Software System Capstone – CPSC 49200-004

Syllabus

Spring Semester 2024

I. Instructor Information

Dr. Michael J. Lewis, Assistant Professor Computer Science
Office : AS-110-A-A
Office Hours: T 11:00 am – 2:00 pm
Weekly sessions: Wed 6:00 pm (Jan 17th), Thursday 6:00 pm
Office phone number: (815) 836-5331
Email address: mlewis8@lewisu.edu
CELF: Angel Rubio

II. Course Information

CPSC-49200-004
3 Credit hours

Course description:

In this course, students will participate, as part of a team, in the design, implementation and testing of a medium-to-large software project. Additionally, this course will cover topics in professional ethics, intellectual properties, privacy and professional communication.

Course meeting times, days, and location:

Thursday 6:00 pm afterwards CDT through Zoom. Passcode -5321
https://lewisu-edu.zoom.us/j/6218100622?pwd=WndDTE5vTTNvL1ZPYithalpMVE1ZQT09

Additional instructional time: You will need to arrange time for online meetings with members of your project team and your client.

Student Learning Outcomes:

Course student learning outcomes: On the successful completion of this course students will be able to:

- Conduct a review/setup of software needed for a project.
- Identify the biases within software that runs within our institutions.
- Articulate the political ramifications of software that is used within our local and global communities.
- Collaborate in a team setting, in helping to develop a high-grade software product.

- Examine the intersectionality between technology and social justice and equity.
- Work with professional software development tools.
- Effectively document their role in the creation of a software product.
- Explain privacy and regulation issues relating to developing and using software.
- Understand how types of software licensing can affect an individual and community.
- Provide examples of the role of ethics in code, and in how people use code.
- Apply code management skills within a team.
- Apply software engineering concepts to a software work.
- Effectively present their product as a team.
- Document the usage of the product so partners can understand how to implement the product within their business/community.
- Present a project, show how the project is run and explain the design issues.
- Write clear, concise and accurate technical documents following well defined standards.
- Reflect on the benefits and biases of software and data.

Program student learning outcomes: A Lewis University Computer Science Undergraduate will be able to:

1. Develop efficient programs using languages of various programming paradigms and for a variety of platforms.
2. Work in a team to design and implement complex data processing systems collaboratively.

Baccalaureate Characteristics/Graduate Student Learning Outcomes:

1. Essential Skills

2. Major Approaches to Knowledge

6. Critical Thinking

7. Lifelong Learning

III. University Mission Statement

Lewis University, guided by its Catholic and Lasallian heritage, provides to a diverse student population program for a liberal and professional education grounded in the interaction of knowledge and fidelity in the search for truth.

Lewis promotes the development of the complete person through the pursuit of wisdom and justice. Fundamental to its Mission is a spirit of association, which fosters community in all teaching, learning and service.

How this course connects to the University Mission:

This course embraces the Mission of the University by fostering an environment in which each student is respected as an individual within a community of learners. In the spirit of the vision of Lewis University, the goals and objectives of this course seek to prepare students to be successful, life-long learners who are intellectually engaged, ethically grounded, socially responsible, and globally aware.

IV. Required Course Materials

Textbook(s):

- Codev2 by Lawrence Lessig. This is freely available at: http://codev2.cc/. All discussion assignments will be based off of Codev2.

Pick from one or more of the following books for the Open Reading Progress Document :

- **Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor**. ISBN 978-1-25007-431-7 (hardcover) 978-1-46688-596-7 (ebook).
- S. Noble. 2018 **Algorithms of Oppression: How Search Engines Reinforce Racism**. NYU Press
- C. O'Neil 2017 **Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy**. Broadway Books. ISBN 978-0-55341-881-1 (hardcover) 9780553418828 (ebook).
- S. Wachter-Boetter. 2017 **Technically Wrong: Sexist Apps, Biased Algorithms, and Other Threats of Toxic Tech**. ISBN 978-0-39363-463-1 (hardcover)

Supplemental readings, videos, online materials: Students will require access to Blackboard where instructional videos and slides will be made available.

Hardware and software requirements:

Students will require various development software depending on the project selected. Most or all projects will focus on web site creation so it is highly recommended to use a front-end library or framework so team members can compartmentalize their work. I expect to see the code organized in folders/classes or some type of modular/object-oriented structure. I will be giving examples in React for the front end web software, but if you are more comfortable using another front end library or framework you are free to use it in your project e.g Laravel,Django. Use a backend database library/framework that you are most comfortable with. MySQL is the most common tool for relational databases but feel to use a non-relational database as well e.g. MongoDb if this fits your overall design better. Regarding style templates for showing a professional web interface, I recommend using the bootstrap library. For code editors I recommend Microsoft Studio Code, but you are free to use other editors e.g Eclipse, Android Studio.

V. Instructional Methods and Activities

Modality of Instruction: Online

Additional Activities: Students will meet as a team to complete a software project. This will require meetings online with team members and myself and meetings with the project's client.

VI. Course Schedule

All assignments are due by midnight on Wednesday of the week following the week assigned. Consult Blackboard for specific due dates. I am flexible with late submissions within the range of a few hours, but that must not be a habit. If your late submission is due to medical reasons, you then must provide me with the necessary documentation. Other reasons for missing an

assignment e.g. Lewis conference, sporting event that you are participating in, then you have to let me know in advance.

Week 1 (Sunday Jan 14th)

- Review syllabus
- Project Progress Document update - Github assignment
- Discussion: 5 points
- CEL video

Week 2 (Jan 21nd)

- Update session - Select projects – Team Attendance taken
- Project Progress Document update
- Open Reading Progress Document
- Discussion: 5 points

Week 3 (Jan 28th)

- Reflection session with the CELF – Individual attendance taken (Feb 1st)
- Begin working on your project
- Project Progress Document update
- Discussion: 5 points

Week 4 (February 4th)

- Project Progress Document update
- Discussion 5 points
- Open Reading Progress Document

Week 5 (February 11th)

- Update session
- Project Progress Document update:
- Discussion

Week 6 (February 18th)

- Update session
- Project Progress Document update
- Open Reading Progress Document
- Discussion

Week 7 (February 25th)

- Update sessions
- Project Progress Document update
- Discussion

Week 8 (March 3rd)

- Reflection session with CELF – Individual attendance taken (March 7th)
- Project Progress Document update
- Open Reading Progress document
- Discussion: 5 points

Week 9 (March 10th Spring break no class this week)

- Use time to work on team presentation

- Discussion

Week 10 (March 17th)

- Team Presentation
- Project Progress Document
- Open Reading progress document
- Discussion
- Team project manual draft due : 20 points.

Week 11 (March 24th)

- Update session – Team attendance taken
- Project Progress Document
- Project manual critiques due

Week 12 (March 31st)

- Update session – Team attendance taken
- Project Progress Document

Week 13 (April 7th)

- Update session – Team attendance taken
- Project Progress Document

Week 14 (April 14th)

- Reflection session with CELF – Individual attendance taken (April 18th)
- Project Progress Document

Week 15 (April 21)

- Final Presentation
- project manual final due
- Survey Assignment

Finals week – no finals. enjoy your break!

VII. Grading Criteria and Course Policies

In this course, you will work in a team of 2-4 students to complete a substantial project. Often you will need to use the languages and technologies that you have not used before. This will be a common experience for you as you begin a professional career. I will assist you and will try to point you to appropriate tutorials and have some instructional videos and lectures showing basic setup of software tools, but you will be expected to do some research on your own. At the completion of the semester, you will submit a fully functional software application. It is expected that you will spend a minimum of 5 hours each week on the project.

Course Grade

Writing

(Discussion, Open Reading Document, Progress Document, Project Manual)

This course is designed to meet the advanced writing requirement for Computer Science. There are four major writing components in this course are listed below. You will receive feedback from your instructor on each assignment and from your peers on several assignments. If you feel that you need additional help or feedback on any of the writing-focused assignments, please make an appointment with the Writing Center. Assistance is available in face-to-face appointments, real-time phone appointments or via email.

The three major writing components in this course are the open reading progress document, the project progress document, and the project manual. Grading for these assignments will incorporate the advanced writing student learning outcomes. The project manual composes of 15% of your total grade. In addition, you will be writing weekly discussions two based on the book *Code* worth 10% of your grade. The ongoing writing assignments - Open Reading Progress document and Project Progress Document are both worth 15% of your grade.

Discussion 10%

For the first 10 weeks you are to post your opinion and author's interpretation on a topic, from at least one of the four books specified in the *required course material* and reply to another student's posting on the blackboard discussion forum. The discussion is based on the following Code reading assigned for that week. Both the posting and the reply are due by Wednesday 11:59 pm. The discussion is worth 5 points.

The 5 points will be assessed as follows:

- Specify what the author is conveying in this chapter. In addition, write your opinion on the topic. This discussion paragraph is required to be between 90 - 200 words (I will not punish you for going over this limit if you are getting your writing juices flowing). This section is worth 3 points.
- Comment on another student's discussion post. This is a short post stating why you agree or disagree with the student with either his/her interpretation of the reading or the student's opinion on the subject. This can also include adding a few points that would help supplement the student's post. A reply that just states 'I agree' or disagree without adding any substance stated above will not get credit. This section is worth 2 points.

Open reading Progress Document 10%

Here you are to pick from the open reading document list specified above section (IV). Every two weeks until week 10 you are to write on your own selected passage of material based on the books detailed in the *required course materials for the open reading progress document* section. This length of the reading is of your choosing, it can be a chapter, or just a series of pages as long as the content that you have read is substantial enough to write on. Document what passages you have read and specify what the author is trying to convey and your opinion on the topic. This writing includes any technology-based solutions or what aspects of code/technology is needed to be removed to help solve the problem. The two-week update of

this progress document is required to be at a minimum 300 words in length. Submit as one updated word document, biweekly by Wednesday11:59 pm.

Project Progress Document 15%

Each week you are to write an update on the project progress. These can be bullet points. You will submit as an updated word document every week until week 15. Each submission is worth a maximum of 7 points. Progress documents are individual assignments up to week 4 or 5. Progress document after that point are team-based assignments. The rubric is as follows.

Unsatisfactory (0-1 points)	**Satisfactory (2-5 point)**	**Distinguished (6-7 points)**
· No specification on the type of progress. · Completely repeats the progress from last progress document.	· Specifies the individual progress not the group's (even in team-based submissions). · Appropriately written in full sentences with correct spelling and grammar · Ties to previous progress. · Articulate goals for next week.	· Include all the satisfactory deliverables. · Very clearly expresses what was accomplished. · For code or software that is not working, explain in detail what you tried and what the output was. · Show screen shot of what you did, and what was done before.

There will be no points for late updates or for updates that does not document some progress for the week or if you make a general statement of progress or state the same thing from last week e.g. *I went through a tutorial*.

Project manual 15 %

This team document contains the following sections.

- **Proposal/Use**: Create the project proposal. You must specify the motivation behind the creation of this project. What were the challenges that were noted by the external partner? What new features were requested? Specify what are the goals and what will the team accomplish at the end of the semester. How will the team accomplish these goals? What is the plan/approach that will create a successful timely implemented project? Include a section that will specify how a user would use the software/website, and what type of user would use this.
- **Requirements**: This section should specify what is needed to set up the project. Your team must specify the tools, the purpose of using the tools, how the tools are integrated within the project and how to install the tools.
- **Database**: This section should specify the database and the tables used for the project. An Entity-relational diagram is to be included in this section to show the relations between all the data entities. If your project does not use a database, you will identify any data consumed or produced by your application.
- **Application Workflow**: Provide professional looking diagrams detailing the application workflow, for example producing a flow diagram that shows how each web page connects to other web pages. You must have at least 15 diagram boxes modeling your workflow. Also, supply screen shots of your project with documentation so others (application users) can better understand the application workflow.

- **Features table (listing):** Create a table or listing showing the features of your project. Describe the feature. Specify the software software(s) you used. Mark if the feature was an added feature, improved upon feature, a feature that already existed (for projects that were taken on from the previous Capstone semester) and for a feature that can be added later. An example of a feature would be adding a secure login system using role authentication, or it can be a development feature such as migrated from just a php, css project to a Laravel, or Node.js framework in order to organize the project better and provide easier client installation and maintenance.
- **Project Planning**: Specify any software planning tools you used for this project. This section will summarize these issues as the project tasks are to be completed during the semester and identify who is responsible for carrying out the tasks throughout the duration of the semester.
- **Test Planning:** Provide a test plan for the application based on the different scenarios of user inputs. The test plan can be program based, involve unit testing and can include documenting application use. Also specify how you generated any test data for the database that would work with your test queries. I will also take account for a test database as a test planning solution. In this case for your final demo, use the test database and show the difference scenarios in which your data is populated to the site. If the project is research based show via graph or table and report on your test findings.
- **Conclusion**: Were you able to accomplish all that you planned? This section should provide a final summary of the project and suggest a list of future features.

The project manual is graded from three different assignments: the team draft, project manual feedback (review) and final submission of the project manual.

- **Team draft**: By week 10, your team will upload/create a team draft of the project manual on google docs within the following folder on the Sage system: Project-manuals
- The project manual should be 5-7 pages in length. Each student should include a paragraph describing their contribution to the team document. This assignment is worth 15 points.
    - Individual contribution is stated (4 points)
    - Resulting document is well organized and consistently written (7 points)
    - Grammar, punctuation and spelling are correct (4 points)
- **Review**: On week 11, each team will post a review of all the other team's project manual from Project-manuals link. After the review each team can then respond to their feedback and explain how their concerns will be address in the final report.
- **Final draft**: By week 15, your team will submit the complete project manual with the corrections, further additions, testing results and a conclusion section during finals week. The final document should be 7 – 8 pages in length. Each student should include a paragraph describing their contribution to the team document. The final project manual will be graded based on the following criteria:
    - Each section clearly addresses the criteria listed above in the description. 60 %
    - Feedback received from teams is addressed 20%
    - The document is correctly structured (have sections, properly align text and images). 10%
    - The project manual is clearly written with appropriate punctuation and spelling (10 %)

Presentations- project work 25% grade

Presentations will be given on the 10th and 15th week. For the first presentation, you are to present progress of your design which includes showing a demo of your code. Your final presentation will be graded based on 6 categories.

- Organization - Connecting the purpose of your project to what you have accomplished within a well-structured manner.
- Content - Showing a good knowledge on how the project was put together and the resources used.
- Visual Aids/Text - Well suited diagrams that complement your explanations.
- Delivery Techniques - Good articulation, tone and delivery.
- A working demo of your project, also specify the github link within your submission

Attendance 10 % grade

Attendance is taken for all the presentations and CELF sessions. I will also notice but not take attendance on who comes to all the weekly sessions. The amount/lack of engagement will have an effect on borderline grades.

Service Assignments – 15% grade

The service assignments are a part of the Community of Engaged Learning (CEL) curriculum. Attendance will be taken for all the service assignments if you miss all of the service assignments you will not pass the course. There will be three types of service assignments: 1. CELF reflection sessions 2. End of class survey 3. Reflection from volunteer work. The CELF reflection sessions will occur on the 3rd, 8th and 14th week of the Thursday 6 pm session. Some or all of the sessions will be conducted by the CELF and be based on ethics/community/social justice topics intersecting with technology. Angel the CELF (Community Engaged Learning Facilitator) for this class will guide all the reflective sessions. The survey assignment will be given on week 15. The end of class service assignment will be due by the end of Week 14. For this assignment you are to find non-profit organization and volunteer for a service for a day. The assignment requires that you write a 300+ word report on your volunteer experience and provide some documentation of your visit.

Schedule Changes: The instructor reserves the right to modify the schedule; however, students will be notified via Blackboard announcements and Lewis email prior to any change.

Grading Policies:

It is expected that all assignments will be submitted on time unless prior arrangements (before the due date) are made. An extension is not automatically granted. Assignments, outside of milestone assignments, that are turned in late will have a 5% per day reduction in grade. Assignments submitted later than one week after the deadline will receive no credit.

Changes to Course Assignments or Grades:

Students will be notified of any changes to assignment points or grading policy via Blackboard announcements and Lewis email prior to any change.

VIII. Practices and Policies during the Coronavirus Pandemic

Responsiveness to Change

Understanding that the COVID-19 pandemic could influence the course of this semester, Lewis University will be guided by our Lasallian mission and the well-being of our community of students, faculty, and staff in respond and adapting to any sudden changes or circumstances. Based on the guidance of the State of Illinois and the Centers for Disease Control, it may be necessary to require adherence to new to health and safety protocols and/or make changes to the planned modality this course.

Flexibility, Accommodations, and Student Absences

The University community is committed to academic standards while maintaining flexibility and empathy.

- In accordance with the Flyer's Promise, students must report positive COVID-19 tests and exposures to Lewis University. Visit the Lewis COVID homepage for reporting instructions.
- Absences relating to the Coronavirus crisis will require documentation to be recognized as excused.
- Students experiencing disruptions in their lives related to the Coronavirus that impact class attendance and participation should contact their instructor to make arrangements for completing missed work.

Students who require academic accommodations due to disability caused by COVID-19, or to limit risk of exposure to Coronavirus, can engage in an interactive process with the Learning Access Coordinator to explore avenues for accommodations. Students can contact the Academic Services office at 815-836-5593 or learningaccess@lewisu.edu to request an appointment.

Except in the case of unforeseen circumstances that require a university-wide shift in instructional modalities, courses will only be offered in the modality listed in the course schedule. It is not possible to accommodate remote attendance in on-campus classes unless the course is listed as multi-option in the schedule.

Face Coverings

The Lewis community is a mask friendly environment and recognizes the benefits of wearing face coverings by encouraging and supporting all who choose to wear one.

- Some settings on campus may require face coverings. When this is the case, clear signage will be posted.
    - Based on the guidance of the State of Illinois and the Centers for Disease Control, it may be necessary for Lewis to require face coverings. Lewis will notify the campus community if policy changes.

IX. Information for Students

Requests for Reasonable Accommodations

Lewis University is committed to providing equal access and opportunity for participation in all programs, services, and activities. If you are a student with a disability who would like to request a reasonable accommodation, please speak with the Learning Access Coordinator at the Center for Academic Success and Enrichment (CASE). Please make an appointment by calling 815-836-5593 or emailing learningaccess@lewisu.edu. Since accommodations require early planning and are not provided retroactively, it is recommended that you make your request prior to or during the first week of class. It is not necessary to disclose the nature of your disability to your instructor. For more information about academic support services, visit the website at: www.lewisu.edu/CASE.

Lewis University has adopted Blackboard Ally providing alternative formats for files uploaded by instructors. Students can click the down arrow next to any file, and select *Alternative Formats*.

Sanctified Zone

Guided by its Catholic and Lasallian heritage, Lewis University is firmly committed to fostering a campus atmosphere that is permeated by its Mission values of Fidelity, Wisdom, Knowledge, Justice, and Association. Accordingly, we have declared the University campus to be a Sanctified Zone, a place, and a people *United in Diversity*. The active promotion of diversity and the opposition to all forms of prejudice and bias are a powerful and healing expression of our desire to be Signs of Faith (Signum Fidei) to each other. To learn more about the Sanctified Zone, please visit: http://www.lewisu.edu/sanctified zone

As a Sanctified Zone, Lewis University affirms the importance of diverse spiritual and value-based identities, worldviews, and expressions, including the observance of religious and cultural traditions. To learn more about the rich diversity of spiritual and cultural holidays celebrated within the Lewis community, please see the Interfaith Calendar. Please note that this calendar is *not* a designation of spiritual and cultural holidays officially recognized or observed by Lewis University; rather, it is intended as an educational resource for the Lewis community.

Lewis University is committed to inclusion “together and by association” on our campus and in our classrooms. At the beginning of the semester, you should carefully review this course syllabus and requirements. If you have religious or cultural observances that reasonably conflict with attendance or submission of assignments in this class, please let the instructor know as soon as possible so that alternative arrangements may be discussed at the instructor’s discretion.

Academic Integrity

Scholastic integrity lies at the heart of Lewis University. Plagiarism, collusion, and other forms of cheating or scholastic dishonesty are incompatible with the principles of the University. Students engaging in such activities are subject to loss of credit and expulsion from the University. Cases involving academic dishonesty are initially considered and determined at the instructor level. If the student is not satisfied with the instructor's explanation, the student may appeal at the department/program level. Appeal of the department /program decision must be made to the Dean of the college/school. The Dean reviews the appeal and makes the final decision in all cases except those in which suspension or expulsion is recommended, and in these cases the Provost makes the final decision.

University Student Complaint Policy

The University Student Complaint Policy can be found at lewisu.edu/studentcomplaints

University Grade Appeal Policy

The University Grade Appeal Policy can be found at lewisuedu/studentcomplaints

Additional policies and handbooks for this program, department, and college and where they can be found *(list policies or handbooks and where they can be found, or provide a link to the web location – delete if this does not apply)*

Center for Health & Counseling Services

To support student success, all Lewis students are eligible for free health and mental health services on the Romeoville campus. This includes commuters and those living on campus, part-time and full-time students, graduate and undergraduate students, and those taking Lewis classes at other locations. For more information, visit the Center for Health & Counseling website at www.lewisu.edu/studentservices/health or call (815)836-5455.