

CS587

Software Project Management

Syllabus

Instructor: Dr. Atef Bader
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Grading:	Exam	30%
	Final Project	30%
	5 Assignments	40%

Textbooks:

Managing and Leading Software Projects

Author: Richard E. Fairley

ISBN: 978-0-470-29455-0

Year: 2009

Publisher: Wiley - IEEE Computer Society Press



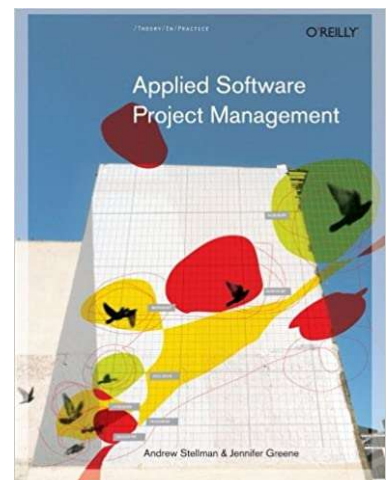
Applied Software Project Management

Author: Jennifer Greene and Andrew Stellman

ISBN: 978-0-596-00948-9

Year: 2005

Publisher: O'Reilly Media



Recommended References:

- Product Manager vs. Project Manager, Bruce McCarthy, 2018, ISBN: 9781492034445, O'Reilly Media
- Software Project Estimation: Intelligent Forecasting, Project Control, and Client Relationship Management, Dimitre Dimitrov, 2019, ISBN: 9781484250259, Apress
- Metrics and Models in Software Quality Engineering 2nd Edition by Kan, 2003, ISBN: 0201729156, Addison-Wesley
- The Economics of Software Quality, Capers Jones and Olivier Bonsignour, June 2011, ISBN: 9780132564731, Addison-Wesley
- Software Metrics, 3rd Edition, James Bieman and Norman Fenton, 2014, ISBN: 9781439838228, CRC Press
- Agile Metrics in Action: How to measure and improve team performance, Christopher W. H. Davis, 2015, ISBN: 9781617292484, Manning Publications
- Learning Agile, Jennifer Greene, Andrew Stellman, 2014, ISBN: 978-1449331924, O'Reilly Media
- Agile for Project Managers, Denise Canty, 2015, ISBN: 9781482244991, Auerbach Publications
- Pro DevOps with Google Cloud Platform: With Docker, Jenkins, and Kubernetes. Riti, P. 2018, ISBN: 978-1484238967, Apress.
- Cloud Native DevOps with Kubernetes, Arundel, J, Domingus, J. 2019, ISBN: 978-1492040767, O'Reilly Media.
- Modern DevOps Practices, Agarwal, G. 2021, Packt Publishing. ISBN: 978-1800562387

Course Description

This course covers the fundamental concepts of managing software projects, both traditional and agile software project management are covered. All phases of the project management lifecycle are explained, including project initiation, project planning and control, project status reporting and reviews through project completion and post project lessons learned analysis. The concept of process

maturity is introduced using the SEI Capability Maturity Model to show the correlation between established management and development practices and project success. The course covers software metrics used in the estimation of the size, cost, and schedule of the software projects. In addition to treating the key project management processes, tools, and techniques, the course gives special emphasis to the human side of project management including leadership and motivation strategies. The course emphasizes the importance of software quality and the use of mature software development processes in managing successful projects.

Course Objectives

By the end of this course, the student will be able to:

- Create project plan, track and record task status, and present project status to management
- Define the software project management process and the software development process
- Explain the fundamental concepts necessary to manage a modern software project including techniques and tools used for project initiation, project planning and control, project status reporting and reviews, project completion and lessons learned analysis
- Discuss the differences between Agile and traditional project management
- Examine modern workflow automation practices
- Compare and Contrast DevOps, MLOps, and CI/CD (Continuous Integration and Continuous Development) practices
- List the skills required of a successful project manager who is capable of leading and managing the development team, and communicate effectively with the customer and senior management
- Compare and contrast the different software size estimation techniques and quality management metrics
- Explain why risk management and contingency planning are at the heart of any successful project
- Examine the issues regarding the project cost, resources, schedule, productivity, and quality
- Compare and contrast project quality metrics, product quality metrics and in-process quality metrics

The following topics are covered in detail:

- **Introduction**
 - Roadmap for software project management

- Software Products: computer Science, software engineering, and software project management
 - Organizational structures and software product lines
 - Software Development Process Models: Waterfall, Iterative and Agile
 - Software estimation, measurements, metrics, and quality
 - The growth of project management as a profession
 - Software project quality tracking and defects forecasting
- **Principles of Project Management**
 - Defining
 - Planning
 - Executing
 - Controlling
 - Closing
- **Project Analysis**
 - Software project size, effort, and scheduling of projects
 - Estimating software project size and complexity
 - Scheduling tools and techniques
 - Measurements for tracking project progress
- **Resource Management**
 - Assessing competencies and skills
 - Resource allocation
- **Project Monitoring**
 - Metrics collection and analysis
 - Milestones and status reporting
- **Defect Detection/Prevention**
 - Defect removal effectiveness
 - Phase-based defect removal model
- **Risk Management**
 - Risk identification, quantification, and prioritization
 - Risk avoidance, mitigation, and contingency planning
- **Agile Project Management Process**
 - Differences between Agile and Traditional Project Management
 - Scrum and XP Agile Methods
- **Configuration Management**
 - Basic configuration concept

- Configuration management process
- Configuration control and configuration audits
- **Agile Project Management Process**
 - Differences between Agile and Traditional Project Management
 - Scrum and XP Agile Methods
- **Modern Best Practices and Workflow Automation**
 - Explain how DevOps and MLOps practices leverage the team shared responsibilities to increase software delivery and deployment velocity and improve service reliability.
 - Examine the technique for automating continuous integration (CI), continuous delivery (CD) for containerized microservices applications.
- **Quality Control, Planning and Assessment**
 - Software project quality assessment and process maturity assessment
 - ISO audits & quality reviews
 - Testing process and product certification
 - Monitoring compliance with processes
 - Process improvement