**CS 518 - Intro to Software Engineering**

**Instructors**

* David Benedetto. [David.Benedetto@unh.edu](mailto:David.Benedetto@unh.edu)

**Catalog Description**

Study of software development practices and processes in the following areas: software life cycle; system validation and verification; development pipeline; cloud infrastructures; virtual machines, and containers; logging, instrumentation, and performance; fundamental security concepts. Experience working in groups. Restricted to students not in Senior Standing. Prereq: CS 416 or CS 417 or equivalent.

**My Description**

Students learn and apply principles and practices of modern software engineering. These include: working in teams using Agile methodology; considering tradeoffs involved in engineering design; designing a web-based software product with microservices architecture; developing and testing a web service / API with a database; developing and testing a web server / API gateway; containerizing, composing, and deploying an application.

**Course Text**

* There is no need to purchase a text, readings will be provided

# Course overview

**Course Format**

| Lecture | First class will be a lecture based primarily on reading assignments. May include active learning components. |
| --- | --- |
| Lab | Second class will be a lab. There will be some individual and some group labs. |
| Recitation | Third class will be recitation to review and get help. |

# 

**Outline**

| **week#** | **M date** |  |  |  |
| --- | --- | --- | --- | --- |
| 1 | 08/25 | Intro | git | basics |
| 2 | 09/01 | App / user | mongodb | CRUD operations |
| 3 | 09/08 |  | flask | routes, templates |
| 4 | 09/15 |  | flask\_login | login / logout |
| 5 | 09/22 |  | azure | deploy |
| 6 | 09/29 | API / business | mongodb | CRUD operations |
| 7 | 10/06 |  | fastapi | endpoints + API testing |
| 8 | 10/13 |  | integration | integrate into app |
| 9 | 10/20 |  | azure | deploy |
| 10 | 10/27 | Planning | agile; gitlab | project vision;  epics, stories, and issues |
| 11 | 11/03 |  | git | branching and merging |
| 12 | 11/10 | Development | dev1 | develop |
| 13 | 11/17 |  | dev2 | deploy |
| - | 11/24 |  |  |  |
| 14 | 12/01 |  | present | present |

**Units:**

* App / User: Develop and deploy a web-based application with authorization and user management features.
* API / Business: Develop and deploy an API for business-functionality; integrate that functionality into the App.
* Planning: Create a draft charter and design document for your group's project.
* Development: Develop and deploy your custom API and integrated App. Present your work.

# 

# 

# Grading & assignments

**Grading (percentages are approximate and may be subject to some variation)**

* Engineering concepts (20%)
  + Reading and discussion. Students will learn about fundamental concepts of software engineering.
* Individual labs (45%)
  + Data manager. Students will build a program that allows users to manipulate data in a database;
  + REST API. They will build and deploy a REST API that allows the data manager to be accessed remotely.
  + Web app. Students will build a web application that will serve as a user interface to the database.
* Group project components (35%)
  + Planning
    - Charter and stories. Students will design their own project, establish their own objectives, and decide how users will interact with their product.
    - Designs. Students will create system design diagrams to show how components of their system interact, and how data is related.
    - Sprint planning. Students will use project management tools to plan for their group work over the final two weeks of the semester.
  + Development
    - REST API. By applying what they learned in developing their own Data manager, students will design a REST API for manipulating data in their system.
    - Web app. By applying what they've learned in developing their own Web app, students will design a user interface for their own system.
  + Presentation and final submission:
    - Presentations. Students will present their work to their peers. The presentation should include a live or recorded demo.
    - Final submission. Students will document the design, implementation, testing, and evaluation of their work.
* Grade adjustment (variable)
  + Grade adjustments may be made at the professor's discretion, based on work contribution and/or attendance at meetings, presentations, and other events. Adjustments may also be made for behavior detrimental to the team. Please note that dominating a team and taking on more than your share of the work can also be detrimental - all team members should strive to get everyone involved in the project.

**Policies**

**Attendance and group work; late work**

* *Attendance and group work:* Students who neither attend lab nor notify their lab instructor and group will receive NO CREDIT for group work. Students who are late for lab may be deducted points proportional to the amount of lab time they miss.
* *Remote attendance; excused absences:* Students can make arrangements to attend remotely, but in-person is strongly preferred. Students can receive credit without attending, but they will need to contribute to the lab. This should be reserved for extenuating circumstances, which should be communicated with TAs and lab mates.
* *Grade adjustments:* in some circumstances, adjustments may be made to individual grades. This will be done using the assignment "grade adjustment". Multiple adjustments may be made - each adjustment will be accompanied by an explanatory comment.
* *Late work:* 10% off for each day late, up to 5 days. Exceptions can be made, but only if you notify your TA and/or the instructor prior to the deadline.
* *Regrading.* If a group or student loses significant points on an assignment, they can improve their work and earn back some of the credit they have lost. They should email a request to their TA and copy the Instructor.

**Attendance - general**

Class attendance is important for your learning. You are responsible for all course assignments and meeting all deadlines unless exceptions are agreed upon with the instructor ahead of time. If you need to miss class for a planned activity, let the instructor know ahead of time. In the event that you need accommodation for a religious or cultural holiday/observance, please make that request as early in the semester as possible.

If you are dealing with an unexpected, extenuating circumstance that will keep you out of class or affect your performance for more than a day or two, reach out to the Dean of Students ([dean.students@unh.edu](mailto:dean.students@unh.edu) ) to request a letter be sent to all your faculty. Note: If you are asked to quarantine or isolate due to COVID-19 by Health & Wellness, a letter will automatically be sent to your faculty. In the case of extended absence, please contact your instructor to discuss your options.

**Accommodations**

According to the Americans with Disabilities Act (as amended, 2008), each student with a disability has the right to request services from UNH to accommodate his/her/their disability. If you are a student with a documented disability or believe you may have a disability that requires accommodations, please contact Student Accessibility Services (SAS) at 201 Smith Hall. Accommodation letters are created by SAS with the student. Please follow-up with your instructor as soon as possible to ensure timely implementation of the identified accommodations in the letter. Faculty have an obligation to respond once they receive official notice of accommodations from SAS but are under no obligation to provide retroactive accommodations. For more information refer to https://www.unh.edu/studentaccessibility or contact SAS at 603.862.2607, 711 (Relay NH) or [sas.office@unh.edu](mailto:sas.office@unh.edu).

**Confidentiality and Mandatory Reporting**

The University of New Hampshire and its faculty are committed to assuring a safe and productive educational environment for all students and for the university as a whole. To this end, the university requires faculty members to report to the university’s Title IX Coordinator (Laura Buchs, laura.buchs@unh.edu, 603-862-2930/1527 TTY) any incidents of sexual violence and harassment shared by students. If you wish to speak to a confidential support service provider who does not have this reporting responsibility because their discussions with clients are subject to legal privilege, you can contact SHARPP (Sexual Harassment & Rape Prevention Program) at (603) 862-7233/TTY (800) 735-2964. For more information about what happens when you report, how the university treats your information once a report is made to the Title IX Coordinator, your rights and reporting options at UNH (including anonymous reporting options) please visit student reporting options .

Help us improve our campus and community climate. If you have observed or experienced an incident of bias, discrimination or harassment, please report the incident by contacting the Civil Rights & Equity Office at UNH.civilrights@unh.edu or TEL # (603) 862-2930 voice/ (603) 862-1527 TTY / 7-1-1 Relay NH, or visit the CREO website. Anonymous reports may be submitted.

**COVID protocols**

It is your responsibility to pay attention to messaging from the University (RAVE and Canvas and Email) in the event that any COVID protocols change. You can always access current COVID protocols and requirements through the Health and Wellness Website: <https://www.unh.edu/health/health-alert-covid-19>