CS 487-01 - Software Engineering

Instructor: Dennis J. Hood
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Office Hours: Tue/Thu 12:55pm – 1:35pm in SB209-B

Course Catalog Description: Study of the principles and practices of software engineering. Topics include software quality concepts, process models, software requirements analysis, design methodologies, software testing, and software maintenance. Hands-on experience building a software system utilizing the approaches presented in lecture. Students working in teams develop all life cycle deliverables including requirements specification and design documents, system code, testing documents, and user manuals.
Prerequisite: (CS 331 or CS 401) and CS 425. **Credit**: 3-0-3
Lecture Day, Time & Place: Tue/Thu 11:25am – 12:40pm, SB-104
TAs: tbd

Schedule of Lecture Topics and Assignments: (subject to change at the discretion of the instructor)

Week	Lect. Dates	Topics	Readings	Assignments	
				Descriptions	**Due Dates**
1	**1/9**	Intro and Motivation	Ch. 1		
	1/11				
2	**1/16**	Evolution of Software Processes	Ch. 2 & 3	Research Paper (R) Team Project (T)	
	1/18				
3	**1/23**	Requirements Engineering	Ch. 4	Homework 1 (HW1)	
	1/25				
4	**1/30**	Testing and Quality Mgmt.	Ch. 8 & 24		HW1: 2/3
	2/1				
5	**2/6**	Modeling and Prototyping	Ch. 5, 6 & 7	Homework 2 (HW2)	Tm Analysis 2/10
	2/8				
6	**2/13**	Dependability and Exception Handling	Ch. 10 & 11		HW2: 2/16
	2/15				
7	**2/20**	Safety and Security	Ch. 12 & 13		Tm Test Plan 2/24
	2/22				
8	**2/27**	Exam Prep	n/a	Midterm Exam (2/29)	RP Draft 3/2
	2/29	Midterm Exam			
9	**3/5**	Evolution and Resilience	Ch. 9 & 14		
	3/7				
SB	**3/11**	Spring Break	n/a	n/a	n/a
10	**3/19**	Automation and Reuse	Ch. 15 & 16	Homework 3 (HW3)	Tm Design 3/23
	3/21				
11	**3/26**	Embedded Software Systems	Ch. 19, 20 & 21		
	3/28				
12	**4/2**	Service-Oriented Architecture	Ch. 17 & 18	Homework 4 (HW4)	HW3: 4/6 Tm Review 4/8
	4/4				
13	**4/9**	Situation Awareness	Ch. 22 & 23		HW4: 4/13
	4/11				
14	**4/16**	HCI (CCI & HHI)	Case studies		Tm Assess. 4/20
	4/18	User-Centered Des.			
15	**4/23**	Team Presentations	n/a		RP Final 4/27
	4/25	Exam Prep	n/a		
16	**4/29**	Exam week	n/a	Final Exam (tbd)	

Readings:

- Sommerville (2016), *Software Engineering (10th Edition)*, Pearson Education Ltd., ISBN 978-0-13-394303-0
- Additional reading assignments (articles, papers, etc.) will be posted to Blackboard.

Course Objectives: This course aims to provide students with a solid foundation in software engineering concepts. It will provide students with the historical context and current best practices for analyzing, designing, developing and validating software systems including technical, financial and human resource issues. It will also take students through the risks and challenges that face software engineers and provide frameworks for effectively and efficiently engineering software systems that meet the needs of a diverse user community.

Course Outcomes: Students successfully completing this course will be able to:

- Describe using appropriate terminology the current state and best practices of software engineering.
- Understand and explain software development as a series of engineering activities and processes.
- Demonstrate software development team-working skills.
- Analyze and capture client/user needs.
- Select an appropriate life cycle and process model for development of a software product.
- Explain the importance of software quality evaluation activities.
- Develop a series of software life-cycle deliverables.
- Develop representations/models and descriptions of an evolving software product for inclusion in a requirements specification document.
- Build a multi-level design model and evaluate software design alternatives.
- Design, execute, and log multi-level software tests.
- Describe the role that tools can play in the software life cycle.
- Communicate the deliverables of a software development project.
- Describe software engineering as a profession and discuss ethics in engineering software systems.

Course Notes: Copies of each week's course lecture notes (PowerPoint deck) will be posted on BlackBoard by Monday evening of each week. Students should review the notes and associated readings before lecture. Students should note that the lecture notes are meant to frame the lecture and class discussion, and alone will not provide the depth of knowledge required to successfully achieve the course objectives. Students are required to actively participate in class discussions and to take notes as necessary.

Grading:

- **Homework Assignments**: Students will be required to complete 4 individual homework assignments (see schedule above.) The average homework grade will count for 20% of their overall course grade.
- **Team Project**: Students work in assigned teams to complete a design project utilizing the techniques described in lecture for engineering software systems. This assignment will count for 20% of their overall course grade.
- **Individual Research Paper**: Each student will research a software engineering case study and document their findings. This assignment will count for 20% of their overall course grade.
- **Exams**: There will be a closed-book midterm exam covering the material in the first half of the course worth 10% of the student's overall course grade. There will also be a comprehensive, closed-book final exam worth 15% of the student's overall course grade.
- **Participation**: Students are required to actively participate in class discussions. Participation will count for 15% of the student's overall grade.
- **Academic Honesty**: Plagiarism will result in an automatic overall course grade of E.
- **Extra Credit**: There will be no extra credit opportunities.

ADA: Reasonable accommodations will be made for students with documented disabilities. In order to receive accommodations, students must obtain a letter of accommodations from the Center for Disability

Resources (CDR). The CDR is located in 3424 S. State St. – 1C3-2 and can be reached at 312.567.5744 or disabilities@iit.edu.