



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad -500 043

## INFORMATION TECHNOLOGY

### COURSE DESCRIPTOR

<b>Course Title</b>	<b>SOFTWARE PROCESS AND PROJECT MANAGEMENT</b>				
<b>Course Code</b>	AIT512				
<b>Programme</b>	B.Tech				
<b>Semester</b>	VI	IT			
<b>Course Type</b>	Elective				
<b>Regulation</b>	IARE - R16				
<b>Course Structure</b>	<b>Theory</b>			<b>Practical</b>	
	<b>Lectures</b>	<b>Tutorials</b>	<b>Credits</b>	<b>Laboratory</b>	<b>Credits</b>
	3	-	3	-	-
<b>Chief Coordinator</b>	Mr. E. Sunil Reddy, Assistant Professor				
<b>Course Faculty</b>	Mr. E. Sunil Reddy, Assistant Professor				

#### I. COURSE OVERVIEW:

The course focuses on more advanced Software Engineering topics which provide the overall software development life cycle and adopt suitable processes required. The course includes Analyze, prioritize, and manage requirements, Estimate efforts required, plan, and track the plans, configuration and quality management techniques.

#### II. COURSE PRE-REQUISITES:

Level	Course Code	Semester	Prerequisites	Credits
UG	ACS008	IV	Software Engineering	4

#### III. MARKSDISTRIBUTION:

Subject	SEE Examination	CIA Examination	Total Marks
Software Process and Project Management	70 Marks	30 Marks	100

#### IV. DELIVERY / INSTRUCTIONAL METHODOLOGIES:

✗	Chalk & Talk	✓	Quiz	✓	Assignments	✗	MOOCs
✓	LCD / PPT	✓	Seminars	✗	Mini Project	✓	Videos
✗	Open Ended Experiments						

#### V. EVALUATION METHODOLOGY:

The course will be evaluated for a total of 100 marks, with 30 marks for Continuous Internal Assessment (CIA) and 70 marks for Semester End Examination (SEE). Out of 30 marks allotted for CIA during the semester, marks are awarded by taking average of two CIA examinations or the marks scored in the make-up examination.

**Semester End Examination (SEE):** The SEE is conducted for 70 marks of 3 hours duration. The syllabus for the theory courses is divided into five modules and each module carries equal weightage in terms of marks distribution. The question paper pattern is as follows. Two full questions with “either” or “choice” will be drawn from each module. Each question carries 14 marks. There could be a maximum of two sub divisions in a question.

The emphasis on the questions is broadly based on the following criteria:

50 %	To test the objectiveness of the concept.
50 %	To test the analytical skill of the concept OR to test the application skill of the concept.

#### Continuous Internal Assessment (CIA):

CIA is conducted for a total of 30 marks (Table 1), with 25 marks for Continuous Internal Examination (CIE), 05 marks for Quiz/ Alternative Assessment Tool (AAT).

Table 1: Assessment pattern for CIA

Component	Theory		Total Marks
	CIE Exam	Quiz / AAT	
CIA Marks	25	05	30

#### Continuous Internal Examination (CIE):

Two CIE exams shall be conducted at the end of the 8th and 16th week of the semester respectively. The CIE exam is conducted for 25 marks of 2 hours duration consisting of two parts. Part–A shall have five compulsory questions of one mark each. In part–B, four out of five questions have to be answered where, each question carries 5 marks. Marks are awarded by taking average of marks scored in two CIE exams.

#### Quiz / Alternative Assessment Tool (AAT)

Two Quiz exams shall be online examination consisting of 25 multiple choice questions and are to be answered by choosing the correct answer from a given set of choices (commonly four). Marks shall be awarded considering the average of two quizzes for every course. The AAT may

includeseminars, assignments, term paper, open ended experiments, five minutes video and MOOCs.

#### VI. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes (POs)		Strength	Proficiency assessed by
PO 1	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	1	Term Paper
PO 2	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences	2	Seminar
PO 9	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	2	Presentation on real-world problems
PO11	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	3	Seminar

**3 = High; 2 = Medium; 1 = Low**

#### VII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes (PSOs)		Strength	Proficiency assessed by
PSO 1	<b>Professional Skills:</b> To produce engineering professional capable of synthesizing and analyzing mechanical systems including allied engineering streams.	1	Seminar
PSO 2	<b>Software Engineering Practices:</b> An ability to adopt and integrate current technologies in the design and manufacturing domain to enhance the employability.	3	Presentation on real-world problems
PSO 3	<b>Successful Career and Entrepreneurship:</b> To build the nation, by imparting technological inputs and managerial skills to become technocrats.	1	Seminar

**3 = High; 2 = Medium; 1 = Low**

#### VIII. COURSE OBJECTIVES :

The course should enable the students to:	
I	Understand overall software development life cycle and adopt suitable processes..
II	Analyze, prioritize, and manage both functional and quality requirements.
III	Estimate efforts required, plan, and track the plans.
IV	Understand and apply configuration and quality management techniques.

**IX. COURSE OUTCOMES (COs):**

<b>COs</b>	<b>Course Outcome</b>	<b>CLOs</b>	<b>Course Learning Outcome</b>
CO 1	Describe the concept of Software Development Life Cycle and analyze the concepts of processes, TSP, PSP.	CLO 1	Describe the basic concepts of Software Development Life Cycle.
		CLO 2	Summarize the concept of processes.
		CLO 3	Analyze the concepts of Personal Software Process (PSP), Team Software Process (TSP).
		CLO 4	Use the concept of agile processes in real-world problems.
CO 2	Determine the functional requirements, elicitation techniques and Quality Attribute workshop, ACDM, documentation, and specification, change management and traceability of requirements	CLO 5	Determine the Functional requirements and quality attributes..
		CLO 6	Understand elicitation techniques, Quality Attribute Workshop (QAW).
		CLO 7	Determine the analysis, prioritization, and trade off
		CLO 8	Use Architecture Centric Development Method (ACDM).
		CLO 9	Illustrate the documentation, and specification.
		CLO 10	Describe the change management and traceability of requirements.
CO 3	Understand Estimation, Planning, And Tracking	CLO 11	Explain software risks.
		CLO 12	Understand the concept of function points, COCOMO II, estimations
		CLO 13	Understand the Work break down structure, macro and micro plans
		CLO 14	Understand the planning poker, wideband Delphi
		CLO 15	Summarize the tracking the plan, Earned Value Method (EVM)
CO 4	Explore the concept of Configuration And Quality Management.	CLO 16	Identifying artifacts to be configured, naming conventions
		CLO 17	Understand the version control, configuration control, quality assurance techniques.
		CLO 18	Summarize the concept of peer reviews, Fagan inspection
		CLO 19	Apply testing of unit, registration, system, and acceptance, test data and test cases..
		CLO 20	Understand the bug tracking, casual analysis.
CO 5	Use of Software Process Definition And Management.	CLO 21	Use Process elements, process architecture.
		CLO 22	Usage of Process relationship between elements, process modeling.
		CLO 23	Use of the process definition techniques ETVX, CMMI, sixsigma.

**X. COURSE LEARNING OUTCOMES (CLOs):**

<b>CLO Code</b>	<b>CLO's</b>	<b>At the end of the course, the student will have the ability to:</b>	<b>PO's Mapped</b>	<b>Strength of Mapping</b>
AIT512.01	CLO 1	Describe the basic concepts of Software Development Life Cycle.	PO 1	1
AIT512.02	CLO 2	Summarize the concept of processes.	PO 2	2

<b>CLO Code</b>	<b>CLO's</b>	<b>At the end of the course, the student will have the ability to:</b>	<b>PO's Mapped</b>	<b>Strength of Mapping</b>
AIT512.03	CLO 3	Analyze the concepts of Personal Software Process (PSP), Team Software Process (TSP).	PO 11	3
AIT512.04	CLO 4	Use the concept of agile processes in real-world problems.	PO 11	3
AIT512.05	CLO 5	Determine the Functional requirements and quality attributes,.	PO 2	2
AIT512.06	CLO 6	Understand elicitation techniques, Quality Attribute Workshop (QAW).	PO 2	2
AIT512.07	CLO 7	Determine the analysis, prioritization, and trade off	PO 2	2
AIT512.08	CLO 8	Use Architecture Centric Development Method (ACDM).	PO 2	2
AIT512.09	CLO 9	Illustrate the documentation, and specification.	PO 9	2
AIT512.10	CLO 10	Describe the change management and traceability of requirements.	PO 9	2
AIT512.11	CLO 11	Explain software risks.	PO 2	2
AIT512.12	CLO 12	Understand the concept of function points, COCOMO II, estimations	PO 2	2
AIT512.13	CLO 13	Understand the Work break down structure, macro and micro plans	PO 9	2
AIT512.14	CLO 14	Understand the planning poker ,wideband Delphi	PO 1	1
AIT512.15	CLO 15	Summarize the tracking the plan ,Earned Value Method (EVM)	PO 1	1
AIT512.16	CLO 16	Identifying artifacts to be configured, naming conventions	PO 1, PO 2	2
AIT512.17	CLO 17	Understand the version control, configuration control, quality assurance techniques.	PO 1, PO 2	2
AIT512.18	CLO 18	Summarize the concept of peer reviews, Fagan inspection	PO 1, PO 2	2
AIT512.19	CLO 19	Apply testing of unit, registration, system, and acceptance, test data and test cases..	PO 9, PO 11	3
AIT512.20	CLO 20	Understand the bug tracking, casual analysis.	PO 9, PO 11	3
AIT512.21	CLO 21	Use Process elements, process architecture.	PO 11	3
AIT512.22	CLO 22	Usage of Process relationship between elements, process modeling.	PO 11	3
AIT512.23	CLO 23	Use of the process definition techniques ETVX, CMMI, sixsigma.	PO 11	3

**3= High; 2 = Medium; 1 = Low**

#### **XI. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES**

<b>Course Outcomes (COs)</b>	<b>Program Outcomes (POs)</b>						
	<b>PO 1</b>	<b>PO 2</b>	<b>PO 9</b>	<b>PO11</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
CO 1	1	2	-	3	1	-	1
CO 2	-	2	2	3	-	-	-
CO 3	1	2	2	-	1	3	-

Course Outcomes (COs)	Program Outcomes (POs)						
	PO 1	PO 2	PO 9	PO11	PSO1	PSO2	PSO3
CO 4	2	2	3	3	1	-	-
CO 5	-	-	-	3	-	-	-

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**XII. MAPPING COURSE LEARNING OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:**

Course Learning Outcomes (CLOs)	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO 1	1												1		1
CLO 2		2													
CLO 3											3		1	3	
CLO 4											3		1		
CLO 5		2													
CLO 6		2													
CLO 7		2													1
CLO 8		2													
CLO 9									2					3	
CLO 10									2						
CLO 11		2											1		1
CLO 12		2											1		
CLO 13									2						
CLO 14	1														1
CLO 15	1														
CLO 16	2	2											1		
CLO 17	2	2											1		
CLO 18	2	2											1		
CLO 19									3		3		1		
CLO 20									3		3		1	3	

Course Learning Outcomes (CLOs)	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO 21												3			
CLO 22												3			1
CLO 23												3			

3 = High; 2 = Medium; 1 = Low

### XIII. ASSESSMENT METHODOLOGIES–DIRECT

CIE Exams	PO1, PO2,PO9 PO11,PSO1, PSO2,PSO3	SEE Exams	PO1, PO2,PO9 PO11,PSO1, PSO2,PSO3	Assignme nts	-	Seminars	PO1, PO2, PO9,PSO1
Laboratory Practices	-	Student Viva	-	Mini Project	-	Certification	-
Term Paper	PO1, PO2, PO9,PSO1						

### XIV. ASSESSMENT METHODOLOGIES-INDIRECT

✓	Early Semester Feedback	✓	End Semester OBE Feedback
✗	Assessment of Mini Projects by Experts		

### XV. SYLLABUS

<b>Unit-I</b>	<b>DEVELOPMENT LIFE CYCLE PROCESSES</b>
Overview of Software Development Life Cycle, introduction to processes, Personal Software Process(PSP), Team Software Process(TSP), unified processes, agile processes, choosing the right process.	
<b>Unit-II</b>	<b>REQUIREMENTS MANAGEMENT</b>
Functional requirements and quality attributes, elicitation techniques, Quality Attribute Workshop (QAW), analysis, prioritization, and trade off, Architecture Centric Development Method (ACDM), requirements, documentation, and specification, change management, traceability of requirements.	
<b>Unit-III</b>	<b>ESTIMATION, PLANNING, AND TRACKING</b>
Identifying and prioritizing risks, risk mitigation plans, estimation techniques, use case points, function points, COCOMO II, top down estimation, bottom up estimation. Work break down structure, macro and micro plans, planning poker, wideband Delphi, documenting the plan, tracking the plan, Earned Value Method (EVM).	
<b>Unit-IV</b>	<b>CONFIGURATION AND QUALITY MANAGEMENT</b>
Identifying artifacts to be configured, naming conventions and version control, configuration control, quality assurance techniques, peer reviews, Fegan inspection, unit, registration, system, and acceptance testing, test data and test cases, bug tracking, casual analysis	
<b>Unit-V</b>	<b>SOFTWARE PROCESS DEFINITION AND MANAGEMENT</b>
Process elements, process architecture, relationship between elements, process modeling, process definition techniques, ETVX (Entry-Task-Validation-exit), process baselining, process assessment and improvement, CMMI, six sigma.	

<b>Text Books:</b>
<ol style="list-style-type: none"> <li>1. Pankaj Jalote, “Software Process Management in Practice”, Pearson, Illustrated, 2002.</li> <li>2. Walker Royce, “Software Project Management – A Unified Framework”, Pearson Education, 1<sup>st</sup> Edition, 2002.</li> </ol>
<b>Reference Books:</b>
<ol style="list-style-type: none"> <li>1. Watts S.Humphrey, “PSP: A Self Improvement Process for Software Engineers”, Addison Wesley, 1<sup>st</sup> Edition, 2005.</li> <li>2. Chris F. Kemerer, “Software Project Management- Readings and Cases”, McGraw-Hill, Illustrated Edition, 1997.</li> <li>3. Watts S. Humphrey, “Introduction to the Team Software Process”, Addison-Wesley, Illustrated Reprint, 2000</li> </ol>

## XVI. COURSE PLAN:

The course plan is meant as a guideline. Probably there may be changes.

Lecture No	Topics to be covered	Course Learning Outcomes (CLOs)	Reference
1	Describe the basic concepts of Software Development Life Cycle.	CLO 1	T1
2-3	Summarize the concept of processes.	CLO 2	T1
4-5	Analyze the concepts of Personal Software Process (PSP), Team Software Process (TSP).	CLO 2	T1
6-7	Use the concept of agile processes in real-world problems.	CLO 3	T1
8-9	Determine the Functional requirements and quality attributes.	CLO 3	T2
10-11	Understand elicitation techniques, Quality Attribute Workshop (QAW).	CLO 3	T2
12-13	Determine the analysis, prioritization, and trade off	CLO 5	T2
14-15	Use Architecture Centric Development Method (ACDM).	CLO 7	T2
16-18	Illustrate the documentation, and specification.	CLO 9	T2
19-20	Describe the change management and traceability of requirements.	CLO 13	T2
21-22	Explain software risks.	CLO 13	T2
23	Understand the concept of function points, COCOMO II, estimations	CLO 15	T2
24-25	Understand the Work break down structure, macro and micro plans	CLO 15	T2
26-27	Understand the planning poker ,wideband Delphi	CLO 11	T2
28	Summarize the tracking the plan ,Earned Value Method (EVM)	CLO 16	T2
29	Identifying artifacts to be configured, naming conventions	CLO 16	T2
30	Understand the version control, configuration control, quality assurance techniques.	CLO 16	T2
31-33	Summarize the concept of peer reviews, Fagan inspection	CLO 16	T2
34	Apply testing of unit, registration, system, and acceptance, test data and test cases..	CLO 17	T2



Lecture No	Topics to be covered	Course Learning Outcomes (CLOs)	Reference
35	Understand the bug tracking, casual analysis.	CLO 17	T2
36	Use Process elements, process architecture.	CLO 19	T1
37	Usage of Process relationship between elements, process modeling.	CLO 19	T1
38	Use of the process definition techniques ETVX,CMMI,six sigma.	CLO 20	T1
39	Describe the basic concepts of Software Development Life Cycle.	CLO 20	T1
40-41	Summarize the concept of processes.	CLO 21	T1
42	Analyze the concepts of Personal Software Process (PSP), Team Software Process (TSP).	CLO 22	T1
43	Use the concept of agile processes in real-world problems.	CLO 23	T1
44-45	Determine the Functional requirements and quality attributes.	CLO 23	T1

**XVII. GAPS IN THE SYLLABUS-TO MEET INDUSTRY / PROFESSION REQUIREMENTS:**

S No	Description	Proposed Actions	Relevance With Pos	Relevance With Psos
1	To improve standards and analyze the concepts.	Seminars	PO 1	PSO 1
2	software project management best practices	Seminars / NPTEL	PO 9	PSO 1
3	Encourage students to apply real time applications and CMM levels.	NPTEL	PO 2	PSO 1

**Prepared by:**

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