University of Massachusetts Boston CS410

Syllabus for CS410 Software Engineering

Real Projects. Real Impact. Real $kills.

CS410 is a project-based course that introduces all aspects of the software development process. Together with real-world clients, you will learn to create high-quality software from initial specification to final validation. This course also includes advanced topics such as Docker containers, Cython wrapping, applied Deep Learning, and agile development methods. After successful completion of this course, you will be a hot ticket in the eyes of any engineering recruiter.

We will learn and use:

- The Software Development Life Cycle (Requirements, Design, Implementation, Verification, Maintenance)
- Prototyping, Scrum, Agile, DevOps
- UML Modeling
- Python and C++ (w/ Cython)
- Docker Containers / Kubernetes
- Applied Deep Learning with Keras/TensorFlow
- Github / git and Overleaf / LaTeX

Teaching Staff

Instructor: Daniel Haehn
Teaching Assistants: Loraine Franke and Jesse Freeman
Contact: `staff@cs410.net`

Lectures

Mondays, Wednesdays, Fridays
11:00-11:50am
Remote!

Office Hours

Mondays and Wednesdays
1:00-2:30pm and by request
Remote!

Blackboard Access

Please use Blackboard to access lecture videos, slides, and all other materials.
Login at `https://umb.umassonline.net/`.

Questions and Concerns

Please direct questions and concerns of any kind (now and during the semester) to the teaching staff in person or at `staff@cs410.net`.

Course Structure

34 Lectures
Project (80% of final grade)
- Team Selection (5% of final grade)
- Proposal (Requirements, Specification, and Design) (20% of final grade)
- Implementation, Deployment, and Testing (25% of final grade)
- Project Presentation (10% of final grade)
- Final Project Documentation (20% of final grade)

Participation (in-class, in-office, and as part of blackboard discussions, 20% of final grade)
No assignments
No exams

We will have **multiple guest lectures** from experienced software engineers.

Final Grade

The weighted scores from above will result in a final grade as follows:

$\geq$ 90 = A	69-66 = C
89-86 = A-	65-62 = C-
85-82 = B+	61-58 = D+
81-78 = B	57-54 = D
77-74 = B-	53-50 = D-
73-70 = C+	below 50 = F

Interactive Lectures (Bring your Laptop!)

Lectures will include interactive components. If you do not have a laptop or reliable internet, please contact the teaching staff at `staff@cs410.net`.

Project Milestones and Late Submissions

All project milestones (Team Selection, Project Proposal, Revised Project Proposal, Final Project Documentation) are due at 11:59pm on the specified day. Late submissions will result in score reductions of 1% per late hour.

Participation

Class attendance and participation, as well as posts in the online discussion forum, count towards your grade. Please skip at most 4 classes and contribute at least once to every official discussion topic, if you want a 100% participation score.

Collaboration Policy

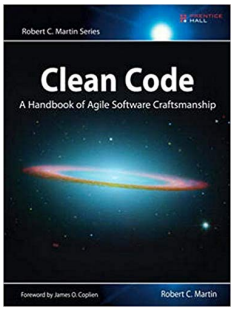
You are allowed and encouraged to collaborate with anybody. However, please make sure to give proper credit. For instance, if your friend helps you with your report or you copied code from another source, you must acknowledge their name in your code and the project documentation.

Open Source License and Proprietary Code

The course material is publicly available under the MIT license (`https://opensource.org/licenses/MIT`). Some projects might include proprietary knowledge and code or require a signed non-disclosure agreement (NDA).

Readings

The course material is based on the following books:



Limited copies of all books are available through the teaching staff. While the books are great, **you do not need to purchase them**—the most up-to-date information is available online.

Disability Accommodations

If you have a disability and feel you will need accommodation to complete course requirements, please contact the Ross Center for Disability Services at 617.287.7430.

Other Policies

We follow the Academic Policies of the Office of the Registrar.
See `https://www.umb.edu/registrar/academic_policies` or contact `staff@cs410.net` for questions.

Timeline

Date		Lecture		Due at 11:59pm
01/25/2021	M	01	Introduction	
01/27/2021	W	02	The Software Development Cycle	
01/29/2021	F	03	Hands-on Day! (Environment)	
02/01/2021	M	04	Requirements and Specifications	
02/03/2021	W	05	Requirements and Specifications II	
02/05/2021	F	06	Project Presentations	
02/08/2021	M	07	Design: Architecture	
02/10/2021	W	08	Guest Lecture: Kristen Laird, Microsoft	
02/12/2021	F	09	Hands-on Day! (UML)	
02/15/2021	M		No Class (President's Day)	
02/17/2021	W	10	Design: Modularity	
02/19/2021	F	11	Hands-on Day! (Overleaf/Project Proposal)	Team Selection
02/22/2021	M		No class: Project Proposal Work I	
02/24/2021	W		No class: Project Proposal Work II	
02/26/2021	F		No class: Project Proposal Work III	Project Proposal
03/01/2021	M	12	Guest Lecture: Nam Wook Kim, Boston College	
03/03/2021	W	13	Implementation	
03/05/2021	F	14	Hands-on Day! (C++ Basics)	
03/08/2021	M	15	Implementation II	
03/10/2021	W	16	Guest Lecture: Mike Chabot, DraftKings	
03/12/2021	F	17	Hands-on Day! (C++ Functions and Classes)	
03/15/2021	M		No class (Spring Break)	
03/17/2021	W		No class (Spring Break)	
03/19/2021	F		No class (Spring Break)	
03/22/2021	M	18	Guest Lecture: Rudolph Pienaar, Boston Children's Hospital	
03/24/2021	W	19	DevOps and Deployment	
03/26/2021	F	20	Hands-on Day! (C++ Arrays and Vectors)	Revised Project Proposal
03/29/2021	M	21	Deployment II	
03/31/2021	W	22	Testing	
04/02/2021	F	23	Hands-on Day! (C++ Templates)	
04/05/2021	M	24	Software Development Models	
04/07/2021	W	25	Guest Lecture: Fritz Lekschas, Harvard University	
04/09/2021	F	26	Hands-on Day! (C++ and Python with Cython!)	
04/12/2021	M	27	Applied Deep Learning	
04/14/2021	W	28	Agile Programming and Scrum!	
04/16/2021	F	29	Hands-on Day! (Testing Frameworks)	
04/19/2021	M		No class (Patriot's Day)	
04/21/2021	W		No class: Implementation Time	
04/23/2021	F		No class: Implementation Time	
04/26/2021	M		No class: Implementation Time	
04/28/2021	W		No class: Project Status Meeting	
04/30/2021	F		No class: Implementation Time	
05/03/2021	M	30	Project Presentations I	
05/05/2021	W	31	Project Presentations II	
05/07/2021	F	32	Project Presentations III	
05/10/2021	M	33	Recap I	
05/12/2021	W	34	Recap II and Last Class	
05/14/2021	F		No class / Office hours only	
05/17/2021	M		No class / Office hours only	
05/19/2021	W		No class / Office hours only	
05/21/2021	F		No class / Office hours only	Final Project Documentation