Synchronization –Principles of concurrency-mutual exclusion: hardware support-semaphores-monitors-message passing-reader/writer problem.	15	Up to K4	CO1
II	**Deadlock and Memory Management** Concurrency: Deadlock and Starvation - principles of deadlock - deadlock prevention -	15	Up to K4	CO2

	deadlockavoidance-deadlockdetection-anintegrateddeadlockstrategy-diningphilosophers' problem – Linux kernal concurrency mechanisms. Memory management memory management requirements-memory partitioning-paging-segmentation-security issues. Virtual memory : hardware and control structures - operating system software–Linux memory management.			
III	**Uni Processor, Multiprocessor and real time Scheduling** Uni -processor scheduling : types of scheduling - scheduling algorithms. Multiprocessor and Real time scheduling : multiprocessor scheduling - real time scheduling – Linux scheduling	15	Up to K4	CO3
IV	**I/O Management and File Systems** I/O management and Disk scheduling :I/O devices- organization of I/O function - operating system design issues - I/O buffering - disk scheduling - RAID - disk cache -Linux I/O. File management : overview - file organization and access - file directories -file sharing - record blocking -secondary storage management - file system security –Linux file management.	15	Up to K5	CO4
V	**Embedded Operating system, Distributed systems** Embedded operating system: Embedded Systems- Characteristics of embedded operatingsystemsTinyOS.Distributedprocessing,client/serverandclusters:client/servercomputing – Distributed message passing – remote procedure calls – clusters – Beowulf and Linux clusters.	15	Up to K5	CO5

TEXTBOOK(S):

William Stallings.(2014). *Operating Systems – Internals and Design Principles*, Sixth Edition, Pearson Education Ltd.

1. UNIT I:Chapter3.1to 3.6,4.1to 4.3,4.6,5.1to5.6
2. UNIT II:Chapter6.1 to 6.6,6.8,7.1to 7.5,8.1,8.2,8.4
3. UNIT III: Chapter 9.1,9.2,10.1,10.2,10.3
4. UNIT IV :Chapter 11.1 to 11.7, 11.9, 12.1 to 12.7,12.9
5. UNITV:Chapter13.1,13.2,13.4,16.1,16.2,16.3,16.4,16.7

REFERENCEBOOK(S):

1. Charles Crowley. (2009).*Operating system-A design oriented approach*. TMH,
2. Deital.H.M.(2003)*Operating System*. Pearson Education. 11th Edition.
3. Milon MilenKovic. (1997).*Operating Systems Concepts And Design.*Tata Mc Graw-Hill. NewDelhi.2nd Edition.
4. Pramod Chandra. & P.Bhatt. (2007)*An Introduction to Operating Systems*. PHI.
5. William Stallings.(2008)*Operating Systems Internals and Design Principles*. PHI.

Websites and e-Learning resources

1. https://www.crectirypati.com/sites/default/files/lectur_notes/OpertingSystemsLectureN otes.pdf
2. http://www2.cs.uic.edu/~jbell/CourseNotes/OperatingSystems
3. http://www.smartzworld.com/notes/linux-programming-pdf-lp-pdf-notes/
4. http://www.cs.put.poznan.pl/akobusinska/downloads/Operating_Systems_Concepts.pdf

Rationale for nature of Course:

- **Knowledge and Skill:** These include a good understanding of Operating System
- **Activities to be given:** Create, test and deploy new, innovative website applications in a timely and efficient manner, while concurrently working with other developers to meet data acquisition requirements

COURSE OUTCOMES:

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

COs	CLO Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CO1	Identify the role of Operating System and understand the design of control unit.	K1 to K4
CO2	Understanding CPU Scheduling, Synchronization	K1 to K4
CO3	Identify Deadlock Handling and Solve Deadlock Detection Problems.	K1 to K4
CO4	Describe the role of paging, segmentation and virtual memory in operating systems.	K1 to K5
CO5	Illustrate the file system interface	K1 to K5

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	**2**	**3**	**1**	**1**	**2**	**2**
CO2	**3**	**3**	**2**	**2**	**2**	**2**
CO3	**3**	**2**	**2**	**3**	**2**	**2**
CO4	**3**	**2**	**2**	**2**	**2**	**3**
CO5	**3**	**3**	**2**	**3**	**2**	**3**

LESSON PLAN:

UNIT	Course Content	No. of Hours	Mode of Teaching
I	**Process, Thread, SMP and Concurrency Control** Process description and control-what is a process? – process states- process description – process control-execution of operating system-security issues. Threads, SMP , Micro kernels: Processes and threads-symmetric multiprocessing-microkernels–Linux process	15	Chalk and Talk, PPT,

	and thread management. Concurrency: Mutual exclusion and Synchronization –Principles of concurrency-mutual exclusion: hardware support-semaphores-monitors-message passing-reader/writer problem.		quiz, on the spot test
II	**Deadlock and Memory Management** Concurrency: Deadlock and Starvation - principles of deadlock - deadlock prevention - deadlockavoidance-deadlockdetection-anintegrateddeadlockstrategy-diningphilosophers' problem – Linux kernel concurrency mechanisms. Memory management: memory management requirements-memory partitioning-paging-segmentation-security issues. Virtual memory : hardware and control structures - operating system software–Linux memory management.	15	Chalk and Talk, PPT, quiz, on the spot test
III	**Uni Processor, Multiprocessor and real time Scheduling** Uni -processor scheduling: types of scheduling - scheduling algorithms. Multiprocessor and Real time scheduling : multiprocessor scheduling - real time scheduling – Linux scheduling	15	Chalk and Talk, PPT, quiz, on the spot test
IV	**I/O Management and File Systems** I/O management and Disk scheduling: I/O devices- organization of I/O function -operating system design issues - I/O buffering - disk scheduling - RAID - disk cache -Linux I/O. File management: overview - file organization and access - file directories -file sharing - record blocking -secondary storage management - file system security –Linux file management.	15	Chalk and Talk, PPT, quiz, on the spot test

V	**Embedded Operating system, Distributed systems** Embedded operating system: Embedded Systems- Characteristics of embedded operatingsystemsTinyOS.Distributedprocessing, client/serverandclusters:client/servercomputing – Distributed message passing – remote procedure calls – clusters – Beowulf and Linux clusters.	15	Seminar, PPT , Group discussion
	Total	**75**	

Course Designer
Mrs.G.Amudha

Annexure - 2

DEPARTMENT OF INFORMATION TECHNOLOGY					Class: I M.Sc.			
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
II	Elective - IV	23OPITDSE2C	Human Computer Interaction	4	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	Entrepreneurship oriented
✔	✔	

Course Objectives:

1. To know the definition of interactive design and human computer interaction.
2. To learn the design process and design goals.
3. To gain the knowledge on Screen based controls and components.
4. To learn the key concepts and terms used in evaluation.
5. To develop interactive models

Course Content:

UNIT	Details	No. of Hours	K Level	Course Objectives
I	**Introduction:** Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design. The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user–Interface popularity, characteristics- Principles of user interface.	15	Up to K4	CO1
II	Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions .Screen Designing: Design goals Screen planning	15	Up to K4	CO2

	and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amountof information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web– statistical graphics– Technological consideration in interface design.			
III	Windows–New and Navigation schemes selection of window, selection of devices based and screen-based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.	15	Up to K4	CO3
IV	HCI in the software process, The software lifecycle Usability engineering Iterative design and proto-typing Design Focus: Prototyping in practice Design rationale Design rules Principles to support usability Standards Golden rules and heuristics HCI patterns Evaluation techniques ,Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method. Universal design, Universal design principles Multi-modal interaction		Up to K5	CO4
V	Cognitive models Goal and task hierarchies Design Focus: GOMS saves money Linguistic models The challenge of display-based systems Physical and device models Cognitive architectures Ubiquitous computing and augmented realities Ubiquitous computing applications research Design Focus: Ambient Wood – augmenting the physical Virtual and augmented reality Design Focus: Shared	15	Up to K5	CO5

	experience Design Focus: Applications of augmented reality Information and data visualization Design Focus: Getting the size right.			

Text Books:

1. Wilbert O'Galitz.Wiley. *The essential guide to user interface design.* DreamTech. Units1,2,3
2. GreGoryd. Abowd .& RussellBealg *Human Computer Interaction.* AlanDix.Janet Fincay. Pearson Education .Units 4,5

Reference Books:

1. Designing the user interface. Ben Shneidermann. Pearson Education Asia. 3rdEdition.
2. Interaction Design Prece,Rogers,Sharps.Wiley Dreamtech.
3. User Interface Design, Soren Lauesen, Pearson Education.
4. Human–Computer Interaction, D.R.Olsen, Cengage Learning.
5. Human–Computer Interaction, Smith- Atakan, CengageLearning.

Websites and e-Learning resources

1) https://www.researchgate.net/profile/Ankit-R-Patel/post/What-sources-are-better-to-use-for-studying-the-topic-of-human-machine-interface-Uses-of-HMI/attachment/5ec1d96d5b40580001ffc37a/AS%3A892342391279618%401589762413367/download/1983_WP_The+Psychology+of+Human+Computer+Interaction.PDF
2) https://download.booklibrary.website/readings-in-humancomputer-interaction-toward-the-year-2000.pdf
3) https://www.researchgate.net/publication/200026251_The_Handbook_of_Task_Analysis_for_Human-Computer_Interaction

Rationale for nature of Course:

- **Knowledge and Skill:** To make students developing well-designed, efficient, and testable code. Conducting software analysis, programming, testing, and debugging.

COURSE OUTCOMES:

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

COs	CLO Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CO1	Explain the definition of interactive design and human computer interaction	K1 to K4
CO2	To learn the design process and design goals.	K1 to K4
CO3	Analyze Screen based controls and components.	K1 to K4
CO4	Assess the key concepts and terms used in evaluation.	K1 to K5
CO5	To build interactive models.	K1 to K5

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	3	3	2
CO2	3	2	2	3	3	2
CO3	3	2	3	3	3	3
CO4	3	2	3	3	3	3
CO5	3	2	2	3	3	3

LESSON PLAN:

UNIT	Course Content	No. of Hours	Course Objectives	Mode of Teaching
I	**Introduction:** Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design. The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user–Interface popularity, characteristics- Principles of user interface.	15	CO1	Chalk and Talk, PPT, quiz, on the spot test
II	Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds,	15	CO2	Chalk and

	understanding business junctions .Screen Designing: Design goals Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amountof information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web– statistical graphics– Technological consideration in interface design.			Talk, PPT, quiz, on the spot test
III	Windows–New and Navigation schemes selection of window, selection of devices based and screen-based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.	15	CO3	Chalk and Talk, PPT, quiz, on the spot test
IV	HCI in the software process, The software lifecycle Usability engineering Iterative design and proto-typing Design Focus: Prototyping in practice Design rationale Design rules Principles to support usability Standards Golden rules and heuristics HCI patterns Evaluation techniques ,Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing an evaluation method. Universal design, Universal design principles Multi-modal interaction		CO4	Chalk and Talk, PPT, quiz, on the spot test
V	Cognitive models Goal and task hierarchies Design Focus: GOMS saves money Linguistic models The challenge of display-based systems Physical and device models Cognitive architectures Ubiquitous computing and	15	CO5	Seminar, PPT presentation

	augmented realities Ubiquitous computing applications research Design Focus: Ambient Wood – augmenting the physical Virtual and augmented reality Design Focus: Shared experience Design Focus: Applications of augmented reality Information and data visualization Design Focus: Getting the size right.			

Course Designer
Ms.B.Yuvashree

DEPARTMENT OF INFORMATION TECHNOLOGY					Class: I M.Sc			
Sem.	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
II	Elective IV	23OPITDSE2D	Advanced Software Engineering	4	5	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives:

1. Analyze the approach to designing, developing, operating, and maintaining a software system.
2. Design a managing the technical aspects of the project, managing the project team, and managing the cost and schedule.
3. Recognize a Seeking an opportunity to work as a design engineer with an established company.
4. Determine a test strategy is to produce an understanding of the complete approach, tools, targets, and timing of test activities to be performed.
5. Examine the project's scope and feasibility to finalize and allocate the budget of a construction project.

Course Content:

UNIT	Details	No. of Hours	K Level	Course Objectives
I	**Introduction:** A Generic View of Process - Process Models: The Waterfall Model-Incremental Model-Evolutionary Model-Specialized Model-The Unified Process-Agile Process - Agile process Models **Exercise:** Choose any one project and do the following exercises for the chosen project a. Student Result Management System b. Library management system c. Online course reservation system	15	Up to K4	CO1

	d. Railway reservation system e. Recruitment system f. Stock Maintenance System Write the Problem Statement for a suggested system of relevance			
II	**System Engineering:** System Engineering Hierarchy - System Modeling - Requirements Engineering: Tasks- Initiating The Process-Eliciting Requirements-Developing Use Cases- Negotiating Requirements-Validating Requirements - Building the Analysis Models: Data modeling concepts - Scenario based - Flow oriented - Class based Modeling **Exercise:** Preparation of Software Requirement Specification Document	15	Up to K4	CO2
III	**Design Engineering:** Design Concepts - Design Models - Pattern Based Design - Architectural Design - Component Level Design: Component - Class Based and Conventional Components Design - User Interface Design: Analysis and Design **Exercise:** Draw DFD and Use Case diagram for the chosen project using any CASE tools	15	Up to K4	CO3
IV	**Testing Strategies:** Software Testing - Strategies: Conventional - Object Oriented - Validation Testing - System Testing: Recovery - Security - Stress - Performance - Testing Tactics: Testing Fundamentals- Black Box - White Box - Basis Path-Control Structure **Exercise:** Develop test cases and perform various testing using any one of the testing tools	15	Up to K5	CO4
V	**Estimation :** Software project Estimation - Empirical Estimation models - Risk management : Software	15	Up to K5	CO5

	Risks - Risk Identification - Risk Projection - Risk Mitigation, Monitoring and Management - Quality Management: Quality Concepts - Quality Assurance –SoftwareRelaibility QualityStandards.CaseStudy :Devops Tools **Exercise:** Perform Estimation of effort using FP Estimation for chosen system and prepare Gantt Chart/PERT Chart for the same.			

Text Books:

1. Roger Pressman.S., (2005).*"Software Engineering: A Practitioner's Approach"*, 6th Edition. Mcgraw Hill.

Reference Book(s)

1. Richard Failey,(2004). *"Software Engineering Concepts"*.Tata McGraw-Hill.
2. P. Fleeger,(1999). *"Software Engineering"*.Prentice Hall.
3. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli,(1991). *"Fundamentals ofSoftwareEngineering"*.Prentice Hall Of India.
4. Sommerville,(1996). *"Software Engineering"* 5th Edition: Addison Wesley.

Websites and e-Learning resources

1. http://productdevelop.blogspot.in/2011/03/what-are-formal-technical-reviews-ftr.html
2. http://basicqafundamentals.blogspot.in/2011/03/difference-between-alpha-testing-beta.html
3. https://www.wiziq.com/tutorials/software-engineering
4. http://www.jkinfoline.com/software-engineering.html
5. http://www.freetutes.com/systemanalysis/
6. http://www.softwaretestingstuff.com/2007/09/white-box-testing.html (Unit IV : White Box Testing)

Rationale for nature of Course:

- **Knowledge and Skill:** Software developer skills are mathematical knowledge and a capacity for problem-solving to write source code, which is the sequence of words and symbols that allows a program to function.

- **Activities to be given:** Software engineers spend their day solving problems in web applications and programs, writing code, attending meetings, and collaborating with their peers.

COURSE OUTCOMES:

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

COs	CLO Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CO1	Recognize the software process models including the specification, design, implementation, and testing for a software project	K4
CO2	Use recent and advanced tools necessary for software project development, testing, management and reuse	K4
CO3	Compare and contrast various design, testing and quality issues	K4
CO4	Prioritize the requirements and risk accordingly that meet user expected performance, maintenance and quality	K5
CO5	Design software projects with well-defined architecture, modules, components and interfaces	K5

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	**3**	**2**	**2**	**3**	**3**	**2**
CLO2	**3**	**2**	**2**	**3**	**3**	**2**
CLO3	**3**	**2**	**3**	**2**	**3**	**3**
CLO4	**3**	**3**	**2**	**3**	**3**	**3**
CLO5	**3**	**3**	**3**	**2**	**3**	**3**

Annexure - 2

LESSON PLAN:

UNIT	Course Content	No. of Hours	Course Objectives	Mode of Teaching
I	**Introduction:** A Generic View of Process - Process Models: The Waterfall Model-Incremental Model-Evolutionary Model-Specialized Model-The Unified Process-Agile Process - Agile process Models **Exercise:** Choose any one project and do the following exercises for the chosen project a. Student Result Management System b. Library management system c. Online course reservation system d. Railway reservation system e. Recruitment system f. Stock Maintenance System Write the Problem Statement for a suggested system of relevance	15	CO1	Chalk and Talk, PPT, quiz, on the spot test
II	**System Engineering:** System Engineering Hierarchy - System Modeling - Requirements Engineering: Tasks- Initiating The Process-Eliciting Requirements-Developing Use Cases- Negotiating Requirements-Validating Requirements - Building the Analysis Models: Data modeling concepts - Scenario based - Flow oriented - Class based Modeling **Exercise:** Preparation of Software Requirement Specification Document	15	CO2	Chalk and Talk, PPT, quiz, on the spot test
III	**Design Engineering:** Design Concepts - Design Models - Pattern Based Design - Architectural Design - Component Level Design: Component - Class Based and Conventional Components Design - User Interface Design: Analysis and Design	15	CO3	Chalk and Talk, PPT, quiz, on the spot test

	Exercise: Draw DFD and Use Case diagram for the chosen project using any CASE tools			
IV	**Testing Strategies:** Software Testing - Strategies: Conventional - Object Oriented - Validation Testing - System Testing: Recovery - Security - Stress - Performance - Testing Tactics: Testing Fundamentals- Black Box - White Box - Basis Path- Control Structure **Exercise:** Develop test cases and perform various testing using any one of the testing tools	15	CO4	Chalk and Talk, PPT, quiz, on the spot test
V	**Estimation :** Software project Estimation - Empirical Estimation models - Risk management : Software Risks - Risk Identification - Risk Projection - Risk Mitigation, Monitoring and Management - Quality Management: Quality Concepts - Quality Assurance –Software Reliability Quality Standards. Case Study :Devops Tools **Exercise:** Perform Estimation of effort using FP Estimation for chosen system and prepare Gantt Chart/PERT Chart for the same.	15	CO5	Seminar, PPT presentation
	Total	**75**		

Course Designer
Mrs.R.Boomadevi