



# ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ

("ವಿ ಟಿ ಯು ಅಧಿನಿಯಮ 1994"ರ ಅಡಿಯಲ್ಲಿ ಕರ್ನಾಟಕ ಸರ್ಕಾರದಿಂದ ಸ್ಥಾಪಿತವಾದ ರಾಜ್ಯ ವಿಶ್ವವಿದ್ಯಾಲಯ)

## VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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REF: VTU/BGM/BOS/Syllabus/2024-25/494

DATE: 30 APR 2024

### CIRCULAR

**Subject:** 21CS61- Software Engineering & Project Management course/subject modified regarding...

**Reference:** Chairperson, BoS in CSE/ISE recommendation dated: 29.04.2024  
The Hon'ble Vice Chancellor's approval dated 30.04.2024

This is about the subject mentioned above; the syllabus of the course/subject "**Software Engineering and Project Management (21CS61)**" of the 2021 scheme is modified and also textbook/s for referring the syllabus module wise mentioned in the syllabus. This modification was made based on the feedback received from the stakeholders. A copy of the modified syllabus is enclosed with this circular for ready reference to teachers and students concerned.

The following all CSE and allied streams' students and teachers are hereby informed to note the modified syllabus of 21CS61-Software Engineering & Project Management;

1. B.E. in Computer Science & Engineering
2. B.E., in Information Science and Engineering
3. B.E., in Artificial Intelligence and Machine Learning
4. B.E. in CSE(Artificial Intelligence and Machine Learning)
5. B.E., in Data Science
6. B.E., CSE(Data Science)
7. B.E., in Artificial Intelligence and Data Science
8. B.E., in CSE(Artificial Intelligence)
9. B.E., In CSE(IoT, Cyber Security with Block Chain Technology)
10. B.E., in Computer Science & Design

All the Principals of Engineering Colleges are hereby informed to bring the content of this circular to the notice of all concerned.

Encl: As mentioned above.

  
REGISTRAR  
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**To,**

- **The Principals of all Engineering Colleges under the ambit of the university**

**Copy to;**

1. The Hon'ble Vice-Chancellor through the secretary to the VC for information
2. The Registrar (Evaluation) VTU Belagavi for information and needful
3. The Director, ITI SMU VTU Belagavi for information and to make provision for uploading of the circular
4. The Special Officer QPDS Examination section for information and needful
5. The Special Officer, academic section for information
6. Office copy

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## VI Semester

<b>SOFTWARE ENGINEERING &amp; PROJECT MANAGEMENT</b>			
Course Code	<b>21CS61</b>	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:2:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
<b>Course Learning Objectives</b>			
CLO 1. Outline software engineering principles and activities involved in building large software programs. Identify ethical and professional issues and explain why they are of concern to Software Engineers.			
CLO 2. Describe the process of requirement gathering, requirement classification, requirement specification and requirements validation.			
CLO 3. Infer the fundamentals of object oriented concepts, differentiate system models, use UML diagrams and apply design patterns.5			
CLO 4. Explain the role of DevOps in Agile Implementation.			
CLO 5. Discuss various types of software testing practices and software evolution processes.			
CLO 6. Recognize the importance Project Management with its methods and methodologies.			
CLO 7. Identify software quality parameters and quantify software using measurements and metrics. List software quality standards and outline the practices involved			
<b>Teaching-Learning Process (General Instructions)</b>			
These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.			
<ol style="list-style-type: none"><li>1. Lecturer method (L) need not to be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes.</li><li>2. Use of Video/Animation to explain functioning of various concepts.</li><li>3. Encourage collaborative (Group Learning) Learning in the class.</li><li>4. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.</li><li>5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it.</li><li>6. Introduce Topics in manifold representations.</li><li>7. Show the different ways to solve the same problem with different circuits/logic and encourage the students to come up with their own creative ways to solve them.</li><li>8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.</li></ol>			
<b>Module-1</b>			
<b>Software and Software Engineering: The nature of Software, The unique nature of WebApps, Software Engineering, The software Process, The software Engineering practice, The software myths, How it all starts</b>			
<b>Textbook 1: Chapter 1: 1.1 to 1.7</b>			
<b>Process Models: A generic process model, Process assessment and improvement</b> , Prescriptive process models, Waterfall model, Incremental process models, Evolutionary process models, Concurrent models, Specialized process models.			
<b>Textbook 1: Chapter 2: 2.1 to 2.4</b>			

<b>Teaching-Learning Process</b>	Chalk and board, Active Learning, Problem based learning
<b>Module-2</b>	
<p><b>Understanding Requirements:</b> Requirements Engineering, Establishing the ground work, Eliciting Requirements, Developing use cases, Building the requirements model, Negotiating Requirements, Validating Requirements  <b>Textbook 1: Chapter 5: 5.1 to 5.7</b></p> <p><b>Requirements Modeling Scenarios, Information and Analysis classes:</b> Requirement Analysis, Scenario based modeling, UML models that supplement the Use Case, Data modeling Concepts class Based Modeling.  <b>Textbook 1: Chapter 6: 6.1 to 6.5</b></p>	
<b>Teaching-Learning Process</b>	Chalk and board, Active Learning, Demonstration
<b>Module-3</b>	
<p><b>AGILE DEVELOPMENT:</b> What is Agility?, Agility and the cost of change. What is an agile Process?, Extreme Programming (XP), Other Agile Process Models, A tool set for Agile process  <b>Principles that guide practice: Software Engineering Knowledge, Core principles, Principles that guide each framework activity</b>  <b>Textbook 1: Chapter 3: 3.1 to 3.6, Chapter 4: 4.1 to 4.4</b></p>	
<b>Teaching-Learning Process</b>	Chalk and board, Active Learning, Demonstration
<b>Module-4</b>	
<p><b>Introduction to Project Management:</b>  Introduction, Project and Importance of Project Management, Contract Management, Activities Covered by Software Project Management, Plans, Methods and Methodologies, Some ways of categorizing Software Projects, Stakeholders, Setting Objectives, Business Case, Project Success and Failure, Management and Management Control, Project Management life cycle, Traditional versus Modern Project Management Practices.  <b>Textbook 2: Chapter 1: 1.1 to 1.17</b></p>	
<b>Teaching-Learning Process</b>	Chalk and board, Active Learning, Demonstration
<b>Module-5</b>	
<p><b>Software Quality:</b>  Introduction, The place of software quality in project planning, Importance of software quality, Defining software quality, quality models, ISO 9126, product and process metrics, product versus process quality management, Quality Management systems, process capability models, techniques to enhance software quality, testing, Software reliability, quality plans.  <b>Textbook 2: Chapter 13: (13.1 to 13.14)</b></p>	

<b>Teaching-Learning Process</b>	Chalk and board, Active Learning, Demonstration
<p><b>Course Outcomes</b></p> <p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>CO 1. Understand the activities involved in software engineering and analyze the role of various process models</li> <li>CO 2. Explain the basics of object-oriented concepts and build a suitable class model using modelling techniques</li> <li>CO 3. Describe various software testing methods and to understand the importance of agile methodology and DevOps</li> <li>CO 4. Illustrate the role of project planning and quality management in software development</li> <li>CO 5. Understand the importance of activity planning and different planning models</li> </ul>	
<p><b>Assessment Details (both CIE and SEE)</b></p> <p>The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together</p> <p><b>Continuous Internal Evaluation:</b></p> <p>Three Unit Tests each of <b>20 Marks (duration 01 hour)</b></p> <ul style="list-style-type: none"> <li>1. First test at the end of 5<sup>th</sup> week of the semester</li> <li>2. Second test at the end of the 10<sup>th</sup> week of the semester</li> <li>3. Third test at the end of the 15<sup>th</sup> week of the semester</li> </ul> <p>Two assignments each of <b>10 Marks</b></p> <ul style="list-style-type: none"> <li>4. First assignment at the end of 4<sup>th</sup> week of the semester</li> <li>5. Second assignment at the end of 9<sup>th</sup> week of the semester</li> </ul> <p>Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for <b>20 Marks (duration 01 hours)</b></p> <ul style="list-style-type: none"> <li>6. At the end of the 13<sup>th</sup> week of the semester</li> </ul> <p>The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be <b>scaled down to 50 marks</b> (to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).</p> <p><b>CIE methods /question paper has to be designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.</b></p> <p><b>Semester End Examination:</b></p> <p>Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (<b>duration 03 hours</b>)</p> <ul style="list-style-type: none"> <li>1. The question paper will have ten questions. Each question is set for 20 marks. Marks scored shall be proportionally reduced to 50 marks</li> <li>2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), <b>should have a mix of topics</b> under that module.</li> </ul> <p>The students have to answer 5 full questions, selecting one full question from each module</p>	
<p><b>Suggested Learning Resources:</b></p>	
<p><b>Textbooks</b></p> <ul style="list-style-type: none"> <li>1. Roger S. Pressman: Software Engineering-A Practitioners approach, 7th Edition, Tata McGraw Hill.</li> </ul>	

2. Bob Hughes, Mike Cotterell, Rajib Mall: Software Project Management, 6<sup>th</sup> Edition, McGraw Hill Education, 2018.

**Reference:**

1. Pankaj Jalote: An Integrated Approach to Software Engineering, Wiley India.

**Weblinks and Video Lectures (e-Resources):**

1. [https://onlinecourses.nptel.ac.in/noc20\\_cs68/preview](https://onlinecourses.nptel.ac.in/noc20_cs68/preview)
2. [https://www.youtube.com/watch?v=WxkP5KR\\_Emk&list=PLrjKTql3jnm9b5nr-ggx7Pt1G4UAHeFlJ](https://www.youtube.com/watch?v=WxkP5KR_Emk&list=PLrjKTql3jnm9b5nr-ggx7Pt1G4UAHeFlJ)
3. <http://elearning.vtu.ac.in/econtent/CSE.php>
4. <http://elearning.vtu.ac.in/econtent/courses/video/CSE/15CS42.html>
5. <https://nptel.ac.in/courses/128/106/128106012/> (DevOps)

**Activity Based Learning (Suggested Activities in Class)/ Practical Based learning**

Case study, Field visit