Anurag Group of Institutions

An Autonomous Institution
(Formerly CVSR College of Engineering)
Venkatapur (V), Ghatkesar (M), Ranga Reddy (Dist.)
Ph: 08499953666, 08499963666. www.anurag.edu.in

Department of Computer Science and Engineering

Course Name   : Software Engineering

Course Number   : A54027

Course Designation   : Core

Prerequisites   : Programming Language

II B Tech – II Semester
2016-2017

Mrs.G.Sudeepthi
Assistant Professor
Course Coordinator

Syllabus

Unit – I	**Introduction to Software Engineering**: The evolving role of software, Changing Nature of Software, Software myths. **A Generic view of process:** Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), personal and team process models.
Unit – II	**Process models:** The waterfall model, Incremental process models, Evolutionary process models. Agile Process. **Software Requirements**: Functional and non-functional requirements, software requirements document. **Requirements engineering process:** Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.
Unit – III	**System models**: Context Models, Behavioral models, Data models, Object models. **Design Engineering:** Design process and Design quality, Design concepts, the design model,Modeling component –level design: Designing class-based components, conducting component-level design. Performing User interface design: Golden rules.
Unit – IV	**Testing Strategies :** A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing **Product metrics:** Software Quality, Metrics for Analysis-functional based metrics, Metrics for Design Model-object oriented metrics, class oriented metrics, component design metrics, Metrics for source code, Metrics for maintenance.
Unit – V	**Metrics for Process and Products:** Metrics for software quality. **Risk management:** Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan. **Quality Management :** Quality concepts, Software Reviews, Formal technical reviews, Software reliability, The ISO 9000 quality standards.

Text Books & Reference Books

Text Books	
1.	Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition.McGrawHill International Edition.
2.	Software Engineering- Sommerville, 7th edition, Pearson education.
Suggested / Reference Books	
1	Software Engineering- K.K. Agarwal & Yogesh Singh, New Age International Publishers
2	Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, JohnWiely.
3	Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies
Other Resources	
1	http://highered.mheducation.com/sites/0072853182/information_center_view0/index.html
2	http://www.mhhe.com/engcs/compsci/pressman/student/olc/cases.mhtml

Time Table

Room No: 110/A-Block

W.E.F: 05-12-2016
To 05-04-2017

Class Hour	1	2	3	4		5	6	7
Time	9:00 -09:50	09.50 –10:40	10:40 –11:30	11:30 – 12: 20		1:10 – 2:00	2:00 – 2:50	2:50 – 3:40
MON								
TUE	II-A SE							
WED				II-A SE	12:20 – 1:10 LUNCH BREAK			
THU								
FRI	II-A SE							
SAT			II-A SE					

Programme Educational Objectives (PEO's)

1. The graduates are employable as software professionals in reputed industries.

2. The graduates analyze problems by applying the principles of computer science, mathematics and scientific investigation to design and implement industry accepted solutions using latest technologies.

3. The graduates work productively in supportive and leadership roles on multidisciplinary teams with effective communication and team work skills with high regard to legal and ethical responsibilities.

4. The graduates embrace lifelong learning to meet ever changing developments in Computer Science and Engineering.

Programme Specific Outcomes (PSOs)

1. **Professional Skill:** The ability to understand, analyze and develop software solutions.
2. **Problem-Solving Skills:** The ability to apply standard principles, practices and strategies for software development.
3. **Successful Career:** The ability to become Employee, Entrepreneur and/or Life Long Learner in the domain of Computer Science.

Programme Outcomes (PO's)

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling to complex engineering activities, with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** 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.
12. **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.

Course Outcomes:

Students will be able to:

1. Analyze and apply the framework activities for a given project.
2. Apply Right process model and identify the requirements for a given project.
3. Design various system models for a given Context.
4. Apply various testing techniques and calculate the metrics for SDLC Lifecycle.
5. Qualitatively manage the Software Project.

Mapping of Course outcomes with PO's & PEO's

Course Outcomes	PO's	PEO's
CO1	1,2,3,4,5,6,7,8,9,10,11,12	1,2,3,4
CO2	1,2,3,4,5,6,7,8,9,10,11,12	1,2,3,4
CO3	1,2,3,4,5,6,7,8,9,10,11,12	1,2,3,4
CO4	1,2,3,4,5,6,7,8,9,10,11,12	1,2,3,4
CO5	1,2,3,4,5,6,7,8,9,10,11,12	1,2,3,4

Articulation matrix of Course outcomes with PO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1	2	1	1	2	2	2	1	1
CO2	2	3	2	2	2	1	1	2	3	3	3	1
CO3	2	1	2	3	2	2	1	2	1	3	3	1
CO4	3	3	3	2	2	2	1	1	2	3	2	1
CO5	3	2	2	2	2	1	1	2	2	3	3	2

Mapping of Course outcomes with PSO's

	PSO1	PSO2	PSO3
CO1	3	3	3
CO2	3	3	3
CO3	3	3	3
CO4	3	2	2
CO5	2	3	3

Course Schedule

Distribution of Hours in Unit – Wise

Unit	Topic	Chapters		Total No. of Hours
		Book1	**Book2**	
I	Introduction to Software Engineering A Generic view of process	Ch1,2	-	11
II	Process models Software Requirements Requirements engineering process	Ch3,4,7	Ch 6	12
III	System models Design Engineering Modeling component –level design	Ch 9,10,11,12	Ch 8	14
IV	Testing Strategies Product metrics	Ch 13,15	-	10
V	Risk management Quality Management	Ch 25,26,22	--	12
Contact classes for Syllabus coverage				**59**
Online Quiz :2 Quiz for (Unit I/II/IV) ,1 Quiz for (Unit III/V) Descriptive Tests : 02 (Before Mid Examination) Revision classes :1 per unit Case study presentation-4				

Number of hours / lectures available in Semester / Year: 64

The number of topics in each unit are not the same – because of the variation, all the units have an unequal distribution of hours

Lecture Plan

S. No.	Topic	Expected Date of Completion	Actual Date of Completion	Teaching Learning Process
		Unit-I		
1	**Introduction to Software Engineering**: The evolving role of software.	6-12-2016 8-12-2016		
2	Changing Nature of Software, Software myths	09-12-2016 10-12-2016		
3	**A Generic view of process:** Software engineering- A layered technology,	13-12-2016		
		Online Quiz in Moodle		
4	process framework	15-12-2016 16-12-2016		
5	The Capability Maturity Model Integration (CMMI),	17-12-2016 20-12-2016		
6	personal and team process models	22-12-2016		
7	Revision	23-12-2016		
8		Activity-24-12-2016		
9		Online Quiz in Moodle		
		Unit-II		
1	**Process models:** The waterfall model, Incremental process models	27-12-2016 29-12-2016		
2	Evolutionary process models.	30-12-2016 03-01-2017		
3	Agile Process.	05-01-2017 06-01-2017		

4	**Software Requirements**: Functional and non-functional requirements	07-01-2017		
5	software requirements document.	19-01-2017		
	Online Quiz in Moodle			
6	**Requirements engineering process :** Feasibility studies, Requirements elicitation and analysis	20-01-2017		
7	Requirements validation, Requirements management	21-01-2017		
8	Revision	24-01-2017		
9	Online Quiz in Moodle			
10	Case Study Discussion	26-01-2017		
	Unit-III			
1	**System models**: Context Models	27-01-2017 28-01-2017		
2	Behavioral models, Data models, Object models	31-01-2017 02-02-2017		
3	Case Study Presentation	03-02-2017		
4	Case Study Presentation	04-02-2017		
5	Assigment Test-I	07-02-2017		
6	Design Engineering: Design process and Design quality	10-02-2017		
7	Design concepts, the design model	11-02-2017		
8	Modeling component –level design	14-02-2017 21-02-2017		

9	Designing class-based components, conducting component-level design	23-02-2017		
10	Performing User interface design: Golden rules	24-02-2017 25-02-2017		
11	Revision	28-02-2017		
12	Online Quiz in Moodle			
Unit-IV				
1	Testing Strategies : A strategic approach to software testing, test strategies for conventional software	02-03-2017 03-03-2017		
2	Black-Box and White-Box testing	04-03-2017		
3	Validation testing, System testing	07-03-2017		
Online Quiz in Moodle				
4	Product metrics: Software Quality, Metrics for Analysis-functional based metrics	09-03-2017 10-03-2017		
5	Metrics for Design Model-object oriented metrics	11-03-2017		
6	class oriented metrics, component design metrics	14-03-2017		
7	Metrics for source code, Metrics for maintenance	16-03-2017		
8	Revision	17-03-2017		
9	Online Quiz in Moodle			
Unit-V				
1	Metrics for Process and Products: Metrics for software quality.	18-03-2017		
2	Risk management: Reactive	21-03-2017		

	vs. Proactive Risk strategies			
3	software risks, Risk identification	21-03-2017		
4	Risk projection, Risk refinement, RMMM, RMMM Plan	23-03-2017 30-03-2017		
5	Quality Management : Quality concepts	30-03-2017		
6	Software Reviews, Formal technical reviews	24-03-2017		
7	Software reliability, The ISO 9000 quality standards.	25-03-2017		
8	Revision	28-03-2017		
9	Case Study –Presentation	31-03-2017		
10	Case Study –Presentation	01-04-2017		
11	Assignment Test –II	04-04-2017		
12	Online Quiz in Moodle			
	Total Number Of Classes : 49			

Date of Unit completion & Remarks

Unit – I
Date:
Remarks:

Unit – II
Date:
Remarks:

Unit – III
Date:
Remarks:

Unit – IV
Date:
Remarks:

Unit – V
Date:
Remarks:

Unit Wise Assignments (With different Levels of thinking – Blooms Taxonomy and Course Outcomes)

Unit – 1	
1.	List the various misbelieves in software industry give proper reasons for each.(Level- 2, CO-1)
2.	List the various misbelieves in software industry give proper reasons for each.(Level- 2, CO-1)
3.	Differentiate between PSP & TSP. Mention the various activities involved in it.(Level- 2, CO-1)
4	Illustrate the process meta model developed by SEI.(CMMI) (Level- 2, CO-1)
5	Differentiate between Process patterns vs Process assessment(Level- 3, CO-1)
Unit – 2	
1.	Compare and Contrast various process model with neat sketch(Level- 4, CO-2)
2.	Differentiate functional and nonfunctional requirements (Level- 3, CO-2)
3.	Explain requirement elicitation and analysis briefly.(Level- 2, CO-2)
4.	Explain the common process framework neatly with diagram (Level- 2, CO-2)
5	differentiate between requirements validation and requirement management (Level- 3, CO-2)
Unit – 3	
1.	Analyze the taxonomy of various architecture styles (Level- 4, CO-3)
2.	Illustrate the steps involved in conducting component level design(Level- 3, CO-3)
3.	Recall the "Golden Rules" that are basis for performing user interface design (Level- 2, CO-3)
4	Design DFD,State chart diagram,CFD & ER with neat sketch (Level- 4, CO-3)
5	Explain different design concepts involved in design engineering (Level- 2, CO-3)
Unit – 4	
1.	Illustrate the metrics for analysis and object oriented metrics (Level- 3, CO-4)

2.	What are Formal technical reviews? Explain how it will assess software design quality (Level- 2, CO-4)
3.	Define integration testing. What are the various approaches through which integration testing can be performed.(Level- 2, CO-4)
4.	Debate black box & white box testing.(Level- 4, CO-4)
5	Give the Metrics for maintenance & source code (Level- 2, CO-4)
Unit – 5	
1.	When does proactive & Reactive risks occur in project development(Level- 4,CO-5)
2.	Recall reviews. Mention types of reviews that can be conducted.(Level- 2 ,CO-5)
3.	Formulate RMMM Plan (Level- 3, CO-5)
4.	Differentiate between Statistical Software Quality Assurance vs Software Quality Assurance (Level- 3 ,CO-5)
5	Explain about different types of reviews (Level- 2 ,CO-5)

Case Studies (With Higher Levels of thinking – Blooms Taxonomy) for the academic year 2016-17 II semester

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1(Covering Syllabus Up to Mid-1)   Android Application SRS Report

Design and development of Android application for any real time problem and submit detailed report of the following
1. Problem statement
2. Identification of requirements

Note: Team of 3 Members has to be formed
        The report should not exceed 10 pages (L6)

Rubric -8 (Understanding of Engineering core)

2(Covering Entire Syllabus) Android Application Design &Test cases Report

Design and develop a Android application for any real time problem and submit detailed report of the following
1   Design of UML diagrams(usecase,class,sequence,activity,component,deployment)
2. Testing & Screen shot of application

Note: Team of 3 Members has to be formed
        The report should not exceed 10 pages (L6)

Rubric -8 (Understanding of Engineering core)

Unit – I:
1. Define Process pattern and mention various types of process patterns available in software engineering(L2)
2. Write short notes on legacy software (L2)
3. Explain the software characteristics (L2)
4. Differentiate between product line software and system software.(L3)
5. Differentiate between PSP & TSP (L3)

Unit – II:

1. List two advantages of employing Prototyping in Software process? (L2)
2. Explain the role of Agile process in software engineering(L2)
3. List the merits and demerits of RAD process model (L2)
4. Does feasibility study necessary/not? Justify your answer (L4)
5. Let us suppose a project is been assigned to "xyz"Company and it has to be delivered within less amount of time. For the above context what is the process model you choose ,justify your answer.(L4)

Unit – III:

1. What are the differences between Context models and Behavioral models? (L3)
2. Define feasibility study(L2)
3. Differentiate between cohesion and coupling (L3)
4. Differentiate between Data model and Object model (L3)
5. Using your knowledge of how an ATM is used, develop a set of use cases that could be used to derive the requirements for an ATM system. (L4)

Unit – IV:

1. Distinguish between verification and validation (L3)
2. Brief the various methods encountered in cost estimation of a project. (L2)
3. Differentiate testing and debugging(L3)
4. Explain validation testing (L2)
5. Give the Metrics for source code (L2)

Unit – V:

1. Discuss the importance of quality assurance(L2)
2. Distinguish between generic risks and product specific risks(L3)
3. Discuss about ISO 9000 quality standards(L2)
4. Identify all the risk factors in a s/w project? (L3)
5. Define what is software reliability(L2)

Tutorial Sheet

Unit-I Topics Revised	
Topic Name	**Date**

Unit-II Topics Revised	
Topic Name	**Date**

Unit-III Topics Revised	
Topic Name	**Date**

Unit-IV Topics Revised	
Topic Name	**Date**

Unit-V Topics Revised	
Topic Name	**Date**

Topics beyond Syllabus

S. No	Name of the Topic
1	Brief overview of UML Diagrams.
2	Automated Testing Tool(Bugzilla)

Course Assessment Sheet

Batch: 2015-2019

Academic Year/Sem: 2016-17/ II BTECH II SEMESTER

Course Name: SOFTWARE ENGINEERING

Course Number: A54027

Course Attainment = 75% of Direct + 25% of Indirect=

Course Attainment	Remarks

Remarks and suggestions:

1 - Slight   2 - Moderate   3 – Substantial

Course Coordinator

Blooms Taxonomy Direct

Level 1	**Remembering**	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.
Level 2	**Understanding**	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.
Level 3	**Applying**	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.
Level 4	**Analyzing**	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.
Level 5	**Evaluating**	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.
Level 6	**Creating**	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.

Course assessment sheet (MID1 & ASS1)

S.No	REG.NO	S1	S2	S3	S4	S5	L1	L2	L3	L4	L5	ASS	TOT
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Course assessment sheet (MID2 & ASS2)

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External Examination

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CSP Rubric Name & Number

S.No.	Criteria	LEVEL (Level : 3-Excellent Level :2-Good Level : 1-Poor)	
		CSP Rubric	
1	Oral Communication	3	Student speaks in phase with the given topic confidently using Audio-Visual aids. Vocabulary is good
		2	Student speaking without proper planning, fair usage of Audio-Visual aids. Vocabulary is not good
		1	Student speaks vaguely not in phase with the given topic. No synchronization among the talk and Visual Aids
2	Writing Skills	3	Proper structuring of the document with relevant subtitles, readability of document is high with correct use of grammar. Work is genuine and not published anywhere else
		2	Information is gathered without continuity of topic, sentences were not framed properly. Few topics are copied from other documents
		1	Information gathered was not relevant to the given task, vague collection of sentences. Content is copied from other documents
3	Social and Ethical Awareness	3	Student identifies most potential ethical or societal issues and tries to provide solutions for them discussing with peers
		2	Student identifies the societal and ethical issues but fails to provide any solutions discussing with peers
		1	Student makes no attempt in identifying the societal and ethical issues
4	Content Knowledge	3	Student uses appropriate methods, techniques to model and solve the problem accurately
		2	Student tries to model the problem but fails to solve the problem
		1	Student fails to model the problem and also fails to solve the problem
5	Student Participation	3	Listens carefully to the class and tries to answer questions confidently
		2	Listens carefully to the lecture but doesn't attempt to answer the questions
		1	Student neither listens to the class nor attempts to answer the questions
6	Technical and analytical Skills	3	The program structure is well organized with appropriate use of technologies and methodology. Code is easy to read and well documented. Student is able to implement the algorithm producing accurate results
		2	Program structure is well organized with appropriate use of technologies and methodology. Code is quite difficult to read and not properly documented. Student is able to implement the algorithm providing accurate results.
		1	Program structure is not well organized with mistakes in usage of appropriate technologies and methodology. Code is difficult to read and student is not able to execute the program
7	Practica	3	Independently able to write programs to strengthen the concepts covered in theory

		2	Independently able to write programs but not able to strengthen the concepts learned in theory
		1	Not able to write programs and not able to strengthen the concepts learned in theory
8	Understanding of Engineering	3	Student uses appropriate methods, techniques to model and solve the problem accurately in the context of multidisciplinary projects
		2	Student tries to model the problem but fails to solve the problem in the context of multidisciplinary projects
		1	Student fails to model the problem and also fails to solve the problem in the context of multidisciplinary projects

Course assessment sheet Indirect:
CSP Rubric Name & Number:

S.No.	Hall Ticket Number	Rubric Assessment	Remarks
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S.No.	Hall Ticket Number	Rubric Assessment	Remarks
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Indirect Assessment Sheet

Batch: 2015-2019

Academic Year/Sem: 2016-17/ II BTECH II SEMESTER

Course Name: SOFTWARE ENGINEERING

Course Number: A54024

Part A.
Case Study 1 :

Design and development of Android application for any real time problem and submit detailed report of the following
1. Problem statement
2. Identification of requirements

Note: Team of 3 Members has to be formed
     The report should not exceed 10 pages (L6)

Rubric Name: 8 (Understanding of Engineering core)

Number of Students Appeared:

Assessment	(1) Threshold value	(2) Target % of students on or above threshold	(3) Target No. of students on or above Threshold	(4) Actual % of students on or above Threshold	(5) Actual No. of students on or above Threshold	(6) Level of Attainment
Case Study						

Attainment Level $=((\text{Col.}(5) / \text{Col. } (3))*3) =$

Case Study 2 :

Design and develop a Android application for any real time problem and submit detailed report of the following
   1   Design of UML
     diagrams(usecase,class,sequence,activity,component,deployment)
     2. Testing & Screen shot of application

Note: Team of 3 Members has to be formed
     The report should not exceed 10 pages (L6

Rubric Name: 8 (Understanding of Engineering core)

Number of Students Appeared:

Assessment	(1) Threshold value	(2) Target % of students on or above threshold	(3) Target No. of students on or above Threshold	(4) Actual % of students on or above Threshold	(5) Actual No. of students on or above Threshold	(6) Level of Attainment
Case Study						

Attainment Level =((Col.(5) / Col. (3))*3) =

Attainment of Case study: (case study 1+case study2)/2=

Part B. Course End survey Report :

Assessment	(1) Threshold value	(2) Target % of students on or above threshold	(3) Target No. of students on or above Threshold	(4) Actual % of students on or above Threshold	(5) Actual No. of students on or above Threshold	(6) Level of Attainment
Course end survey						

Attainment Level =((Col.(5) / Col. (3))*3) =

Total attainment: (Part A+ Part B)/2=

Add-on Programmes (Guest Lecture/Video Lecture/Poster Presentation):

1. NPTEL Video Lectures are played on Software Testing.
2. Poster Presentation by students.
3. Presentation of Animated Videos

Unit Wise PPT's & Lecture Notes