Systems Integration

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Academic Integrity

“Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu”

The latest version of this can be found here: https://www5.njit.edu/policies/sites/policies/files/NJIT-University-Policy-on-Academic-Integrity.pdf

Objective

This course will be an intensive project based course designed to leverage the breadth of your background in Information Technologies. You will work in a group, on an extensive project throughout the semester. This class will give you ample opportunity to refresh your understanding of the core information technology skills of system administration, network administration, database administration, software engineering, graphic design, and full stack web development. Furthermore, this class will give you the opportunity to become a domain expert in one or more of these areas for your team.

Use of Artificial Intelligence

All work submitted is expected to be the result of your efforts and your efforts alone. Use of AI is not permitted for submitted works.

Modality

This course is offered in-person twice a week, with in-person office hours. In addition to the in-person component of the course, a Discord server has been set up for this course as a supplemental way to communicate with your teams and the professor. The course also uses

canvas to provide major announcements, a place to host the syllabus, and for the submission of assignments and documentation for the project. You are responsible for keeping up to date with your email, discord, and canvas.

Grading

- Milestones (~5): 10%
- Project Proposals: 5%
- Change Log: 10%
- Mid-Term Design Challenge: 15%
- Mid-Term Milestone : 25%
- Final Project : 25%
- Final Design Challenge : 10%

Course Materials

- Discord
    - Office Hours (MIXR Labs): https://discord.gg/VGVQ3nrG5Y
    - Class Discussion: https://discord.gg/qJf3QmBESN
- NJIT VPN Access Or Alternative VPN
- VirtualBox or comparable Virtual Platform
- Ubuntu Latest LTS image
- A Github Account
- Trello Account (recommended)
- Unofficial textbook: https://www.oercommons.org/courses/systems-integration-a-project-based-approach
- Seed Project: https://github.com/engineerOfLies/rabbitmqphp_example

Additional Resources

The following web pages will be very helpful while working on projects:

- Canvas - Be sure your credentials are up to date
- Discord - For live discourse
- Stack Overflow - Your new home
- Google - First stop on debugging

Submission Criteria

All projects for the class must follow a set of submission guidelines to be eligible for grading. All projects must include the following:

- Project Proposal: The proposal functions as our contract for your project. You put forth the vision for your project and we will discuss together what will be expected at grading time. You are to post a PDF of your design document to Canvas. Specific deliverables will be agreed upon and posted to your canvas project thread. This is how your project will be graded. Without an approved proposal your project cannot be graded (and will default to a 0).
- Presentations: You are required to present your projects in class as part of the project deliverables.

- Change Log: Your team is expected to submit a complete log of the activities of your group. This includes your Trello Board exported to JSON (or whatever project management software you used), All git repos and branch names, All Server Documentation, and relevant Team Chat / Email Logs.

Professional Conduct

This course is about learning to work in a professional team environment as well as the technical aspects. You are all expected to behave in such a manner both in and out of the classroom. You are expected to treat each other with respect and to refrain from any sort of personal misconduct. If there is conflict within a team, troubleshooting the issue is as much a responsibility of the team as any other deliverable. Any amount of disrespect or harassment will not be tolerated. See the NJIT Code of Student Conduct for further guidelines.

Late Policy

Any projects that are submitted late will have a penalty of 1 point (of its percent value towards your final grade) per day late. Any project more than 7 days late will not be considered for grading. No exceptions.

Project Guidelines

You and your group are to identify a third party data source and build a service based upon that data. An example may include sports statistics, server status, market data, etc. It can be any source as long as it is legal to use and not generated by the team.

Course Topics

Software as a service
Team Management
Project Management
AGILE / SCRUM
ETL
Messaging Layers
Server Side Development
Change Management
Disaster Recovery
Integration of Networking, Systems Administration, Web Development, Back End Development

Course Milestones

Week 1: Introduction and Project Overview

- Begin Networking for Teams

Week 2: Tutorials for Virtual Machine and web server setup

- Milestone - Get your own virtual machine setup
- Milestone - Get your own web Server setup

Week 3: Tutorials for Database and message queueing system setup

- Teams set
- Project Proposals Due
- Milestone - Teams get the message Queue sample project working across each other's VMs
- Team Scrum update

Week 4: Review for midterm common deliverables

- Milestone - User Authentication Functional
- Teams meet with professor AFTER they demonstrate functional Authentication to get team specific midterm deliverables
- Team Scrum update

Week 5: Project Support Lab

- Milestone - Distributed Logger working
- Milestone - 1 personal deliver done
- Team Scrum update

Week 6: Project Support Lab

- Milestone - 2 personal delivers done
- Team Scrum update

Week 7: Project Support Lab

- Milestone - 2 personal delivers done
- Team Scrum update

Week 8: Midterm Milestone Due / Midterm Design Challenge

Week 9: Overview of Final Project Framework

Week 10: Deployment Systems in Depth

Week 11: Final Project Quality of Life Features - Guidelines for personal deliverable scope

- Milestone - Setup multiple VM Tiers
- Milestone - Setup Deployment Server
- Milestone - Setup SystemD for all custom tasks

Week 12: Project Support Lab

- Milestone - Deployment System Functional
- Teams meet with professor AFTER they demonstrate functional deployment to get team specific final deliverables

Week 13: Project Support Lab

- Milestone - Database Replication
- Milestone - Responsive Website, Hashed Passwords
- Milestone - 2 Personal deliverables done

Week 14: Project Support Lab
- Milestone - Failover / Backup functional
- Milestone - Firewalls and SSL setup
- Milestone - 1 Personal deliverable done

Week 15: Final Design Challenge / Final Project Presentations / Change Logs Due

Weekly topics subject to change, attend class to keep up to date.