DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE & Affiliated to Anna University, Chennai)
Re-Accredited by NAAC with 'A' Grade
Accredited by NBA for AERO, BME, CSE, ECE, EEE, IT & MECH.
PERAMBALUR-621212, TAMILNADU, INDIA.
Website: www.dsengg.ac.in

M.E COMPUTER SCIENCE AND ENGINEERING REGULATIONS – 2023

Name of the Faculty				
Designation/Department	AP/CSE			
Course Code/Name	**P23CST24- ADVANCED SOFTWARE ENGINEERING**			
Year/Section/Department	I/A/CSE			
Credits Details	L: 3	T: 0	P: 0	C:3
Total Contact Hours Required	45			

Syllabus:

UNIT I - SOFTWARE PROCESS MODELS AND PRINCIPLES	**No. of Periods: 9**
Software Process Models: Waterfall, V-model, Spiral iterative and incremental-Componentbased development, Fourth Gen Techniques, Introduction to Agile Software Development, AgilePrinciples and Practices, Extreme Programming	
UNIT II - MODELLING REQUIREMENTS AND DESIGN	**No. of Periods: 9**
Software Requirements Engineering, Software Architecture: Architectural Tactics and PatternsArchitecture in the Life Cycle: Architecture and Requirements. Designing Architecture. Object Oriented Design, Design principles DFD, UML tools, OOD metrics, Overview of Design Patterns	
UNIT III - SOFTWARE VALIDATION	**No. of Periods: 9**
Introduction to Software Verification Validation, levels of testing, types of testing, Black box design techniques, White box design techniques, statement coverage, decision coverage, condition coverage, Static Review process. Functional non-functional testing. Software Maintenance - Software Maintenance, Software Configuration Management.	
UNIT IV - SOFTWARE REUSE	**No. of Periods: 9**
euse based Software Engineering Approaches supporting software reuse Application Frame works Commercial-Of-The-Shelf (COTS) systems: COTS Solution Systems, COTS Integrated Systems. Component-Based Software Engineering (CBSE) Components, Component Models CBSE Processes: CBSE for Reuse, CBSE with Reuse Component based Development Component Qualification, Adaptation, and Composition Economics of CBSE.	
UNIT V - ASPECT ORIENTED SOFTWARE DEVELOPMENT	**No. of Periods: 9**
Introduction to Aspect-Oriented Software Development (AOSD): Aspect-Orientation in the Software Life cycle Developing Software components with Aspects. Insight into Mashup in Software Engineering Categorization of Mashup Enterprise Mashups - Principles of lean, Insight into Lean software development principles. Social Software Engineering	

TOTAL: 45 PERIODS

Objectives:

1. To give an overview of fundamentals of software process models and principles.
2. To describe the essentials of software Engineering concepts related to requirements, modeling, deriving distributed architecture, software validation and reuse
3. To establish foundation on concepts of aspect-oriented development and recent trends and tools.

Text Book:

T1- **Ian Goodfellow, Yoshua Bengio, Aaron Courville**, *Deep Learning*, MIT Press, 2016..
T2 - **Francois Chollet**, *Deep Learning with Python*, 2nd Edition, Manning Publications, 2021..
T3 **Michael Nielsen**, *Neural Networks and Deep Learning*, Determination Press, 2015.

Reference Book:

R1. Andrew S. Tanenbaum & David J. Wetherall, *Computer Networks*
R2. Douglas E. Comer, Internetworking *with TCP/IP*.
R3.Charlie Kaufman, Radia Perlman, Mike Speciner**,** *Network Security: Private Communication **in** a Public World*

Website:

W1: https://www.statlect.com/probability-distributions
W2: https://www.khanacademy.org/math/statistics-probability
W3: https://stattrek.org/probability/probability-rules.aspx
W4: https://www.geeksforgeeks.org/probability-in-maths//

Online Mode of Study:

W1: https://onlinecourses.nptel.ac.in/noc24_ma23/preview
W2: https://www.coursera.org/courses?query=probability%20and%20statistics
W3: https://www.khanacademy.org/math/statistics-probability
W4: https://stattrek.org/statistics/tutorials.aspx
W5: https://www.statlect.com/

Course Plan:

Topic Number	Topic	Reference Detail	Page Number	Mode of teaching	Number of Periods Required	Cumulative Period
UNIT I - SOFTWARE PROCESS MODELS AND PRINCIPLES						**9**
1	Software Process Models: Waterfall Model	T1	1-5	BB	1	1
2	V-Model	T1	6-10	BB	1	2
3	Spiral Model	T1	11-15	BB	1	3
4	Iterative and Incremental Models	T1	16-20	BB	1	4
5	Iterative and Incremental Models	T1	21-25	BB	1	5

6	Fourth Generation Techniques	T1	26-30	BB	1	6
7	Introduction to Agile Software Development	T1	31-35	BB	1	7
8	Introduction to Agile Software Development	T1	36-40	BB	1	8
9	Extreme Programming (XP)	T1	41-45	BB	1	9

Outcome of Unit I:

At the end of unit, Students should be able to

- Identify appropriate process models based on the Project requirements

UNIT II -MODELLING REQUIREMENTS AND DESIGN						**9**
10	Software Requirements Engineering	T1	46-50	BB	1	10
11	Software Architecture	T1	51-55	BB	1	11
12	Architectural Tactics and Patterns	T1	56-60	BB	1	12
13	Architecture in the Life Cycle	T1	61-65	BB	1	13
14	Architecture and Requirements	T1	66-70	BB	1	14
15	Designing Architecture	R1	71-75	BB	1	15
16	Object-Oriented Design (OOD)	T1	76-80	PPT	1	16
17	Design Principles	T1	81-85	BB	1	17
18	DFD and UML Tools	T1	86-90	BB	1	18

- **Outcome of Unit II:**

  At the end of this unit, students should be able to:
- Understand the importance of having a good Software Architecture.

UNIT-III - SOFTWARE VALIDATION						**9**
19	Introduction to Software Verification and Validation	T1	91-95	BB	1	19
20	Levels of Testing	T1	96-100	BB	1	20
21	Types of Testing	T1	101-105	BB	1	21
22	Black Box Design Techniques	T1	106-110	BB	1	22
23	White Box Design Techniques	T1	111-115	BB	1	23
24	Statement Coverage	T1	116-120	BB	1	24
25	Decision Coverage	T1	121-125	BB	1	25
26	Condition Coverage	T1	126-130	BB	1	26
27	Static Review Process	T1	131-135	BB	1	27

Outcome of Unit III:

At the end of this unit, students should be able to:

- Understand the five important dimensions of dependability, namely, availability, reliability, safety, security, and resilience.

UNIT-IV- SOFTWARE REUSE						**9**
28	Reuse-Based Software Engineering	T2	136-140	BB	1	28
29	Frameworks Supporting Software Reuse	T2	141-145	BB	1	29
30	COTS Systems	T2	146-150	BB	1	30
31	COTS Solution Systems	T2	151-155	BB	1	31
32	COTS Systems	T2	156-160	BB	1	32
33	Component-Based Software Engineering (CBSE)	T2	161-165	BB	1	33
34	Components and Component Models	T2	166-170	BB	1	34
35	CBSE Processes (For Reuse & With Reuse)	T2	171-175	BB	1	35
36	Component-Based Development	T2	176-180	BB	1	36
Outcome of Unit IV: At the end of this unit, students should be able to: • Understand the basic notions of a web service, web service standards, and service-oriented architecture;						
UNIT-V - ASPECT ORIENTED SOFTWARE DEVELOPMENT						
37	Introduction to Aspect-Oriented Software Development	T2	181-185	BB	1	37
38	Aspect Orientation in Software Life Cycle	T2	186-190	BB	1	38
39	Developing Software Components with Aspects	T2	191-195	BB	1	39
40	Mashup in Software Engineering	T2	196-200	BB	1	40
41	Categorization of Mashups	T2	201-205	BB	1	41
42	Enterprise Mashups	T2	206-210	BB	1	42
43	Principles of Lean Software Development Auto encoders	T2	211-215	BB	1	43
44	Variational Auto encoder (VAE) with IoT	T2	216-220	BB	1	44
45	Social Software Engineering	T2	221-225	BB	1	45
Outcome of Unit V: At the end of this unit, students should be able to: • Be familiar with various levels of Software testing • Apply aspect oriented software development in social software engineering.						

Course Outcome:

At the end of the course the students would be able to

CO1: Identify appropriate process models based on the Project requirements

CO2: Understand the importance of having a good Software Architecture.

CO3: Understand the five important dimensions of dependability, namely, availability, reliability, safety, security, and resilience.

CO4: Understand the basic notions of a web service, web service standards, and service-oriented architecture;

CO5: Be familiar with various levels of Software testing

CO6: Apply aspect oriented software development in social software engineering.

Course Outcome Vs Program Outcome Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	2	1	-	-	-	-	-	-	-	1	-	-	2	1
CO 2	3	2	1	1	1	-	-	-	-	1	-	2	2	1
CO 3	2	1	-	-	-	-	-	-	-	1	-	-	2	1
CO 4	2	1	-	-	-	-	-	-	-	1	-	-	2	1
CO 5	2	1	-	-	-	-	-	-	-	1	1	-	2	1
CO 6	2	1	-	-	1	-	-	-	2	1	1	2	2	1
AVG	**2**	**1**	**1**	**1**	**1**	**-**	**-**	**-**	**2**	**1**	**1**	**2**	**2**	**1**

Internal Evaluation Components:

Web portal	Assignment	Components	Topic Number with Topic / Unit Details	Relevance to CO
Web portal 1	**--**	**Assessment – I (60)**	**Unit I and II**	**CO 1 & CO2**
	1	**Assignment – Handwritten (20)**	1 Explain different software process models (Waterfall, V-Model, Spiral, Incremental) with diagram. 2 Explain Extreme Programming (XP**)** with its features.	CO1
	2	**Assignment – Poster Presentation / PPT (20)**	1. Explain Software Requirements Engineering process in detail. 2 Explain architectural tactics and their role in system design..	CO2

Web portal 2	**--**	**Assessment – II (60)**	**Unit III and IV**	**CO3 & CO4**
	3	**Seminar (20)**	1 Explain software verification and validation with examples. 2 Describe software maintenance and configuration management**...**	CO3
	4	**Case Study Report (20)**	1. Explain reuse-based software engineering approaches. 2. Explain component qualification, adaptation, and composition.	CO4
Web portal 3	**--**	**Model Exam (75)**	**Unit I to V**	**CO1 to CO6**
	5	**MCQ (15)**	**Unit I to V**	**CO1 to CO6**
	-	**Course Attendance (10)**	**--**	**--**

Submission Details:

Phase 1(Before AT 1)	**Phase 2 (Before AT 2)**	**Phase 3(Before Model Exam)**
Assignment 1	**Assignment 2**	**Assignment 3**

PLAN OF ASSESSMENT TEST –DISTRIBUTION OF MARKS:

TEST	**CO- MARK WISE DISTRIBUTION**						**BLOOM'S LEVEL MARK WISE DISTRIBUTION**					
AT-1	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**	**BTL1**	**BTL2**	**BTL3**	**BTL4**	**BTL5**	**BTL6**
	37	**23**	**-**	**-**	**-**	**-**						
AT-2	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**	**BTL1**	**BTL2**	**BTL3**	**BTL4**	**BTL5**	**BTL6**
	-	**-**	**37**	**23**	**-**	**-**						
MODEL	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**	**BTL1**	**BTL2**	**BTL3**	**BTL4**	**BTL5**	**BTL6**
	20	**20**	**20**	**20**	**10**	**10**						

Prepared By **Verified By**

Approved By