

# SENG 6250: Software Systems Modeling and Analysis

## Fall 2019

<b>Instructor</b>	Dr. Mark Hills
<b>Scheduled Class Time</b>	Section 01: Tuesday, Thursday: 3:30pm - 4:45pm Class meets in Brewster B-203  Section 601: Online
<b>Instructor Office</b>	Science & Technology Building, Room C-110
<b>Office Hours</b>	Tuesday 2pm to 3:15pm Wednesday 1:00pm to 3:30pm Thursday 2pm to 3:15pm  Feel free to make an appointment with me if you need to meet outside of these hours.
<b>Instructor Phone</b>	252-328-9692
<b>Instructor Email</b>	<a href="mailto:hillsma@ecu.edu">hillsma@ecu.edu</a> , responses within 24 hours during the week, potentially longer on weekends or over holidays
<b>Course Web Page</b>	Blackboard: <a href="https://blackboard.ecu.edu">https://blackboard.ecu.edu</a>

### Course Description and Objectives

The catalog description for this course is as follows:

*Methods for the construction of software including formal notation language and its application to the analysis and specification of software system requirements.*

In this course we will cover a number of topics in the areas of software modeling. This includes more formal techniques related to formal logics, specification, and model checking; model-driven software engineering techniques including domain-specific modeling languages, model to model transformations, and model to text transformations; and lightweight program analysis techniques, such as those used in continuous integration pipelines and code review systems for identifying potential problems in source code.

Upon completion of this course each student will be able to:

- apply modeling and model-driven techniques for building and understanding software systems;
- use and modify tools such as Eclipse EMF, JPF, JBMC, Error Prone, and SpotBugs to build, explore, reason about, analyze, verify, and transform programs and models of programs;
- engage with, and potentially add to, the research literature on modeling and model-driven software engineering that appears in venues such as the MODELS conference.

## Prerequisites

The prerequisite for this course is SENG 6230 (Software Engineering Foundations). If you have not taken this course, please schedule time to meet with me to discuss your background and preparedness for this course. It also helps if you have experience similar to that gained in SENG 6240 and/or SENG 6245, since that experience will help to give you an appreciation of the need for the techniques discussed in this course.

## Textbooks

The required text for this course is *Model-Driven Software Engineering in Practice*, by Brambilla, Cabot, and Wimmer. You are highly recommended to purchase an ACM membership, which will give you access to the O'Reilly Safari learning platform/site. This book is then available through Safari. You can also find it on Amazon, although it is more expensive there (at least if you purchase it new). Links to the book, as well as instructions for joining ACM and accessing Safari, are available on Blackboard.

Other course material, including references to books, conference or journal articles, tutorials on the web, and videos will be posted as the course progresses.

## Grading

Students will be evaluated based on a combination of class activities, including homework assignments, the midterm and final exams, and a research project/lesson. The final grade will be assessed with the following criteria, with grades normalized to a 100 point scale:

Grading	
A	$\geq 90$
B	$\geq 80$
C	$\geq 70$
F	$< 70$

This grade is based on the following relative weights of the various activities:

Weighting	
Homework, Reading Quizzes	40%
Midterm Exam	20%
Final Exam	20%
Research Project/Lesson	20%

Homework assignments will be due roughly every two weeks. Quizzes will be posted periodically, focused on assigned readings. More details about the homework, the quizzes, and the research project/lesson will be made available during the course.

## **Exams**

Exams are closed book and closed notes, with the exception of an individual note sheet, an 8 ½ x 11 (letter size) sheet of paper, that can include hand-written notes on both sides. This sheet cannot be shared and must be handed in with each exam. The midterm exam is scheduled during the class meeting time on the Thursday before Fall break (October 3). The final exam is scheduled during the final exam period for this class, which is 2pm to 4:30pm on Thursday, December 5<sup>th</sup>. If you are taking the course online, you must have a proctor for both exams. You must use the University of North Carolina Proctoring Network. More information can be found at: <http://online.northcarolina.edu/exams/overview.htm>. The exam will be available at proctoring centers on the stated exam day, as well as the day before and the day after.

## **Starfish**

This course uses the Starfish system to provide you with information on your performance within the course. For more information, please see <http://www.ecu.edu/cs-acad/advising/upload/Starfish-Student-Getting-Started.pdf>.

## **Student Conduct**

Smoking is not permitted in classrooms. Please turn off mobile phones in class. Laptops and tablets can be used for taking notes, but should not be used for other work (or recreational browsing, playing games, etc).

Students are expected to abide by the university's Student Honor Code. The homework that you do is a critical part of your education. Each student is expected to do his or her own individual work. That does not mean you are not allowed to discuss your ideas with other students. Working together can be beneficial, and I encourage you to talk through ideas with other students. But outright copying is considered plagiarism and is unacceptable. Students who copy other students' work, or who allow their work to be copied, or who copy their work from other sources, such as the Internet, will receive either no credit or negative credit for the assignment, and may be reported to the university for an academic integrity violation.

Other potential academic integrity violations are cheating, falsification, multiple submissions of the same work in different classes, and attempts at any of these violations. Please see [http://www.ecu.edu/cs-studentlife/policyhub/academic\\_integrity.cfm](http://www.ecu.edu/cs-studentlife/policyhub/academic_integrity.cfm) for more details.

Academic integrity violations can result in a grade penalty up to and including an F for the course.

## **Incompletes**

No incompletes will be issued in this course except for extraordinary circumstances, which generally will be situations where almost all work is complete, this work has been done at an acceptable level of quality, and it is realistic that you can pass the course once the remaining work is completed.

## **Other Policies**

All homework solutions are due by the posted due date. If for some reason you are not able to complete the assignment on time, you must contact me directly with an explanation and request an extension. If something

comes up and you are having trouble keeping up with the class, talk to me right away, *don't wait until the end of the semester!*

Course participation is an important part of the course. If you do not participate you will make it harder to have the kinds of discussions we need to make the class interesting. Please read the assigned readings in a timely fashion and come to class prepared to talk.

Success in the class is directly correlated with class attendance, so I highly recommend that you attend and actively participate. If for some reason you cannot attend, please let me know – my expectation is that you will watch the lecture online and ask me questions about the material if you have any. For online students, I recommend that you watch the lecture the day it is given and send any questions before the next class session (so I can address them in class). Falling behind will make the course more difficult than it would otherwise be. I will be taking attendance at regular points in the class for my own records.

All code, test scripts, and other software artifacts for your assignments must be stored in an online source repository set up on GitHub. Therefore, you must create a GitHub account if you do not already have one. Any code needed for the assignments will be distributed using either GitHub repositories or Blackboard. Written assignments must instead be scanned as PDFs and uploaded to Blackboard.

### **Copyright on Course Materials**

Course materials, including programming assignments and lecture notes, can only be publicly shared or used for commercial purposes if given permission. This is covered by ECU copyright regulations, available at <http://www.ecu.edu/pr/10/40/02>, which state the following:

7.1.3. Notes of classroom and laboratory lectures, syllabi, exercises and other course materials taken by Students shall not be deemed Student Works, may only be used for personal educational purposes, and shall not be used for commercialization by the Student generating such notes or by any third party without the express written permission of the author of such Works. Violation of University Policy may be grounds for disciplinary action pursuant with the ECU Student Conduct Process.

### **Weather Emergencies**

In the event of a weather emergency, information about ECU can be obtained through the following sources:

ECU emergency notices	<a href="http://www.ecu.edu/alert">http://www.ecu.edu/alert</a>
ECU emergency information hotline	252-328-0062

### **Students with Disabilities**

East Carolina University seeks to comply fully with the Americans with Disabilities Act (ADA). Students requesting accommodations based on a disability must be registered with the Department for Disability Support Services located in Slay 138 ((252) 737-1016 (Voice/TTY)).

For more information, please see <http://www.ecu.edu/cs-studentlife/dss/>.

## **Caveats**

Occasionally, it may be necessary to revise this syllabus due to extenuating circumstances. I reserve the right to revise this syllabus if the need arises. If I do so, I will announce this on Blackboard.