

Metropolitan State University

ICS499 – Software Engineering and Capstone Project

Course Syllabus, Spring 2022

Class Hours and Course Site

ICS499 – Software Engineering and Capstone Project

Spring 2022 – Section 01

Course Credit: 4

Course Dates: 01/12/2022–04/27/2022

Course Time: 06:00 PM - 9:20 PM (every Wednesday)

Course Type: In Person, Synchronous, Lecture

Note 1: Classes on 1/12 and 1/19 will be online and synchronous due to COVID concerns

Note 2: If you are sick or have COVID symptoms, please stay home. I plan to run the class in dual mode (in-person and have the ZOOM up and running). I also share the recording through D2L.

ZOOM Details:

join Zoom Meeting

<https://minnstate.zoom.us/j/98728947633>

Meeting ID: 987 2894 7633

Passcode: 0427

Instructor Information:

Siva R Jasthi, Ph.D

Cell: 651.276.4671

Email: Siva.Jasthi@metrostate.edu

Office Hours: There are no specific office hours. I am generally available for 1:1 meeting before or after the class. On other days, please send me a mail or call

me to setup a time. We can have 1:1 meeting virtually using ZOOM. Please see the Communications section for further details.

Department Information:

Department Information	Name:	Computer Science and Cybersecurity
	Mailing address:	Department of Computer Science and Cybersecurity Metropolitan State University 700 7 th street East Saint Paul, MN, 55106-5000
	Phone:	651-793-1683 (Katie Wilson)

Course Administration

This course is hosted on D2L (Desire2Learn) and can be accessed at <https://metrostate.ims.mnscu.edu/>

- All course materials (lecture slides, homework and project assignments, announcements) will be posted on Desire2Learn (D2L)
- Please configure D2L notifications so that you receive the class notices and announcements delivered to your email.
- You can send an email to the instructor with any question or concern regarding the course. The instructor will get back to you within 24-hours.
- You are responsible for anything I go over in class, regardless if you attended the class or not.
- You are responsible for all assigned reading.

Technical Help on D2L

If you need help on D2L, you can contact Online Learning @ Metro technical support. Their email is online.learning@metrostate.edu

Text Books

No books are needed for this course. You will rely on internet resources to explore the software engineering and programming topics introduced in this class.

Prerequisites

- Prerequisite(s):* ICS 370 Software Design Models OR
ICS 372 Object-Oriented Design and Implementation and

completion of at least 24 hours of upper-division work in the major.

(ICS370 Prerequisites are: ICS 141 & MATH 215)

(ICS372 Prerequisites are: ICS 240 & MATH 215)

Course Description

- Covers concepts and methods in the definition, creation and management of databases.
- Emphasis is placed on usage of appropriate methods and tools to design and implement databases to meet identified business needs.
- Topics include conceptual, logical and physical database design theories and techniques, such as use of Entity Relationship diagrams, query tools and SQL; responsibilities of data and database administrators; database integrity, security and privacy; and current and emerging trends.
- Use of database management systems such as MySQL.
- Coverage of HCI (Human Computer Interaction) topics. Development of GUI front ends to databases with application of HCI principles to provide a high level of usability experience

Competence Statement / Course Outcomes

This course focuses on the theory and practice of effectively and efficiently building software systems that satisfy the requirements placed upon them by customers. This course gives an overview of the software lifecycle and introduces various process models used to develop software.

In the capstone course, students complete projects, emphasizing the workplace environment that the computer scientist or IT professional will encounter. As often as possible, the projects will be real projects done for real clients. Technical skills and knowledge to support software development challenges facing the information systems professional will be addressed through lectures, readings, and assignments in software engineering. Professional responsibilities of an information systems professional will be examined through readings, assignments, and discussions.

Competence Statement / Course Outcomes

1. Effectively and efficiently build software systems
2. Design and document a complete system and implement it
3. Write user manuals
4. Present work orally
5. Understand Computer Ethics issues
6. Understand the users needs and use those build a system that fulfills those needs.
7. Manage the software lifecycle.

8. Select an appropriate process model for a project.
9. Verify and validate a system.
10. Manage a software project, including estimating effort, time, and resources needed.
11. Work cooperatively in a group
12. Create a project plan and execute it
13. Elicit and document system requirements

Course Activities

Here are some typical activities you can expect in this course.

This course gives you

- 1) Experience in some individual programming assignments from inception through delivery
- 2) Experience in implementing a project (which is reasonably complex) carried from inception through delivery,
- 3) Awareness of professional responsibility issues surrounding the work of a computer professional,
- 4) The principles (knowledge and skill) of software engineering and software processes.
- 5) Experience in researching and reporting on a technology or software process subject.
- 6) Finally, you do the department a big favor by completing a survey of your experience in the CS or CIT major at Metropolitan State University.

Elaboration of the Activities

Activity 1: Individual Assignments

1.1. Overview

It is required that each of you have the required proficiency in developing reasonably complex software systems.

You will be given some programming assignments in the initial stages of the course. These assignments may pave the way for bigger project during the final stages of the course.

I reserve the right to change these to group assignments as needed.

Activity 2: Final Project

Final project is significant component of this course. These projects typically involve the following components

- Database (MySQL) components
- Programming/Server component (PHP or Python or Java)

- Interaction component (Python or Java or HTML/CSS)
- Web Services (Consumption and Development)
- Automation

2.1. Overview

Final project assigned to you is usually for a community / non-profit organization. These are typically multi-semester projects (you may be starting a new one or enhancing the existing one). You may be required to speak to the customers, non-profit organizations to solicit requirements and to design solutions for them. It is required that you maintain the confidentiality of these customers and their operations. If your project goes into production, your contributions are typically recognized through MIT License copyright notice.

2.2. Iterations, Demonstrations and Presentations

The project will be completed in several iterations. Each iteration will enhance artifacts of the project. Each iteration will also contain the peer evaluation as well. The project iterations are presented in the class room by demonstrating the functionality or walking through the artifacts.

Activity 3: Software tools and processes

You will apply several tools and processes such as (trello, xampp, github, agile processes, iterations, demonstrations) in doing the projects in this course.

Course Activities and Assignments

This course uses a variety of assignments to measure student outcomes.

Week	Category	Assignment Name	Points	Due Date	Due Time
1	Individual Assignment	A1	25	12-Jan	9:30 PM
2	Individual Assignment	A2	25	19-Jan	9:30 PM
3	Individual Assignment	A3	25	26-Jan	9:30 PM
4	Individual Assignment	A4	25	2-Feb	9:30 PM
5	Individual Assignment	A5	25	9-Feb	9:30 PM
6	Final Project - Iterations	FP1	25	16-Feb	9:30 PM
7	Final Project - Iterations	FP2	25	23-Feb	9:30 PM
8	Final Project - Iterations	FP3	25	2-Mar	9:30 PM
9	Final Project - Iterations	FP4	25	16-Mar	9:30 PM
10	Final Project - Iterations	FP5	25	23-Mar	9:30 PM
11	Final Project - Iterations	FP6	25	30-Mar	9:30 PM
12	Final Project - Iterations	FP7	25	6-Apr	9:30 PM
13	Final Project - Iterations	FP8	25	23-Apr	9:30 PM
14	Final Project - Iterations	FP9	25	20-Apr	9:30 PM

15	Final Project - Iterations	FP10	25	27-Apr	9:30 PM
16	Final Test	Final Test	75	27-Apr	9:30 PM
	Attendance	Attendance	45		
	ICS499 Survey	ICS499 Survey	5		
	Total		500		

Letter Grade

Your letter grade will be determined based on the percentage of possible points that you earn during the quarter. The following table relates the percentage/points to a letter grade. I reserve the right to lower the standards (so as to protect the students from unrealistic expectations of the instructor) after the comparative evaluation of the class.

Grade	Percentage
A	94 - 100%
A-	89 - 93.99%
B+	85 - 88.99%
B	82 - 84.99%
B-	80 - 81.99%
C+	75 - 79.99%
C	73 - 74.99%
C-	70 - 72.99%
D	60 - 69.99%
F	0 - 59.9%

If you have selected S/N grading option, then to receive a satisfactory rating (S), you must earn at least 69% of the possible points. If you wish to elect S/N grading, you must inform the registrar before the second class meeting.

Incompletes

Incompletes are not permitted before the withdrawal date. That is .. withdrawing is preferred over incomplete. And, in order to be eligible for consideration for an incomplete, (1) you have obtained at least 60% of the score in your assignments so far and (2) you must present a reasonable cause for being unable to complete the rest of the course. Please talk to me as early as possible if you feel you need an Incomplete. Eligibility does not mean entitlement. My past experience at Metro State with incomplete grades makes it unlikely that I will grant you one, except in the most justified cases. I reserve the right to say no to any request for an incomplete without justifying my position.

Absences

Absences are discouraged as it is tough to catch up with the later concepts if you miss an earlier class. In this course you will be practicing problem solving skills and programming concepts and techniques. I strongly recommend that you attend all classes so that you can observe the process of solving computer-based problems from start to finish. If you miss a class, email or talk to me as soon as possible and be sure to get the notes from the class web page or from one of your classmates. Also, make sure that you turn in the homework even if you are absent.

ZOOM conferencing tool will provide a report of your presence in the class. I will use that report to mark your attendance.

Respect

Metro State is privileged to serve students from many different nations, racial, ethnic and religious backgrounds. Students, staff and faculty practice a variety of lifestyles and come from many walks of life. We expect our classrooms to be safe havens where the opinions, practices and beliefs of others are treated respectfully. If you feel that you are not being treated appropriately by others in the class, I ask that you bring this to my attention so that the issues can be addressed. If I offend you, I ask that you approach me to share your concern so that we can learn from each other how to live together with respect and honor.

If you do not feel comfortable sharing your concern directly with me, please contact Carolyn Roney at 651-772-7818. It is part of her job at the University to help people resolve their problems.

Complaints

If you have any complaints, I suggest that you first try to resolve it by taking up the matter directly with me. If that does not resolve the problem, you could take up the issue with the Department Chair, who is Dr. Michael Stein. His email is Michael.Stein@metrostate.edu.

University Non-Attendance and Reporting Policy and Procedure

The purpose of the Non-Attendance and Reporting Policy is to ensure Federal Title IV regulations are adhered to with respect to a student's enrollment level for the purpose of calculating and paying financial aid. While Metropolitan State University is not required to take attendance, Federal Title IV financial aid regulations require a procedure to establish that students have attended, at a

minimum, one day of class for each course in which the student's enrollment status was used to determine eligibility for the Pell Grant Program. In addition, the university needs to determine a last date of attendance for those students who receive all failing grades or unofficially withdraw. Attendance is defined based on course delivery mode. A student is "in attendance" if he or she meets the following conditions before the end of the second week of the course:

Classroom Courses –the student is present in the classroom.

Web-Enhanced (Reduced Seat Time Courses) –the student is present in the classroom or submits at least one academically relevant assignment.

Online Courses –the student submits at least one academically relevant assignment

Independent Studies – the student contacts the instructor or submits at least one academically relevant assignment

If a student does not attend the first two classes, either live and/or online, that student is automatically dropped from the course. If a student adds the course past the drop/add date, he/she will not receive points for any assignments, discussions, quizzes, or exams for which the due date has already occurred. Refer to the Non-Attendance & Reporting Policy 2259 [Policy 2259](#), and the Non-Attendance and Reporting Procedure 259 [Procedure 259](#).

Note to the student: The above description is the University Policy, but for some courses, based on how it is listed in the registration materials, participation must occur during the first week of class or the student is dropped from the course.

Center for Accessibility Resources

Our institution values diversity and inclusion; we are committed to a climate of mutual respect and full participation. Our goal is to create learning environments that are usable, equitable, inclusive and welcoming. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment or achievement, please notify the instructor as soon as possible. Students with disabilities are also welcome to contact the Center for Accessibility Resources to discuss a range of options to removing barriers in the course, including accommodations.

Phone: 651-793-1549

Email accessibility.resources@metrostate.edu

Web: [Center for Accessibility Resources](#)

The University provides access to its programs and services by making reasonable accommodations for qualified students. Accommodations may

include approval for early registration, note-takers, interpreters for the deaf, adaptive equipment, and testing arrangements.

Additional Resources for Students

Technical Assistance

IT Helpdesk (it.desk@metrostate.edu; 651-793-1240) provides general computer assistance.

Center for Online Learning (online.learning@metrostate.edu; 651-793-1650) provides general assistance with online learning and course access. Please include your tech id number and course name and number.

Tutoring

The Center for Academic Excellence provides tutoring services free of charge in most academic areas including programming. See <https://www.metrostate.edu/academics/success/tutoring> for more information. Or they can be reached at centerfolk@metrostate.edu or 651-793-1460. Tutoring is available on the Saint Paul and Midway campuses.

Make up Exams and Placement Testing

No makeup tests will be offered. However, I encourage you to talk to me if you have an unavoidable absence.

Veterans and Military Student Services

Programs and support for veterans and students connected to the military. They can be reached at veterans.services@metrostate.edu or 651-763-1561.

TRIO Student Support Services

Support for first-generation students, low-income students and students with disabilities. They can be reached at trio.center@metrostate.edu or 651-793-1525.

Counseling Services

Mental health support for individuals and groups. They can be reached at counseling.services@metrostate.edu or 651-763-1568.

Library and Information Services

The university's hub for information, research help, study rooms and more. You may reach them online through the [Library pages](#) on the Metropolitan State University website or at 651-793-1616.

LGBTQ+ Student Services

Programs and advocacy for Metropolitan State University's LGBTQA community. They can be reached at 651-793-1300 or through the [LGBTQ pages](#) on the Metropolitan State University website.

Technology Requirements and Expectations

Computer Hardware and Software

For this course, your computer must fully pass the System Check found on the [D2L login page](#).

Students must have internet access in order to log into (this is required) the D2L system at least two days per week in order to check for updates and complete required work. Your skills should include the ability to add browser plug-ins for viewing files and content presented within the course or be able to get such assistance from non-campus sources at your own expense.

File Management

Intermediate or higher level skills at file management (ability to create folders, move and rename folders and files, identify type of file by its file-extension, attach files to emails, etc.)

Anti-Virus Software

Updated virus scanning software for all files sent and received (such as McAfee Antivirus, Norton Internet Security, etc.) is required.

Computer Software

Computer skills include proficiency in Microsoft's Internet Explorer (or other web browser) and in using the Internet to access online resources and sites as well as competence at using Microsoft Office products such as Word and Power Point.

Email

This course requires students to use their campus email account for all communication for related to this class. Emails originating from outside the

campus email servers may be deleted without review of the instructor. This policy prevents viruses and spam. Please include in the subject line of your emails the course number and a brief description that summarizes the content of the email as well. It is very important to at least include your course and course number in the subject line to assure proper feedback and credit for your work.

Academic Honesty

All programs and documentation must be individual and original work unless the assignment specifies otherwise. If your program closely resembles someone else's, I will call it to your attention. Identical programs will be assigned 0 points. Two or more programs which closely resemble each other will be treated as one program and the possible points for one program will be divided among the students who submitted those programs. Repeated instances of similar or identical programs will result in a grade of F for the class. A pattern of academic dishonesty may result in expulsion.

What You Can Expect from Me

1. Show up to teach class as scheduled.
2. Treat you with respect. I may not honor all of your requests, but we will listen to what you have to say.
3. Do my work to the best of my ability.
4. Grade your work in a reasonably prompt manner.
5. Try my best to give you feedback on your work.

What I Expect from you

Among other things, we expect that you will:

1. Understand the syllabus well.
2. Join the online class regularly.
3. Ensure that you have the necessary prerequisites for taking the class.
4. Read any material needed ahead of time before they are discussed in class.
5. Be respectful of me and your classmates.
6. Cooperate with your team members.

Assignment Submissions and Late Work / Penalties

1. The deadline for each assignment is controlled by D2L. It is mandatory that you submit your assignments by the deadline.

2. Any requests to extend the due date are not entertained as it is not fair to other students who take deadlines and schedules seriously.
3. However, I will entertain late submissions with late penalty as follows.
 - (a) If the late submission is done within 24 hours (of the due date and time), late penalty of 25% is imposed.
 - (b) No submission will be accepted beyond this grace period.
4. I will provide the feedback on your assignments through D2L. Printed copies are not required.
5. All assignment submissions are demonstrated by you or your team in the class. Working software is one primary objective evidence used in this class.

Communications

I will be running the class in dual mode (in-person as well as through ZOOM) to support the students who may be staying home due to sickness or COVID symptoms. This is synchronous class and the students are expected to be in the class on the scheduled days from 6 to 9:20 PM.

There are no scheduled class room / office hours outside of the class hours. If my time is required, students can call me on my mobile (from 8 AM to 8 PM) and get the needed help. If I am not able to answer, please leave your name and number so that I can call you back within 24 hours.

D2L Discussion Board: Please make use of liberal use of D2L discussion board for asking the questions, for getting the responses from me and other students. However, please make sure that you do NOT post the entire code while asking for help. You can point to the code examples or list the compile errors you are getting.

For any reason, if you want to send an email to me, please send mail to siva.jasthi@metrostate.edu using metrostate email account. If you send mail using your personal address, my account settings will send it to junk / reject your email. I usually respond within 24 hours of you sending me an email.

While doing the assignments, please start early if you need help. The questions you ask on the day the assignment is due – may not be answered due to lack of runway in responding to you (In the worst case scenario, I need 24 hours to respond and you should plan your communications in this context).

You can always talk to me before or after the class if you are looking for any assistance / clarifications / feedback. If you schedule an appointment with me early, I am happy to come to the class one hour early to meet you.

Feedback to the students

Students receive feedback on their submissions as follows.

[1] Individual Assignments: Students receive feedback within a week (before the start of the next class). The feedback is reflected in the D2L dropbox or given to the teams during the demonstrations.

[2] Project Iterations: We take up iterative development per the agile practices in this class. Each team will be giving a demonstration of their iteration in the team's breakout room (in ZOOM). I will be providing the live feedback to their iteration. I will also reflect the feedback in the D2L drop box.

[3] Discussion Board Postings: I will respond to the postings within 24 hours.

[4] Emails: I will respond to the emails within 24 hours.

Copyrights, Intellectual Property Statements of the Course

- All rights reserved. This syllabus or class materials (notes, slides, assignments, solutions, examples) may not be reproduced, displayed, modified or distributed without the express prior written permission of the copyright holder. For permission, contact siva.jasthi@metrostate.edu
- The redistribution of audio or video recordings from the course to individuals who are not students in the class is prohibited without the express permission of the faculty member and any of the students who are recorded.
- All material for this course is restricted to members of this course. Material may not be redistributed without the permission of the instructor.
- All the data, documents, software provided by the customers are strictly confidential. Students engaged in such projects agree to transfer the copyrights to the respective customers.

Class Schedule and Evaluation Breakup

Please see the following Weekly Planner for additional details on the learning activities and outcomes. I reserve the right to change the number / type / due date of the assignments based on the course dynamics. The due dates for the

assignments / drop boxes are set in the D2L. Please refer to D2L Course Calendar for further details. If there are any changes to the schedule, I will announce those in the class.

Week	Date	SE Topic	Q&A / Demo
1	12-Jan	Intro, Setup of Anaconda and XAMPP	A1
2	19-Jan	SDLC - Waterfall Model	A2
3	26-Jan	Agile Software Development	A3
4	2-Feb	SCM and GitHub	A4
5	9-Feb	Global Software Development & Unicode	A5
6	16-Feb	Test Driven Development (TDD)	FP1
7	23-Feb	OO Revisited	FP2
8	2-Mar	Abstraction - Interfaces - Software Design	FP3
	9-Mar	Spring Break	
9	16-Mar	Use Cases and User Stories	FP4
10	23-Mar	Creative Commons and Copyrights	FP5
11	30-Mar	SAFe & Visual Kanban	FP6
12	6-Apr	Project Management	FP7
13	23-Apr	Risk Management	FP8
14	20-Apr	Cloud Computing	FP9
15	27-Apr	Course Recap	FP10