GUJARAT TECHNOLOGICAL UNIVERSITY

BACHELOR OF ENGINEERING SYLLABUS

Subject Code : 3164202

Subject Name : Agile Software Development & Devops

WEF Academic Year :	2020-21
Semester :	6
Category of the Course :	Professional Core

Prerequisite : Software Engineering, Basic Programming Skills.

Rationale :

- To provide students with a theoretical as well as practical understanding of agile software development practices and how small teams can apply them to create high-quality software.
- To do a detailed examination and demonstration of Agile development and testing techniques.
- To understand the benefits and pitfalls of working in an Agile team.
- To understand and use DevOps.

Course Scheme :

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial/ Practical		
L	T	P	C	University exams (ESE)	Progressive Assessment (PA)	External Practical /viva Exam (ESE)	Internal evaluation Practical /viva Exam (PA)	
3	0	2	4	70	30	30	20	150

Course Content :

Unit No.	Content	No. of Hours	Weightage (%)
1	**Principles in Software Engineering :** A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Process Models, Agile Process Model, Component-Based Development. **Agile Methodology:** History of Agile Software Development, Traditional Model vs. Agile Model, Classification of Agile Methods, Agile Manifesto and Principles, Agile Teams, Team Meetings and Ceremonies, Agile Drivers, Capabilities and Values.	9	20
2	**Agile Processes :** Lean Production, SCRUM, Crystal, Feature Driven Development, Adaptive Software Development, Test Driven Development, Kanban, Extreme Programming, Estimation: Agile forecasting and project Management, velocity, progress tracking, Track Done pattern, Project forecasting, UX Design.	7	18

3	**Agility and Knowledge Management :** Agile Information Systems, Agile Decision Making, Institutional Knowledge Evolution Cycle, Development, Acquisition, Refinement, Distribution, Deployment, Leveraging, Managing Software Knowledge, Challenges of Migrating to Agile Methodologies, Agile Knowledge Sharing.	5	10
4	**Agility and Requirements Engineering :** Impact of Agile Processes in RE, Product Backlog, Sprint Backlogs, Current Agile Practices, Variance, Managing Unstable Requirements, Requirements Elicitation, Agile Requirements Prioritization, Agile Requirements Modeling and Generation, Concurrency in Agile Requirements Generation, User Stories – Specification and Formats, Story-Cards.	6	12
5	**Agility Quality Assurance and Testing :** Agile Product Development, Agile Metrics, Financial and Production Metrics in FDD, Agile Approach to Quality Assurance. **Testing:** Functionality Testing, UI Testing, Performance Testing, Security Testing, Agile Testing: Principles of Agile Testers; The agile Testing Quadrants, Agile automation, Test Automation Pyramid. Case Study – Selenium.	7	15
6	**DevOps :** Overview, DevOps - Importance and Benefits, DevOps Principles and Practices, 7-C's of DevOps Lifecycle for Business Agility, DevOps and Continuous Testing, Challenges in selection of right DevOps tools and in DevOps Implementation. Mapping App to DevOps-Assessment. Study of various Open Source Tools in DevOps.	8	25
	Total Hours :	42	100

Textbook :

Robert C. Martin, "Agile Software Development, Principles, Patterns and Practices", First International Edition, Prentice Hall.

Reference Books :

1. David J. Anderson and Eli Schragenheim, —Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results||, Prentice Hall, 2003.
2. Hazza and Dubinsky, —Agile Software Engineering, Series: Undergraduate Topics in Computer Science||, Springer, 2009.
3. Craig Larman, —Agile and Iterative Development: A Manager's Guide, Addison-Wesley, 2004.
4. Kevin C. Desouza, —Agile Information Systems: Conceptualization, Construction, and Management||, Butterworth-Heinemann, 2007.
5. Andrew Stellman, Jennifer Greene - Learning Agile: Understanding Scrum, XP, Lean, and Kanban, O Reilly, 2015

Course Outcomes :

No.	Course Outcomes	RBT Level*
1	Interpret the concept of agile software engineering and its advantages in software development.	RM,UN
2	Analyze the core practices behind several specific agile methodologies.	UN
3	Identify the roles and responsibilities in agile projects and their difference from projects following traditional methodologies.	UN,AP
4	Determine the role of design principles in agile software design.	AN,AP,EL
5	Make use of various tools like "Devops" available to agile teams to facilitate the project.	AN,EL,CR

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

Suggested Course Practical List :

1. Study the complete Software Development Life Cycle (SDLC) and analyze various activities conducted as a part of various phases. For each SDLC phase, identify the objectives and summaries outcomes.
2. To Study the Agile Process Models and 12 Agile Priciples.
3. Study practical on DevOps life cycle & stages.
4. Study of any two Open source tools in DevOps for Infrastructure Automation, Configuration Management ,Deployment Automation, Performance Management, Log Management. Monitoring. (Jenkins, Docker, Behat , Git, Jira, Watir, Chef, Supergiant, SaltStack, Hudson etc).
5. To study Various Testing Techniques related to Agile.
6. To learn about DevOps Pipeline (CI /CD) using any tool.
7. Study Practical on AWS or Microsoft Azure for DevOps.
8. Study Practical on Google Cloud or Salesforce with Copado for DevOps.
9. To setup and configure of Jenkins.
10. To create Job and manage it using Jenkins.

List of Laboratory/Learning Resources Required :

Various Web Based SE Tools

- Software:-Rational Rose, Microsoft Visio, Enterprise resource planning and other Open Source softwares.
- Project Management Tools.
- User Interface Development Tools.
- Object-Oriented Software Engineering Tools.
- Testing Tools.

Other Resources/MOOCs :

1. "Agile Software Development", https://www.edx.org/course/agile-software-development

2. "Agile Software Development", https://www.coursera.org/learn/agile-software-development

3. "The Complete Guide to Agile Software Development" https://clearbridgemobile.com/complete-guideagile-software-development

4. "Agile Fundamentals Ebook: A Complete Guide for Beginners", https://agileken.com/agilefundamentals-ebook/

5.https://devops.com/most-popular-open-source-devops-tools/
6. https://www.guru99.com/devops-tutorial.html
7. Open Source Book on DevOps:
https://github.com/jidibinlin/Free-DevOps-Books-1/blob/master/book/Practical%20DevOps.pdf

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