

CSC 440/540–Software Engineering

Fall 2016 (M 6:15-9:00 in GH 314)

<http://faculty.cs.nku.edu/~waldenj>

INSTRUCTOR INFORMATION

Name James Walden
E-mail waldenj@nku.edu
Office GH 526
Phone (859) 572-5571

Office Hours
MWF 14:00-15:00
M 21:00-22:00
also by appt

SUMMARY

Description Techniques in computer software specification, design, implementation, testing, documentation, and maintenance; development of a large-scale software project by students working in teams.

Prerequisites CSC 402: Advanced Programming Methods,
CSC 439: Software Testing and Maintenance.

Textbook Craig Larman, *Applying UML and Patterns, Third Edition*, Prentice Hall
Michael Hartl, *Ruby on Rails Tutorial (Rails 5)*, <https://www.railstutorial.org/book>

STUDENT LEARNING OUTCOMES

By the end of the course, a successful student should be able to

1. Understand software engineering practices of requirements, design, and implementation.
2. Use UML (Unified Modeling Language) to craft and communicate software project design.
3. Apply knowledge of software engineering processes and tools.
4. Work as a member of a team to develop a software project.

Software engineering is a demanding course that will demand much time and effort throughout the semester.

COURSE TOPICS

This course will cover the following topics.

1. Software engineering methodologies
2. Ruby on Rails
3. Requirements and use cases
4. Object-oriented analysis and design
5. Universal Modeling Language (UML)
6. GRASP and GoF design patterns
7. Implementation
8. Code reviews
9. Validation and verification

See the course web site, <http://faculty.cs.nku.edu/~waldenj/classes/2016/fall/csc440/>, for a detailed course calendar with readings, assignments, and notes.

SEMESTER PROJECT

The focus of the course will be the application of the concepts above through the building and deployment of a web application by a small team of students. The project will be completed over the course of the entire semester. We will use the Ruby on Rails framework, which supports important client-server concepts, such as Model-view-controller (MVC) architecture, REpresentational State Transfer (REST) architecture, and Object-Relational Mapping (ORM) with the active record design pattern.

Project teams will consist of 3-4 students. Team membership is mandatory. You may not work alone on the project. Learning to work effectively in a team is a critical skill as a professional software engineer and is one of the learning outcomes of this course. Teams will work together on a single project, creating project artifacts, such as requirement, design, and test documents, and make oral presentations in addition to writing code.

Students will be responsible for forming project teams. Teams that need members can recruit students who are not part of team, communicating through the forums on Blackboard. Students who are not initially part of a team can advertise their skills and interests in order to join a team. Once teams are formed, students may not move from one team to another.

Projects will have four major deadlines during the semester. Each deadline will require the submission of written documents and an oral presentation. The written document will include a page describing the contributions of each team member. The first deadline will be for the inception phase, for which teams will provide a description of the project and the plan to complete it. The next three deadlines will be iterations of the projects, with submissions including written documents, an oral presentation, and source code for a working version of the system. Each iteration will add functionality to the system and teams must demo the system for the class as part of the oral presentation.

During an oral presentation, class members who are not presenting will take on the roles of project advisors and potential customers for the presenting team. Class attendance is mandatory for oral presentation days.

At the end of the semester, each student must also turn in a 1-2 page individual postmortem report that includes:

- A brief description of what you learned in the course.
- An assessment of your contributions to the team project.
- An assessment of each of your other project team members.

GRADING

Your grade in this course will be based on the following classes of assessments.

Team Project (50%)	The work submitted for all four deadlines of the project, including written documents, oral presentations, and source code will make up half of the grade for the course. Projects will be evaluated according to requirements for each iteration. Students will earn a grade based on their participation in the project, as measured by peer evaluations and repository commits, which can be lower or higher than the overall project assessment, but which will not be below 0% or above 100% of the possible grade. Final project presentations will be on December 5, 2016.
Assignments (25%)	A set of eight assignments covering all parts of the development lifecycle from requirements and design to coding. Some assignments will be individual, while other assignments will be team based.
Midterm Exam (10%)	The midterm examination will be open book and notes, but students may not communicate with anyone else during the exam. The exam will require an hour to complete. The exam will be held on October 10, 2016.
Final Exam (15%)	A comprehensive examination covering all of the material in the course given during finals week in a two hour period. The format will be the same as that of the midterm exam. The exam will be held on December 12, 2016.

Graduate students taking this class as CSC 540 must complete a research paper on a software engineering topic approved by the instructor. This project will be worth 10% of the final grade, while the team project will count for 40% of the final grade for CSC 540 students.

In accordance with university policy, mid-term grades will be available online through MyNKU and are issued to all undergraduate students. These grades are not part of your permanent record and will be replaced when final grades are submitted. Remember: mid-term grades do not guarantee a good or bad class grade; they reflect the current level of performance and can be altered by the quality of subsequent work.

Letter grades will be based the sum of assessment areas above as shown in the table below.

Undergraduate Students			
Grade	Percent	Grade	Percent
A	93-100	C+	77-80
A-	90-93	C	73-77
B+	87-90	C-	70-73
B	83-87	D+	67-70
B-	80-83	D	60-67
		F	0-60

Graduate Students			
Grade	Percent	Grade	Percent
A	93-100	C+	77-80
A-	90-93	C	73-77
B+	87-90	C-	70-73
B	83-87	F	0-70
B-	80-83		

CREDIT HOUR POLICY

In accordance with federal policy, NKU defines a credit hour as the amount of work represented in the achievement of student learning outcomes (verified by evidence of student achievement) that reasonably approximates one hour (50 minutes) of classroom instruction and a minimum of two hours of out-of-class student work. For every course credit hour, a typical student should expect to spend at least three hours per week of concentrated attention on course-related work including, but not limited to, class meeting time, reading, reviewing, organizing notes, studying and completing assignments. At least an equivalent amount of time is expected for other academic activities such as online courses, laboratory work, internships, practica, studio work and other academic work leading to the award of credit hours.

Estimates of the time required for a typical student to complete course expectations are:

In-Class (1 day x 150 min x 15 weeks)	37.5 hours
Class Preparation (1 hour x 15 weeks)	15 hours
Assignments (out of class time)	15 hours
Project	120 hours
TOTAL	187.5 hours

COMMUNICATION POLICY

Students should check the class web site for announcements and new course materials in the 24 hours before each class period. Students should also check their NKU e-mail accounts for important course and university announcements,

such as snow days and other schedule changes.

Students are encouraged to ask questions in person or via telephone during faculty office hours or via e-mail at any time. E-mail messages should be from your NKU e-mail account and must include:

- A subject line beginning with the class number and including a summary of your question, e.g. "CSC 440: Should requirement x be designed using a separate class".
- A detailed description of the problem. Specify precisely on which assignment, machine, user account, and software the problem occurred and provide a list of steps needed to reproduce the problem.
- The message should close with your full name.

The instructor will answer e-mail following the above guidelines within one business day.

STUDENTS WITH DISABILITIES

The University is committed to making reasonable efforts to assist individuals with disabilities in their efforts to avail themselves of services and programs offered by the University. To this end, Northern Kentucky University will provide reasonable accommodations for persons with documented qualifying disabilities. If you have a disability and feel you need accommodations in this course, you must present a letter to me from the Disability Programs and Services Office (SU 303), indicating the existence of a disability and the suggested accommodations. More information can be found at <http://disability.nku.edu>.

HONOR CODE

The Student Honor Code (the "Honor Code") is a commitment by students of Northern Kentucky University, through their matriculation or continued enrollment at the University, to adhere to the highest degree of ethical integrity in academic conduct. It is a commitment individually and collectively that the students of Northern Kentucky University will not lie, cheat, or plagiarize to gain an academic advantage over fellow students or avoid academic requirements.

The purpose of the Honor Code is to establish standards of academic conduct for students at Northern Kentucky University and to provide a procedure that offers basic assurances of fundamental fairness to any person accused of violations of these rules. Each Northern Kentucky University student is bound by the provisions of the Honor Code and is presumed to be familiar with all of its provisions. Students also should aspire to conduct themselves in a manner that is consistent with the highest degree of ethical integrity in all matters, whether covered in the Honor Code or not. The success of this commitment begins in the diligence with which students uphold the letter and the spirit of the Honor Code. Students may view the complete honor code at <http://deanofstudents.nku.edu/policies/student-rights.html#policies>.

STUDENT EVALUATIONS

Northern Kentucky University takes Instructor and Course Evaluations very seriously as an important means of gathering information for the enhancement of learning opportunities for its students. It is an important responsibility of NKU students as citizens of the University to participate in the instructor and course evaluation process. During the two weeks prior to the end of each semester's classes, you will be asked to reflect upon what you have learned in this course, the extent to which you have invested the necessary effort to maximize your learning, and the role your instructor has played in the learning process. It is very important that you complete the online evaluations with thoughtfully written comments.

Student evaluations of courses and instructors are regarded as strictly confidential. They are not available to the instructor until after final grades are submitted, and extensive precautions are taken to prevent your comments from

being identified as coming from you. Students who complete an evaluation for a particular course (or opt out of doing so in the evaluation) will be rewarded for their participation by having access to their course grade as soon as that grade is submitted by the instructor. On the other hand, any student who does not complete the course evaluation (or opt out of doing so in the evaluation) should expect to incur a two week delay in access to his or her course grade beyond the university's official date for grade availability. To complete online evaluations go to <http://eval.nku.edu/>. Click on "student login" and use the same username and password as used on campus.

In addition, you should be aware that:

- Evaluations can effect change in courses. Evaluations without comments are less valuable and less credible than those filled out thoughtfully. Comments that are expressed well are more effective than those that are not.
- Positive feedback is just as important as criticism. Moreover, negative evaluations without any explanation and specifics are not especially useful.
- Once grades are submitted, all evaluations are read not only by the instructor, but also by the instructors department chairperson.
- Evaluations not only provide feedback to your instructor, but also provide information to the department chair for use in performance evaluations. This information affects reappointments, promotions, salaries, and teaching assignments.