Software Engineering
ITSC 3155

This syllabus contains the policies and expectations I have established for this course. Please read the entire syllabus carefully before continuing in this course. These policies and expectations are intended to create a productive learning atmosphere for all students. Unless you are prepared to abide by these policies and expectations, you risk losing the opportunity to participate further in the course.

The standards and requirements set forth in this syllabus may be modified at any time by the course instructor. Notice of such changes will be by announcement in class or email notice or by changes to this syllabus posted on the course website at https://uncc.instructure.com/courses/60586/modules .

- **Course Description**

  The system development cycle is examined in detail from the aspects of software engineering. Current tools and techniques of software systems development – the Agile development model, test---driven development, design patterns, and current software development frameworks – are taught and presented in conjunction with case studies and class problems.

Learning Outcomes

In this class, we will study the basic principles of designing, developing, and deploying software systems. In this course, you will:
- Learn how to find and document software requirements
- Learn the basic principles of software reuse and approaches to reuse
- Learn about various software development paradigms
- Learn how to design a software system
- Learn how to model the design of a software system
- Apply this knowledge to a team software development project

Note: This is a course in which you learn advanced software engineering principles to develop a large and complex software system. You will not learn how to program in this course; you should already know how to program. EVERY student will be expected to implement (i.e., code) a part of a larger software system. Having a working piece of software that meets the project requirements at the end of the course is emphasized. If you do not know how to write a computer program, you should not take this course.

- **Location**

  Tuesdays/Thursdays, 11:30 am-12:45 pm, Online

  Instructor

  Dr. Mohsen Dorodchi, Mohsen.Dorodch@charlotte.edu

  Office Hours: Posted in Canvas

- **Recommended Resources/Texts**
  - Winters, Titus, Tom Manshreck, and Hyrum Wright. Software Engineering at Google : Lessons learned from programming over time. O'Reilly Media, 2020.
  - O'Regan, Gerard. Concise guide to software engineering. Springer, Cham, 2017.

- **Teaching Assistants:** (Office Hours: Online)
  - TBA in Canvas

- **Grading**
  Student performance in the class will be based on assignments (including in-class exercises), midterm, and the course project. Letter grades will be determined by a scale that is based on the performance of the class. Each graded item (assignment, exam, project deliverable) will be assigned a point value. For each item, letter grade cut-offs will be determined based on the performance of the class. The final grade cut-offs will be the sum of the cut-offs for all

assignments. The letter grading scale for individual graded items and the final grade will be no worse than a traditional scale of 90% (A) – 80% (B) – 70% (C) – 60% (D). The point values for assignments will be structured in approximately the following way:

- Homework – 30%
- Quizzes – 20%
- Midterm – 15%
- Final Project – 30%
- Attendance – 5%

Assignments will be made available online. Students should follow the submission instructions given on each assignment. Submissions should be professionally formatted and should always include the author's name. The course project is a team project, and all members of a team are expected to make a significant contribution to both the design and implementation of the project. For each team project deliverable, an individual score will be computed for each student. Each student's individual score will be computed based on peer assessments, self-assessments, and the instructor's observation of the student's contribution. A grade of 0% for a component of any deliverable will result in a failing grade for the project. A failing grade on the course project will result in failure of the course. Details about the course project and project deliverable grading will be made available on the course website.

I. Classroom Expectations

a) Students are expected to attend every class (online or in-person) and remain in class for the duration of the session. Failure to attend class or arriving late may impact your ability to achieve course objectives which could affect your course grade. An absence, excused or unexcused, does not relieve a student of any course requirement. Regular class attendance is a student's obligation, as is a responsibility for all the work of class meetings, including tests and written tasks. Any unexcused absence or excessive tardiness may result in a loss of participation points.

b) The authority to excuse a student's class absence(s) and to grant a student an academic accommodation (turn in a late assignment(s), provide extra time on an assignment, reschedule an exam(s) etc.) sits with the individual instructor. Students are encouraged to work directly with me regarding their absence(s). The Dean of Students Office can assist faculty members in the verification a student's class absence(s) for documented situation related to medical, psychological, personal crisis, or military absences.

c) If I am late in arriving to class, you must wait a full 20 minutes after the start of class before you may leave without being counted absent, or you must follow any written instructions I may give you about my anticipated tardiness.

d) I will conduct this class in an atmosphere of mutual respect. I encourage your active participation in class discussions. Each of us may have strongly differing opinions on the various topics of class discussions. The conflict of ideas is encouraged and welcome. The orderly questioning of the ideas of others, including mine, is similarly welcome. However, I will exercise my responsibility to manage the discussions so that ideas and argument can proceed in an orderly fashion. You should expect that if your conduct during class discussions seriously disrupts the atmosphere of mutual respect I expect in this class, you will not be permitted to participate further.

e) The use of cell phones, smart phones, or other mobile communication devices is disruptive, and is therefore prohibited during class unless otherwise explicitly communicated for course purposes (e.g., use of clicker software from your smart phone). Except in emergencies, those using such devices must leave the classroom for the remainder of the class period. [If unique circumstances are anticipated that necessitates the use of such devices, the course instructor should be notified prior to class to discuss proper etiquette given the unique circumstances. Each non-emergency occurrence will be counted as an unexcused absence.]

f) Students are permitted to use computers during class for note-taking and other class-related work only. Those using computers during class for work not related to that class must leave the classroom for the remainder of the class period. [Each such occurrence will be counted as an unexcused absence.]

g) This 3-credit course requires 3 hours of classroom or direct faculty instruction and 3 hours of work as a group and 6 hours of out-of-class student work each week for approximately 15 weeks. Out-of-class work may include but is not limited to required reading, written assignments and studying for quizzes and exams.

h) Career Skills Emphasis:

    a. In the 21st Century, it is more important than ever for individuals to develop career skills during their educational journey in order to ensure career success after graduation. The National Association of Colleges and Employers (NACE) defines these essential skills in eight specific career skills. These skills include Critical Thinking, Communication, Teamwork, Technology, Leadership, Professionalism, Career & Self-Development, and Equity and Inclusion. These are the skills that employers across all industries are specifically looking for in highly qualified candidates.

    b. Critical Thinking: Identify and respond to needs based upon an understanding of the situational context and logical analysis of relevant information.

    c. Communication: Clearly and effectively exchange information, ideas, facts, and perspectives with persons inside and outside of an organization.

    d. Teamwork: Build and maintain collaborative relationships to work effectively toward common goals, while appreciating diverse viewpoints and shared responsibilities.

    e. Technology: Understand and leverage technologies ethically to enhance efficiencies, complete tasks, and accomplish goals.

    f. Leadership: Recognize and capitalize on personal and team strengths to achieve organizational goals.

    g. Professionalism: Knowing work environments differ greatly, understand and demonstrate effective work habits, and act in the interest of the larger community and workplace.

    h. Career & Self-Development: Proactively develop oneself and one's career through continual personal and professional learning, awareness of one's strengths and weaknesses, navigation of career opportunities, and networking to build relationships within and without one's organization.

    i. Equity & Inclusion: Demonstrate the awareness, attitude, knowledge, and skills required to equitably engage and include people from different local and global cultures. Engage in anti-racist practices that actively challenge the systems, structures, and policies of racism.

i) The career skills will include several classroom activities as well as will be integrated into some of the assignments. Moreover, the final project grade includes certain part on professionalism/leadership/teamwork and communication. The final project rubric identifies the details.

II. Tardiness or Absenteeism

Class Absence(s): The authority to excuse a student's class absence(s) and to grant a student an academic accommodation (turn in a late assignment(s), provide extra time on an assignment, reschedule an exam(s) etc.) sits with the individual instructor. Students are encouraged to work directly with their instructors regarding their absence(s). Note: The Dean of Students Office can assist faculty members in the verification a student's class absence(s) for documented situation related to medical, psychological, personal crisis, or military absences.

III.   Academic Integrity, Plagiarism

All students are required to read and abide by *The Code of Student Academic Integrity*. Violations of the Code of Student Academic Integrity, including plagiarism, will result in disciplinary action as provided in the Code. Definitions and examples of plagiarism are set forth in the Code. The Code is available from the Dean of Students Office or online at: http://legal.uncc.edu/policies/up-407. The code will be strictly enforced and is binding on the students. Grade and academic evaluations in this course include a judgment that the student's work is free from academic dishonesty of any type; and grades in this course therefore should be and will be adversely affected by academic dishonesty. Students who violate the code can be expelled from UNC Charlotte. The normal penalty for a first offense is zero credit on the work involving dishonesty and further substantial reduction of the course grade. In almost all cases the course grade is reduced to an F.

Faculty may ask students to produce identification at examinations and may require students to demonstrate that graded assignments completed outside of class are their own work.

As a condition of taking this course, all required projects and assignments may be subject to submission for textual similarity review to available services like MOSS or TurnitIn for the detection of plagiarism. All submitted projects will be

included as source documents in the service reference database solely for the purpose of detecting plagiarism of such projects. No student papers will be submitted to this service without a student's written consent (http://teaching.uncc.edu/sites/teaching.uncc.edu/files/media/VeriCite/VeriCite_Limited_Copyright_Permission_and_FERPA_Disclosure_Consent_Form.pdf) and permission. If a student does not provide such written consent and permission, the instructor may: (i) require a short reflection paper on research methodology; (ii) require a draft bibliography prior to submission of the final paper; or (iii) require the cover page and first cited page of each reference source to be photocopied and submitted with the final paper.

IV. University Policy on Withdrawals

Students are expected to complete all courses for which they are registered at the close of the add/drop period. If you are concerned about your ability to succeed in this course, it is important to make an appointment to speak with the instructor as soon as possible. The University policy on withdrawal allows students only a limited number of opportunities available to withdraw from courses. It is important for you to understand the financial and academic consequences that may result from course withdrawal (http://provost.uncc.edu/policies/academic/withdrawals).

V. Inclusivity

Preferred Gender Pronoun: This course affirms people of all gender expressions and gender identities. If you prefer to be called a different name than what is indicated on the class roster, please let me know. Feel free to correct me on your preferred gender pronoun. If you have any questions or concerns, please do not hesitate to contact me.

Non-Discrimination: All students and the instructor are expected to engage with each other respectfully.   Unwelcome conduct directed toward another person based upon that person's actual or perceived race, actual or perceived gender, color, religion, age, national origin, ethnicity, disability, or veteran status, or for any other reason, may constitute a violation of University Policy 406, The Code of Student Responsibility. Any student suspected of engaging in such conduct will be referred to the Office of Student Conduct for possible conduct action.

VI. Disability Accommodations

Students in this course seeking accommodations to disabilities must first consult with the Office of Disability Services and follow the instructions of that office for obtaining accommodations.

VII. Sexual Harassment

All students are required to abide by the UNC Charlotte *Sexual Harassment Policy and Grievance Procedures* (available online at: http://legal.uncc.edu/policies/up-502) and the policy on *Responsible Use of University Computing and Electronic Communication Resources* (available online at: http://legal.uncc.edu/policies/up-307). Sexual harassment, as defined in the *Sexual Harassment Policy and Grievance Procedures*, is prohibited, even when carried out through computers or other electronic communications systems, including course-based chat rooms or message boards.

VIII. Title IX Reporting Obligations

UNC Charlotte is committed to providing an environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic violence, dating violence, and stalking. If you (or someone you know) has experienced or experiences any of these incidents, know that you are not alone. UNC Charlotte has staff members trained to support you in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, helping with legal protective orders, and more.

Please be aware that many UNC Charlotte employees, including all faculty members, are considered Responsible Employees who are required to relay any information or reports of sexual misconduct they receive to the Title IX Coordinator. **This means that if you tell me about a situation involving sexual harassment, sexual assault, dating violence, domestic violence, or stalking, I must report the information to the Title IX Coordinator**. Although I have to report the situation, you will still have options about how your case will be handled, including whether or not you wish to pursue a formal complaint. Our goal is to make sure you are aware of the range of options available to you and have access to the resources you need.

If you wish to speak to someone confidentially, you can contact any of the following on-campus resources, who are not required to report the incident to the Title IX Coordinator: (1) University Counseling Center (counselingcenter.uncc.edu, 7-0311); (2) Student Health Center (studenthealth.uncc.edu, 7-7400); or (3) Center for Wellness Promotion

(wellness.uncc.edu, 7-7407). Additional information about your options is also available at titleix.uncc.edu under the "Students" tab.

Course Schedule:

Module	Topic	Date	Topic	Homework
Introduction	**Lecture**	**T 1/14**	**Course Overview**	
Module 1	**Lecture**	**Th 1/16**	**Introduction to Software Engineering**	**Python Crash Course** **Environment Setup**
	Recitation	**T 1/21** **Th 1/23**	**Intro to Python**	
Module 2	**Lecture**	**T 1/28**	**Requirement Engineering**	Python Crash Course 2 Assignment 0 Python Class Quiz - Requirements
	Recitation	**Th 1/30**	**OOP in Practice - 1**	
Module 3	**Lecture**	**T 2/4**	**Software Design**	Assignment1 - Sandwich Maker Quiz - Software Design
	Recitation	**Th 2/6**	**Version Control**	
Module 4	**Lecture**	**T 2/11**	**Agile Software Development**	Assignment 2 - Modular Sandwich Maker Quiz - Agile Software Development
	Recitation	**Th 2/13**	**OOP in Practice - 2**	
Module 5	**Lecture**	**T 2/18**	**Software Implementation and Deployment**	

	Recitation	Th 2/20	**Intro to Relational Database**	Assignment 3 - Sandwich Maker Database Quiz - Software Implementation
Module 6	Lecture	T 2/25	**Application Programming Interface (API)**	Assignment 4 - FastAPI Implementation Quiz - Software Testing
	Recitation	**Th 2/27**	**Software Testing**	
Midterm	Review	📢 **Spring Break 3/3-3/8 (No Class)** **T 3/11**	**Midterm-Prep**	Midterm
	Exam	**Th 3/13**		
Module 7	Lecture	**T 3/18**	**Security** **CRUD Operations Using FastAPI**	Assignment 5 - CRUD Operation in FastAPI Quiz - Security
	Recitation	**Th 3/20**	**Scrum In Depth**	
Module 8	Lecture	**T 3/25**	**TDD / FastAPI- Part2**	Quiz - Scrum
	Recitation	**-----Th 3/27**	**Career Center Workshop**	
Module 9	Recitation	**T 4/1**	**Frontend - Web Development**	
Module 10	Lecture	**Th 4/3**	**Containerization**	

	Recitation	**T 4/8**	**Group Project Meeting** **Docker**	[Group Project - Part 1](#) [Quiz - Containerization [OPTIONAL]](#)
Module 11	**Lecture**	**Th 4/10**	**DevOps**	[Group Project - Part 2](#) [Quiz - DevOps [Optional]](#)
	Recitation	**T 4/15**	**Group Project Meeting** **GitHub Actions**	
Module 12	**Lecture**	**Th 4/17**	**Cloud Computing**	[Quiz - Cloud Computing [Optional]](#)
	Recitation	**T 4/22**	**Group Project Meeting** **SQLAlchemy Join**	
Module 13/14	**Lecture**	**Th 4/24**	**Machine Learning I and II**	Group Project
Module 14	**Lecture**	**T 4/29**	**Career Workshop II**	Group Project