Department of Information Technology

Software Process and Project Management

I M.Tech -I Sem

G.Karuna
Asst. Professor
J.B.Institute of Engineering & Technology
Yenkapally, Moinabad(Mandal)
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J.B.Institute of Engineering & Technology

Department of Information Technology

Results Target

Total Strength of the Class: 18

S. No	Class / Division	No. of Students
a.	**First Class with Distinction**	
b.	**First Class**	
c.	**Pass Class**	

Method of Evaluation

a.	**Internal Examination**	**2**
b.	**Final Examination**	**1**

Course Objective

The software industry is widely developing new methods for managing the complexity of software projects. While software technologies, processes and methods have advanced rapidly, software engineering remains a people-intensive process. The objective of this course is to capture a software management perspective that gives a balanced view of the elements such as theory and practice, technology and people, customer value and provider profitability, strategies and tactics. And understanding of different stages of maturity and different conditions that determine where one can hope to be the key to growth i.e. chaotic software development to more controlled and manageable process. This course mainly includes Software process maturity, software process models such as CMM, PCMM, PSP, TSP, software management renaissance, software management process framework and software management disciplines to produce improved and quality software from industry.

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Syllabus

Subject Name : Software Process and Project management
Class : I M.Tech I Sem

Sl.No.	Unit No.	Topics of the Unit
1	**Unit – I**	**Software Process Maturity:** Software maturity Framework**,** Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process. **Process Reference Models:** Capability Maturity Model (CMM)**,** CMMi, PCMM, PSP, TSP.
2	**Unit – II**	**Software Project Management Renaissance :** Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way.
3	**Unit – III**	**Life-Cycle Phases and Process artifacts:** Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model based software architectures. **Workflows and Checkpoints of process:** Software process workflows, Iteration workflows, Major milestones, minor milestones, periodic status assessments.
4	**Unit – IV**	**Process Planning and Project Organizations:** Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning, line-of- business organizations, project organizations, evolution of organizations, process automation.
5	**Unit – V**	**Project Control and process instrumentation:** The seven core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation. **CCPDS-R Case Study and Future Software Project Management Practices:** Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions

Guidelines to Students

Where will this subject help?

1. Management of quality software production.
2. Controlling, Measuring and Improvement of Software process methods.

Books / Material

Text Books : (TB)
TB 1: Managing the Software Process,*Watts S. Humphrey*, Pearson Education,1999
TB 2 : Software Project Management,*Walker Royce*,Pearson Education,1998

Suggested / Reference Books (RB)
RB1: Software Requirements by Karl E. Weigers,Microsoft Press.
RB2: Managing Software Requirements, Dean Leffingwell & Don Widrig, Pearson Education,2003.
RB3: Mastering the requirements process, second edition, Suzanne Robertson & James Robertson, Pearson Education, 2006.
RB4: Estimating Software Costs, Second edition, Capers Jones, Tata McGraw-Hill, 2007.
RB5: Practical Software Estimation, M.A. Parthasarathy, Pearson Education, 2007.
RB6: Measuring the software process, William A. Florac & Anita D. Carleton, Pearson Education,1999.

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Course Schedule :

Subject Name : Software Process and Project management
Class : I M.Tech I Sem **Faculty Name :** Mrs. G.Karuna

Number of Hours / lectures available in this Semester / Year : 65

Distribution of Hours Unit -wise

Unit	Topic	Total No. of Hours
I	**Software Process Maturity:** Software maturity Framework**,** Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process. **Process Reference Models:** Capability Maturity Model (CMM)**,** CMMi, PCMM, PSP, TSP.	**14**
II	**Software Project Management Renaissance :** Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way.	**11**
III	**Life-Cycle Phases and Process artifacts:** Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model based software architectures. **Workflows and Checkpoints of process:** Software process workflows, Iteration workflows, Major milestones, minor milestones, periodic status assessments.	**14**
IV	**Process Planning and Project Organizations:** Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning, line-of- business organizations, project organizations, evolution of organizations, process automation.	**12**

V	**Project Control and process instrumentation:** The seven core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation. **CCPDS-R Case Study and Future Software Project Management Practices:** Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions	**14**
	TOTAL	**65**

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Topic-wise coverage:

Subject Name : Software Process and Project management
Class : I M.Tech I Sem **Faculty Name :** Mrs.G.Karuna

Unit I: Software Process Maturity & Process Reference Models

Learning Objectives:

This unit gives a way, how an organization can improve through five maturity levels, the principles of software process change in launching an improvement, how to assess software organizations and how the results are used to determine priority needs for improvement.

Lesson Plan:

Total no. of classes: 14

S.No	Name of the Topic	Reference book code	No. of classes required
1	Software maturity Framework	TB1,RB2	2
2	Principles of Software Process Change	TB1,RB2	1
3	Software Process Assessment	TB1,RB2	2
4	The Initial Process, The Repeatable Process	TB1,RB2	2
5	The Defined Process	TB1,RB2	1
6	The Managed Process, the Optimizing Process	TB1,RB2	2
7	Capability Maturity Model (CMM)	TB1,RB6	1
8	CMMi, PCMM	TB1,RB6	1
9	PSP, TSP	TB1,RB3	2

DESCRIPTIVE QUESTIONS :

1. Explain about various process maturity levels for improvement of a software process.
2. Enumerate basic principles of software process change.
3. Mention various critical elements of software Quality Management system.
4. Enumerate and explain different process Definition Techniques.
5. What is meant by software process meturity? Discuss the software meturity Frame work.
6. Discuss the following process reference models:
   a) PCMM
   b) IDEAL.

ASSIGNMENT QUESTIONS:

1. Explain process maturity levels with neat diagram.
2. Explain maturity levels in CMM with a neat diagram.
3. What are the six basic principles of software process change? Explain.
4. Briefly explain Assessment process in software process Assessment.
5. Enumerate various steps in software standards Development Process.
6. Explain about CMMi Process reference model.
7. Write notes on configuration Management Process.

Unit II: Software Project Management Renaissance

Learning Objectives:

The software industry is experiencing a renaissance. Many software engineering principles are replaced by better techniques i.e advanced level of automation. This unit mainly introduces the current state of practice in the software industry before attempting to transition to new one.

Lesson Plan:

Total no. of classes: 11

S.No	Name of the Topic	Reference book code	No. of classes required
1	Conventional Software Management	TB2,RB2	2
2	Evolution of Software Economics	TB2,RB2	2
3	Improving Software Economics	TB2,RB2	3
4	The old way	TB2,RB3	2
5	The new way	TB2,RB3	2

DESCRIPTIVE QUESTIONS :

1. Explain about important trends in improving software economics.
2. Conventional software economics provides a benchmark of performance for onventional software management principles. Explain.
3. a) What are the drawbacks of waterfall model?
   b) Based on what parameters software cost can be estimated? Explain.
4. Mention various modern process approaches for solving conventional problems.
5. List advantages and drawbacks of custom software in comparison with commercial components.
6. Explain principles of software management.

ASSIGNMENT QUESTIONS:

1. What is meant by software economics? Discuss in detail the evolution of software economics.
2. Discuss clearly the pragmatic software cost estimation.
3. What is meant by Software Project Management? Discuss its importance.
4. Discuss clearly about reducing software product size and improving the team effectiveness.
5. Mention the principles of conventional software engineering.

Unit III: Life-Cycle Phases and Process artifacts , Workflows and Checkpoints of process

Learning Objectives:

This unit mainly deals with the process framework standards such as life-cycle phases, life-cycle artifacts, life-cycle work flows and life-cycle check points. These elements are important while making the transition from the conventional approach to an iterative, modern approach. Process standardization requires a balanced approach.

Lesson Plan:

Total no. of classes: 14

S.No	Name of the Topic	Reference book code	No. of classes required
1	Engineering and Production stages	TB2, RB3	1
2	Inception phase, elaboration phase	TB2, RB3	2
3	Construction phase, transition phase	TB2, RB6	2
4	Artifact sets, management artifacts	TB2, RB3	2
5	Engineering artifacts and pragmatic artifacts	TB2, RB3	1
6	Model based software architectures	TB2, RB6	1
7	Software process workflows	TB2, RB3	1
8	Iteration workflows	TB2, RB3	1
9	Major milestones, minor milestones	TB2, RB6	2
10	Periodic status assessments	TB2, RB3	1

DESCRIPTIVE QUESTIONS :

1. a) Give an overview of lifecycle software process Artifacts.
   b) Explain about elaboration phase in lifecycle process.
2. From Technical perspective discuss about software Architecture.
3. Describe iteration's workflow sequence.
4. What is an artifact? Discuss about engineering artifacts.
5. Discuss about Model based software architectures in Management perspective.
6. a) What are the activities of risk management?
   b) Write short notes on software life cycle models.

ASSIGNMENT QUESTIONS:

1. Enumerate various artifacts of the Project Management Process.
2. a) State and explain various artifacts of the project management process.
   b) Write brief notes on configuration management.
3. a) Explain in brief about lifecycle software process Artifacts.
   b) Enumerate the Inception phase in lifecycle process.
4. From Management perspective discuss about software Architecture
5. Describe software process workflows.

Unit IV: Process Planning and Project Organizations

Learning Objectives:

This unit deals with the major disciplines like planning, organization, automation, project control which are necessary for an effective management workflow. Another important discipline is tailoring the process framework to the specific management needs of a given project.

Lesson Plan:

Total no. of classes: 12

S.No	Name of the Topic	Reference book code	No. of classes required
1	Work breakdown structures	TB2, RB5	2
2	Planning guidelines	TB2, RB5	1
3	Cost and schedule estimating process	TB2, RB4	2
4	Iteration planning process	TB2, RB5	2
5	Pragmatic planning	TB2, RB5	1
6	Line-of- business organizations	TB2, RB4	1
7	Project organizations, evolution of organizations	TB2, RB5	2
8	Process automation	TB2, RB5	1

DESCRIPTIVE QUESTIONS :

1. a) Discuss about software process monitoring and audit.
   b) Explain about defect tracking and issue tracking.
2. Write notes on project Tracking.
3. Describe the evolution of organizations.
4. a) What is the need and contents of periodic status Assessment Reviews.
   b) Discuss about project planning using top-down and bottom-up approach.
6. a) List software Management team activities.
   b) Write about change Management team activities in interactive process.

ASSIGNMENT QUESTIONS:

1. a) What is meant by periodic status assessments?
   b) Explain clearly the interaction planning process.
2. What is meant by process automation? Discuss about automation building blocks.
3. Explain about pragmatic planning.
4. Discuss the software development team activities over the project life cycle.
5. a) List software Architecture team activities.
   b) Write about the three states of project environment.

Unit V: Project Control and process instrumentation , CCPDS-R Case Study and Future Software Project Management Practices:

Learning Objectives:

The progress toward project goals and the quality of software products must be measurable throughout the software development life cycle. The most useful metrics are extracted from the evolving artifacts. Objective analysis and automated data collection are crusial to the success of any metrics program and subjective, manual collection techniques are likely to fail. This unit gives the metrics of a software project.

Lesson Plan:

Total no. of classes: 14

S.No	Name of the Topic	Reference book code	No. of classes required
1	The seven core metrics	TB2, RB5	2
2	Management indicators	TB2, RB5	1
3	Quality indicators, life-cycle expectations	TB2, RB6	2
4	Pragmatic software metrics	TB2, RB6	2
5	Metrics automation	TB2, RB6	2
6	Modern Project Profiles	TB2, RB4	1
7	Next-Generation software Economics	TB2, RB5	2
8	Modern Process Transitions	TB2, RB5	2

DESCRIPTIVE QUESTIONS :

1. Explain about the following:
a) Quality Indicators b) Inspections and Walk throughs.
2. Explain about Project closure Analysis Report.
3. Mention and explain about future software Project management practices.
4. Describe the Next-generation software economics.
5. Explain briefly the following:
a) Seven core metrics b) Status reports
c) Defect analysis.
6. Explain briefly the following:
a) Issue Tracking b) Reviews and Inspections.

ASSIGNMENT QUESTIONS:

1. a) What are the goals of software Metrics? Discuss in detail about core Metrics.
   b) Explain process variability in technical and management dimensions with some example applications.
2. Explain features and benefits of a modern process from the point of software project manager.
3.a) What are Management indicators? Explain about quality indicators.
   b) Discuss about modern process transitions.
4. Discuss about changes in modern software economics.

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INDIVIDUAL TIME TABLE

NAME OF THE FACULTY*:* Mrs. G.Karuna

Period	**1**	**2**	**3**	**4**		**5**	**6**	**7**
Day/Time	9.00 - 9.40	9.40 - 10.30	10.30 - 11.40	11.40 - 12.30	12.30 – 1.00	1.00 - 1.50	1.50 - 2.40	2.40 - 3.30
MON								
TUE	SPPM	SPPM						
WED								
THU	SPPM	SPPM						
FRI								
SAT								

L U N C H

Software Process and Project Management:

Total no of theory classes : 04
Total no of practical classes : 00
Total no of classes : 04

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I M.Tech - I SEM (I-MID)
BRANCH: Software Engineering

SUB: Software Process and Project Management

TIME: 90 MINUTES **Marks: 40**

Answer any Four of the following: **(4X10=40M)**

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1. (a) Explain about various process maturity levels for improvement of a software process.
   (b) Enumerate basic principles of software process change.

2. Conventional software economics provides a benchmark of performance for onventional software management principles. Explain.

3. a) What are the drawbacks of waterfall model?
   b) Based on what parameters software cost can be estimated? Explain.

4. Explain about important trends in improving software economics

5. List advantages and drawbacks of custom software in comparison with commercial components.

6. Enumerate and explain different process Definition Techniques.

Marks for Internal Theory Examination

ROLL NO.	NAME OF THE STUDENT	I MID	II MID	Best