CSCI 713: Software Development Processes

Fall 2025, 3 Credits
Department of Computer Science
North Dakota State University

Instructor

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Class Hours: 2:00 – 3:15 pm, Tu/Th, QBB 102
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Catalog Description

This course is designed as a breadth course on the software engineering process. Basic concepts are reviewed, and some methods for each software development activity are explained and experienced.

Course Objectives

This course provides students with a foundational understanding of software development lifecycle models, methodologies, tools, and practices. Students will learn the principles and variants of major lifecycle models; gain hands-on experience with widely used development and operations tools; and explore key activities involved in multi-person software projects. The course emphasizes how these activities vary across different lifecycle models, preparing students for more advanced study in specialized 700-level courses. This course has three major parts: (1) An overview of major software development lifecycle models, along with their major variants. (2) An introduction to essential activities in collaborative software projects, and how these activities are approached differently depending on the methodology. Some commonly employed approaches will be discussed for each activity. (3) A hands-on exploration of popular tools that support software development and operations.

Course Goals

By the end of this course, students will be able to:
- Identify software development lifecycle models and evaluate their advantages, applicability, and limitations.
- Create a tailored approach by combining elements from multiple methodologies to meet specific requirements.
- Understand how requirements are gathered, analyzed, documented, and traced, and explain their importance.
- Describe different types of software design and their roles across various lifecycles and methodologies.
- Explain quality assurance and testing approaches in various software development methodologies.
- Understand how software is deployed, maintained, and evolved.
- Describe commonly employed software development tools, including their purposes, advantages, and limitations.

Course Schedule/Outline

Week	Modules	Projects/Assignments
1	Course Overview	
1-2	Software Development Process	
2-3	Project Initiation and Planning	Assignment 1
4-5	Plan-driven Software Development	
5-6	Agile Software Development	Assignment 2
7-8	DevOps Software Development	Assignment 3
8-9	Requirement Engineering	
9-10	Software Design	Assignment 4
11-12	Software Construction	Assignment 5
13-14	Software Testing	Assignment 6
14-15	Software Maintenance and Evolution	Assignment 7

Approach
- Lectures will be delivered mainly using Google Slides, which will be available to students. The slides are detailed and will serve as course notes. Various other digital supplementary materials, such as literature and reports, will be

available to students. Students are expected to study these materials, understand the subject, and work on the course tasks. Students are encouraged to email or meet with any questions on the subject matter.
- The course tasks (assignments) with their due dates will be posted on Blackboard. Students must complete the tasks by the due dates. The tasks will not be accepted after the due date.
- This course is designed to cover both theoretical and practical aspects of the software development process. Therefore, students are expected to learn the concepts, tools, and techniques taught in the class and apply them to analyze or solve real-world problems through assignments.

Textbooks and Readings
This course does not have a required textbook. The material is drawn from several books and research papers, which are listed on the final slide of each chapter. The primary references include:
- Pressman, Roger S. and Bruce R. Maxim, Software Engineering A Practitioner's Approach, eighth edition, McGraw Hill, 2015, New York, ISBN: 978-0-0780-0.-2212
- Wright, Hyrum. Software Engineering at Google, 2020.
- Pfleeger, Shari Lawrence and Joanne M. Atlee, Software Engineering: Theory and Practice, fourth edition, Prentice Hall, New York, 2010, ISBN: 978-0-13-606169-4.

Course Tasks
- *Assignments:* This course has seven assignments. The assignments will be posted on Blackboard, and students will submit their completed work on Blackboard by the assigned due dates. The course does not have an examination.

Evaluation and Grading
- *Evaluation criteria:* Assignments will be evaluated based on the correctness and originality of the answer and fulfillment of the given criteria.
- *Grading system:* The final grade will be calculated as the weighted sum of the assignment scores.
- *Grading scale:* **A** (90.0-100%), **B** (80-89.9%), **C** (70-79.9%), **D** (60-69.9%), and **F** (0-59.9%).

Professional Conduct
Academic dishonesty has very bad consequences. Copying ideas, sentences, tables, or figures without citation is plagiarism, a form of academic dishonesty. This is a very serious offense because you make it appear to be your work, but in fact, it is not. You must include citations and references when you copy. Receiving unacknowledged help is considered academic dishonesty. You must include citations and references in your work when you receive help, other than from faculty or course materials. For example, if you find a useful web page that was not specified in the assignment, then you must include a citation and reference for it. Similarly, if a discussion with someone is helpful, you should thank them by name in the Acknowledgments section, even if collaboration is not allowed on the assignment. Citations and references are optional for informal discussions. Giving unacknowledged help is also treated as academic dishonesty. Use of LLMs (e.g., ChatGPT) to complete assignments, unless explicitly permitted, will result in a grade of **F** for the assignment or the course.

Attendance
According to NDSU Policy 333 (www.ndsu.edu/fileadmin/policy/333.pdf), attendance in classes is expected. Students will receive an **F** grade if they miss more than six classes. When offered as a web-based (online) course, it is mandatory for enrolled students to fully access all posted online and textbook materials, study those materials, and complete all required assignments, discussions, quizzes, exams, and projects. In the case of a university-sponsored activity, required business trip, or medical procedure, a signed letter from your manager or doctor is required to allow for an extension of the due date. Please email me in advance of the expected absence to arrange any make-up or extensions. Veterans and student service members with special circumstances or who are activated are encouraged to notify the instructor as soon as possible and are encouraged to provide Activation Orders.

Americans with Disabilities Act for Students with Special Needs
Students with disabilities or other special needs requiring special accommodations in this course are invited to share these concerns or requests with the instructor and contact the Disability Services Office (www.ndsu.edu/disabilityservices).

Family Educational Rights and Privacy Act (FERPA)
Your personally identifiable information and educational records as they relate to this course are subject to FERPA (https://www.ndsu.edu/onestop/student-privacy-policy-ferpa).

Academic Honesty Statement
The academic community is operated based on honesty, integrity, and fair play. NDSU Policy 335: Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconducts have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the Office of Registration and Records. Informational resources about academic honesty for students and instructional staff members can be found at www.ndsu.edu/academichonesty.