FR. Conceicao Rodrigues College Of Engineering
Father Agnel Ashram, Bandstand, Bandra-west, Mumbai-50
Department of Computer Engineering
B.E. (Computer) (semester VI)

(2018-2019)

Course Outcomes & Assessment Plan

SUBJECT INCHARGE – SUNIL CHAUDHARI

Course Code	Course/Subject Name	Credits
CPC602	Software Engineering	05

University Syllabus:

Module	Detailed Contents	Hrs
1.	**Introduction** 1.1 Software Engineering Process Paradigms 1.2 Process Models – Incremental and Evolutionary models, 1.3 Typical Application for each model, 1.4 Agile methodology 1.5 Process and Project Metrics.	06
2.	**Software project scheduling, Control & Monitoring** 2.1 Software estimation – Empirical estimation models – Cost/Effort estimation 2.2 Planning – Work breakdown Structure, Gantt Chart. Discuss schedule and cost slippage.	04
3.	**Risk Management** 3.1 Risk Identification, Risk Assessment, Risk Projection, RMMM	04
4.	**Software Configuration Management** 4.1 Software Configuration items, SCM process, Identification of objects in software configuration, version and change control, configuration audit , status reporting, SCM standards and SCM issues.	04
5.	**Software Design Specification** 5.1 Software Design – Abstraction , Modularity 5.2 Software Architecture – Effective modular design, Cohesion and Coupling, Example of code for cohesion and coupling.	08

	5.3 User Interface Design – Human Factors, Interface standards, Design Issues – User Interface Design Process.	
6.	**Software Quality** 6.1 Software Quality Assurance – Software standards , Quality metrics Software Reliability ,Quality Measurement and Metrics	04
7.	**Software Testing** 7.1 Basic concept and terminology, Verification & validation, White Box Testing Path Testing, Control Structures Testing , DEFUSE testing, 7.2 Black Box Testing –BVA Integration, Validation and system testing. 7.3 OO testing methods Class Testing, Interclass testing, testing architecture, Behavioral testing. 7.4 Software Maintenance – Reverse Engineering.	12
8.	**Web Engineering** 8.1 For web based applications – attributes, analysis and design, testing. 8.2 Security Engineering, 8.3 Service Oriented Software Engineering. 8.4 Test Driven Development 8.5 Software engineering with aspects	06

Course Objectives:

The main objective is to introduce to the students about the product that is to be engineered and the process that provides a framework for the engineering technology.

1. To provide knowledge of software engineering discipline.
2. To analyze risk in software design and quality.
3. To introduce the concept of advance software methodology.

Course Outcomes

Upon completion of this course students will have:

CO.No	Course Outcome	Blooms Taxonomy	Explanation
CSC601.1	To compare different types of software development models and choose one based on types of application	Comprehension	Demonstrate/understanding of Software Development Models
CSC601.2	To Gather the requirements and model them using UML principles.	Analysis	Students will be able to identify problem and analyse the requirements and document them
CSC601.3	To Design Software System effectively	Application	They will apply software design principles on to make it effective and modular (Flexible)
CSC601.4	To Apply Software Testing and Maintenance Principles on given problem	Application	Apply different testing types and testing strategies for making bug free software
CSC601.5	To apply umbrella activities on software projects.	Application	Applying Umbrella Activities in different phases of core software development process to help making quality software .

CO Assessment Tools:

CPC602.1 Student will be able to compare different types of software development models and choose one based on types of application

Direct Method Tools *(dm)*	1
Test *(UT)*	0.2
Assignment *(Assign)*	0.2
Practicals *(lab)*	0.2
End Sem Marks(THEORY)*(utTH)*	0.2
End Sem Marks (ORAL)*(utOral)*	0.2
Indirect Method Tools*(idm)*	1

Course Exit Survey *(C01idm)*	
CPC602.1 = 0.8*CO1dm + 0.2* CO1idm	

CPC602.2. To Gather the requirements and model them using UML principles.

Direct Method Tools *(dm)*	**1**
Test *(UT)*	0.2
Practicals *(lab)*	0.3
End Sem Marks(THEORY)*(utTH)*	0.3
End Sem Marks (ORAL)*(utOral)*	0.2
Indirect Method Tools*(idm)*	**1**
Course Exit Survey *(C02idm)*	
CPC602.2 = 0.8*CO2dm + 0.2* CO2idm	

CPC602.3. To Design Software System effectively.

Direct Method Tools *(dm)*	**1**
Test *(UT)*	0.2
Practicals *(lab)*	0.4
End Sem Marks(THEORY)*(utTH)*	0.2
End Sem Marks (ORAL)*(utOral)*	0.2
Indirect Method Tools*(idm)*	**1**
Course Exit Survey *(C03idm)*	
CPC602.3 = 0.8*CO3dm + 0.2* CO3idm	

CPC602.4. To Apply Software Testing and Maintenance Principles on given problem

Direct Method Tools *(dm)*	1
Test *(UT)*	0.2
Assignment *(Assign)*	0.2
Practicals *(lab)*	0.2
End Sem Marks(THEORY)*(utTH)*	0.2
End Sem Marks (ORAL)*(utOral)*	0.2
Indirect Method Tools*(idm)*	1
Course Exit Survey *(C04idm)*	
CPC602.4 = 0.8*CO4dm + 0.2* CO4idm	

CPC602.5. To apply umbrella activities on software projects.

Direct Method Tools *(dm)*	1
Test *(UT)*	0.3
Assignment *(Assign)*	0.2
Practicals *(lab)*	0.2
End Sem Marks(THEORY)*(utTH)*	0.2
End Sem Marks (ORAL)*(utOral)*	0.1
Indirect Method Tools*(idm)*	1
Course Exit Survey *(C05idm)*	
CPC602.5 = 0.8*CO5dm + 0.2* CO5idm	

Course Outcomes Target:

Target Surve)	Attainment 18-19	Attainment 2017-18 (By Prof.Sunil
CPC602.1 – Target: 2.7		Attained: 2.84
CPC602.2 – Target: 2.7		Attained: 2.36
CPC602.3 – Target: 2.7		Attained: 2.68
CPC602.4 – Target: 2.7		Attained: 2.84
CPC602.5 – Target: 2.7		Attained: 2.3

Mapping of CO and PO/PSO

Relationship of course outcomes with program outcomes: Indicate 1 (low importance), 2 (Moderate Importance) or 3 (High Importance) in respective mapping cell.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CPC602.1	2	3									2		3	3
CPC602.2	2	3		1	3				2		2	3	3	3
CPC602.3	2	2	3	1	3				2		2	3	3	3
CPC602.4	2	2	3		3				2		2	3	3	3
CPC602.5	2	3			3				2		3	3	3	3

Rubrics for the Assignments:

Indicator	Average	Good	Excellent	Marks
Organization (2)	Readable with some mistakes and structured (1)	Readable with some mistakes and structured (1)	Very well written and structured without any mistakes (2)	
Level of content (4)	All major topics are covered, the information is accurate (2)	Most major and some minor criteria are included. Information is accurate (3)	All major and minor criteria are covered and are accurate (4)	
Depth and breadth of discussion and representation (4)	Minor points/information may be missing and representation is minimal (1)	Discussion focused on some of the points and covers them adequately (2)	Information is presented in depth and is accurate (4)	
Total				

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UNIT TEST - I

SEMESTER / BRANCH: **VI / COMPUTER**

SUBJECT: **Software Engineering**   MAX. MARKS: **20**

DATE: **04/02/2019**   TIME: **10:00 a.m. to 11:00 a.m.**

CSC601.1	To compare different types of software development models and choose one based on types of application
CSC601.2	To Gather the requirements and model them using UML principles.

Q1. List the Characteristics of Software Engineering and Justify, following characteristic of software "software doesn't wear out but it deteriorates".   **[5Marks] [CO1]**

Q2. Explain importance of Requirement Validation and Requirement Management in Requirement Engineering .   **[5Marks] [CO1]**

Q3. Compare between Kanban model And SCRUM Model   **[5Marks] [CO1]**

Or

Q3. Compare Spiral Model With Rapid Application Development Model.   **[5Marks] [CO1]**

Q4. Consider Following online shopping Portal.

The Customer visits the online shopping Portal. The Customer may buy item or just visit the page and logout. The Customer can select a segment, then category and brands to get different products in the desired brand. The customer can select product for purchasing. the process can be repeated for more items. Once the customer finishes selecting the product/s, the cart can be viewed. If the customer wants to edit the final cart, It can be done here. For final payment the customer has to login the portal. If the customer is visiting for the first time. He must register with the site,else customer must use login page to proceed. Final cart is submitted for payment and card details and address are to be confirmed by the customer. Customer is confirmed with shipment ID and delivery of goods within 15 days. Draw a detailed class diagram and use case diagram for above case Study.

                                        [10 Marks] [CO2]

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UNIT TEST - II

SEMESTER / BRANCH: **VI / COMPUTER**

SUBJECT: **Software Engineering**   MAX. MARKS: **20**

DATE: **08/04/2019**   TIME: **10:00 a.m. to 11:00 a.m.**

CSC601.3	To Design Software System effectively
CSC601.4	To Apply Software Testing and Maintenance Principles on given problem
CSC601.5	To apply umbrella activities on software projects.

Q1. Define role of cohesion and coupling in effective software development .Justify your answer by explaining 2 types of each. **[5Marks] [CO3]**

Q2. What is importance of cyclomatic complexity. Draw the Flow graph and Calculate e cyclomatic complexity of the following program segment using all formulas.

while (first <= last)

{

if (array [middle] < search)

        first = middle +1;

else if (array [middle] == search)

        found = True;

else last = middle – 1;

middle = (first + last)/2;

}

if (first < last) not Present = True;

Or

Q2. What are advantages of Unit Testing. Write a program for checking whether a year is leap or not. Also write   JUNIT5 test for the same considering all the possible test cases. **[5Marks][CO4]**

Q3. Only 60% of the software components planned for reuse will be integrated into the new software.The remaining functionality must be developed. Risk probability:85% (likely). 180 reusable components were planned .

If only 60% can be reused, How many components have to be developed from scratch . The average size of a component is 80 LOC and the average cost for a LOC is $85.00,What will be the overall cost (impact)?Also Calculate Risk exposure for the software. **[5Marks][CO5]**

Q4.The project avtivities ,precedence relationships and durations are described in the table. Find out the critical path of the project. Draw precedence graph Also write advantages of Critical Path Method. **[5Marks][CO5]**

Activity	Precedence	Duration(in Days)
P	--	3
Q	--	4
R	P	5
S	Q	5
T	R,S	7
U	R,S	5
V	T	2
W	U	10

List of Practical's:

#	Experiment Name	Aim	CO map
1	Software Requirements Specification	To prepare software requirements specification document for a selected case study in IEEE format	CO1
2	Function Point Calculation	To calculate function point for a selected case study	CO2
3	Cost Estimation Using Cocomo Model	To calculate function point for a selected case study	CO2
4	Project Scheduling Using Project Management Tool	Use project management tool to schedule project plan for a selected case study	CO2
5	Risk Management Monitoring And Mitigation Plan	Develop a risk table for a selected case study	CO5
6	General Test-Driven Development	General test driven development for a selected case study	CO4
7	Black Box Testing	To design test cases for performing black box testing (equivalence partitioning and boundary value analysis) for a selected case study	CO4
8	White Box Testing	To design test cases for performing white box testing for a selected case study	CO4
9	Cohesion And Coupling	Draw Architecture diagram and incorporate Cohesion and Coupling for each module of <type your selected case study	CO3
10	Design Patterns	Application of at least two types of design patterns in selected case study	CO3

Exit Survey For Software Engineering – Sem VI, Academic Term II (18-19)

Student Name:_____ **Roll No:**
_____

	Very Well	Well	Neutral	Average	Not At All
1. How well you can apply software engineering principles/processes for software project	☐	☐	☐	☐	☐
2. How well you have understood Project Scheduling and Tracking	☐	☐	☐	☐	☐
3. How well you understood software Design Principles	☐	☐	☐	☐	☐
4. How well you have understood principles of software testing	☐	☐	☐	☐	☐
5. How well you have understood advance software Engineering principles like (RMMM,SCM,SQA) to create high quality software Applications	☐	☐	☐	☐	☐

Lecture/Lesson Plan:

Modes of Content Delivery:

I	**Class Room/Lab Teaching**	v	**Self Learning Online Resources**	Ix	Industry Visit
Ii	Tutorial	vi	**Slides**	X	**Group Discussion**
Iii	**Remedial Coaching**	vii	Simulations/Demonstrations	xi	Seminar
Iv	**Lab Experiment**	viii	Expert Lecture	xii	**Case Study**

Date wise Lesson Plan –

Sr. No.	Lecture Topic	Category	Planned Date	Actual Date	Content Delivery Method/Learning Activities	No of Hours	Total
1	Introduction to Software Engineering,discussion with students about internships done in vacation		1/1/2019	1/1/2019	I,V,VI	1	
2	introduction,types of Software,characteristics of software	**To compare different types of software development models and choose one based on types of application (CSC601.1)**	2/1/2019	2/1/2019	I,V,VI	1	
3	waterfall model,incremental model, comparison		4/1/2019	4/1/2019	I,V,VI	1	
4	spiral model ,V model comparison		7/1/2019	11/1/2019	I,V,VI	1	
5	agile model(SCRUM),agile principles,advantages,		8/1/2019	11/1/2019	I,V,VI	1	
6	extreme programming,Kanban model Comparison of agile kanban and XP model		9/1/2019	14/1/2019	I,V,VI	1	
7	Capability Maturity Model		11/1/2019	14/1/2019	I,V,VI	1	7

8	Requirement Elicitation proccess, discussion about SIH 2019	To Gather the requirements and model them using UML principles. (CSC601.2)	14/1/19	15/1/2019	I,V,VI, **X**	**1**	
9	Different requirement gathering techniques		15/1/19	15/1/2019	I,IV,V, VI	**1**	
10	use case diagram , activity diagram		16/1/19	16/1/2019	I,V,VI	**1**	
11	sequence diagram,class diagram		18/1/19	18/1/2019	I,V,VI	**1**	
12	class diagram		21/1/19	21/1/2019	I,V,VI	**1**	
13	Surprise quiz on requirement gathering (Scenarios online attendance management system and Online gas SEWA		22/1/19	22/1/2019	I,V,VI, **X,XII**	**1**	6
14	Project management ,role of project manager,reasons for project failure,	To apply umbrella activities on software projects. (Project scheduling ,monitoring and controlling) (CSC601.5)	23/1/19	23/1/2019	I,V,VI	**1**	
15	people,process, product ,project differences ,importance of stake holders		25/1/19	25/1/2019	I,V,VI	**1**	
16	LOC based Cost estimation,FP based cost estimation and effort Estimation		28/1/19	28/1/2019	I,IV,VI	**1**	
17	numericals,advantages ,disadvantages		29/1/19	29/1/2019	I,VI	**1**	
18	COCOMO Model basic,intermediate advanced organic,semi detached embeded		30/1/19	30/1/2019	I,VI	**1**	
19	Revision for Unit Test I		1/2/2019	1/2/2019	I,V,VI, **X**	**1**	
20	Critical Path Method, concept 1 numerical		8/2/2019	8/2/2019	I,V,VI	**1**	
21	Earned Value Analysis		11/2/19	11/2/2019	I,V,VI	**1**	8
22	Risk Management, Risk identification process,risk table, importance	To apply umbrella activities on software projects. (Risk Management) (CSC601.5)	12/2/19	18/2/2019	I,VI	**1**	
23	Numerical on risk Exposure, RMMM plan		13/2/19	20/2/2019	I,VI	**1**	2

						1	
24	Effective Software Design Principles like abstraction,encapsulation,inheritance ,aggregation,composition,		15/2/19	22/2/2019	I,V,VI	1	
25	Coding to interfaces,why favour Dependancy Injection	**To Design Software System effectively (CSC601.3)**	18/2/19	22/2/2019	I,V,VI	1	
26	Cohesion and its types		20/2/19	25/2/2019	I,IV,V, VI	1	
27	Coupling and its types		22/2/19	26/2/2019	I,IV,V, VI	1	
28	Data Access Object Pattern,Singleton Pattern		25/2/19	27/2/2019	I,IV,V, VI	1	
29	Importance of User Interface Design		26/2/19	8/3/2019	I,V,VI	1	6
30	Software Quality Assurance ,Formal Technical Reviews,walkthrough	**To apply umbrella activities on software projects. (Monitoring Quality ,Configuratio n and version) (CSC601.5)**	27/2/19	11/3/2019	I,V,VI	1	
31	Software Configuration Management Definion tools,git,SVN ,Centralised vs distributed version control mechanism		8/3/2019	13/3/2019	I,IV,V, VI	1	
32	baselines,repository,change control process,Configuration audit and status reporting		11/3/19	15/3/2019	I,V,VI	1	3
33	Role of tester in software develoopment,why software testing,myths about software testing,	**To Apply Software Testing and Maintenance Principles on given problem (CSC601.4)**	13/3/19	18/3/2019	I,V,VI	1	
34	Difference between defect,bug,error and failure,bug fixing life cycle		15/3/19	19/3/2019	I,V,VI	1	
35	white box testing and its Types		18/3/19	20/3/2019	I,,IV,V, VI	1	
36	Black box testing and its Types and comparison		19/3/19	22/3/2019	I,,IV,V, VI	1	
37	Numerical on testing		20/3/19	25/3/2019	I,V,VI	1	11

					I,V,VI	1	
38	Software testing strategies(Unit,integration,regression testing,validation testing,alpha,beta ,user acceptance testing,)			22/3/19	26/3/2019		
39	Junit 5 testing framework introduction ,different annotations used in Junit, example JUNIT test cases for Calculator.			25/3/19	26/3/2019	I,V,VI	1
40	Verification and validation testing			26/3/19	27/3/2019	I,V,VI	1
41	Software Maintenance and its types,			27/3/19	29/3/2019	I,V,VI	1
42	Reverse Engineering and re-engineering			29/3/19	1/4/2019	I,VI	1
43	Test driven Development			1/4/2019	2/4/2019	I,,IV,V,VI	1
Total							**43**

Text Books:

T1. Roger Pressman, Software Engineering: A Practitioners Approach, (6th Edition), McGraw Hill, 2010

T2. Ian Somerville, Software Engineering, 9th edition, Addison Wesley, 2011

T3. Ali Behfrooz and Fredeick J.Hudson, "Software Engineering Fundamentals", Oxford University Press

Reference Books:

1. Ugrasen Suman, ―Software Engineering –Concepts and Practices‖, Cengage Learning
2. Pankaj Jalote, "An integrated approach to Software Engineering", Springer/Narosa
3. Jibitesh Mishra and Ashok Mohanty, ―Software Engineering‖, Pearson
4. Rajib Mall, "Fundamentals of Software Engineering", Prentice Hall India

Reference Web sites: Study Material On Moodle, tutorialpoint.com, mkyong.com ,various youtube channels

Term Work consists of 25 Marks (15 Marks for Practicals +5 Marks for Attendance+ 5 Marks for Assignment)

Total Software Engineering Marks

TW +ORAL+THEORY=25+25+100=150