

## Software Development Projects

### ITCS 4155 - 051

This syllabus contains the policies and expectations 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 meaningfully in the course.

The standards and requirements set forth in this syllabus may be modified by the course instructor. Notice of such changes will be by announcement in class or posted on the course' Canvas site.

- **Course Description:** Advanced software engineering concepts and project practices. The course explores the entire software development process, emphasizing requirements engineering, design, implementation, test, evolution and deployment, as well as software development processes, system modeling and analysis, design patterns, etc. Students apply these concepts, along with knowledge from introductory programming, data structures and algorithms, introductory software engineering and other courses computing courses, to an **agile team software development project** that results in an executable software system prototype.

- **Learning Outcomes**

Upon successful completion of this course, students should learn:

- To define, model and analyze software requirements and design.
- To develop schedules in agile environment with user stories.
- To organize configuration management and system builds.
- Effective communication and collaboration in agile teams.
- To apply software quality assurance techniques, e.g., peer reviews.
- To plan and execute software development project in three development sprints.

- **Class Objectives**

A software project succeeds when it meets the expectations of the people who use it over a long period of time. The objective of the class is to explain software development as an engineering discipline. The course will describe modern methods of software development, process models, software architecture, design patterns, assessment methodologies and tools. You will apply these concepts, along with concepts from introductory programming courses, data structures and algorithms courses, and the first software engineering course, to a team software development project that will result in an executable software system prototype. This course will also help prepare students for entering the workforce; professional development topics will be covered.

**Note:** This is a *capstone course* in which students should apply existing computer science knowledge to develop a software system. We emphasize creating working software that meets the project requirements at the end of the semester. Every student will be expected to participate in design and implementation of a part of a large system. *Students will not learn how to program in this course; they should already know that.* If a student is not comfortable with developing a large software system or work in a group, there are other options available to you to fulfill the capstone experience in computer science. For example, you may work with a faculty member on a semester-long senior project ITSC 4850/4851. If you are engaged in research, enrolling in ITCS 4990 meets capstone requirements too.

#### **Time and Location**

The class will be executed entirely online, using Zoom. Meeting time is 2:30 PM, every Thursday.

Course meeting times will be used primarily for covering new material, clarifications and discussions of upcoming project development steps, followed by the open time for teamwork.

Student project teams will be meeting online, generally during class time, in one of the provided Google Meet breakout rooms.

*Time:* Thursday, 2:30 PM – 5 PM;

- **Prerequisites**

ITSC 2214 and (ITSC 3155 or ITIS 3300 or ITIS 3310 or permission of instructor), senior status.

- **Instructor**

Bojan Cukic, *Office:* Woodward 443F, *Phone:* 704-687-6155, *E-mail:* [bcukic@Tuncc.edu](mailto:bcukic@Tuncc.edu) (the preferred method)

Office Hours: by appointment

- **Teaching Assistant**

Shalom Satwik Thathapudi, Email: [sthathap@uncc.edu](mailto:sthathap@uncc.edu)

Office: A Zoom room will be shared.

Office Hours: Tuesdays 11am – 1pm and by appointment

- **Text(s)**

*Recommended (free on-line)*

- Ivan Marsic, Software Engineering (2012), [http://www.ece.rutgers.edu/~marsic/books/SE/book-SE\\_marsic.pdf](http://www.ece.rutgers.edu/~marsic/books/SE/book-SE_marsic.pdf)

*Optional Reading (no need to purchase)*

- Roger S. Pressman, "Software Engineering: A Practitioner's Approach," 7<sup>th</sup> edition, McGraw Hill, 2010.

- **Course Topics**

WEEK #	1. TOPIC
1	Introduction, engineering ethics, background survey, team selection.
2	Project scheduling, effective team communication; project selection.
3	Requirements Engineering; Project proposal presentations
4	User Stories and Scrum
5	Development sprints and project planning and estimation; Low fidelity prototyping,
6	Sprint 1 demo;
7	Version control, Change management.
8	Capturing design with UML, Test driven development
9, 10	Architectural design and design patterns.
11, 12	Sprint 2 demo, design documentation
13	Peer reviewing and inspections
14	Software testing strategies and techniques
15	Sprint 3 demo: Elevator pitch, project documentation

- **Grading**

1. The grading scale for the final grade will be a traditional scale of 90% (A), 80% (B), 70% (C), 60% (D).
2. Breakdown (tentative)
  - The quizzes will count 10% of the final grade. *The remaining 90% will be derived from project deliverables.*
  - At least 25 points (out of 90 for project deliverables) will be assigned based on student's individual's level of participation and contribution to his / her team.
  - Detailed grade breakdown is available in Canvas.
  - **Comprehensive project is the cornerstone of this class. Class participants will be organized in 3-5 students project teams.** Some projects may be defined by outside sponsors, others will emerge from student/class discussions; All projects will need instructor's approval. Project development will follow agile software lifecycle dynamics and mimic Scrum organizational principles. Formal deliverables will include project proposal, comprehensive design documents and multiple incremental versions of (executable) software (sprints). **The implementation MUST take place (and be available for grading) in GitHub.** The projects will follow strict delivery schedule, discussed and defined in class and shown in Canvas. Delay to agreed deadline windows may cost you grade deduction for each submission.

- **Assignment & Project Submissions**

Canvas will be used for all assignment and project submissions.

- **Important Dates**

See Canvas site.

## II. Classroom Expectations

**Your commitment:** The best way to master the concepts covered in this course is to engage in discussions and activities with your fellow students and your instructional team (i.e., instructor/TAs). **It is also essential to commit to being a productive member of your development team.**

The online environment that we are adopting for this class will include virtual participation via Zoom meetings. Your active participation is necessary. **However, if there are times when you are unable to participate in class meetings because of care-giver responsibilities, health issues, etc., please make sure to inform your instructional team (ahead of time whenever possible) and your development team.** Furthermore, if you come to campus for any reason, please follow the specific COVID-19 related guidelines listed below.

### 1. ZOOM Class expectations

The standards set in place for on-line class participation:

- To be available and responsive during scheduled class time.
- Duties, obligations, and responsibilities are the same as with on-campus class, including the obligation to respond to questions, emails, assignments, projects, etc., in a timely manner.
- To maintain an appropriate level of communication with the instructors, project team members and classmates.
- Never connect to the class from a moving vehicle or in other unsafe situations. If noted by the instructor, you will be disconnected.
- **During class meetings, it is expected to have the camera "on" at the minimum when you speak or during your team presentations.** You may set up virtual Charlotte background in place.
  - **If you do not have a camera or are not willing to turn it on in these situations, YOU SHOULD DROP THIS SECTION and sign up for an on-campus section.**
  - Maintain professionally acceptable standards of online behavior. In case your camera is on, please maintain professional surroundings or use virtual Charlotte backgrounds.

Please contact your instructor if these expectations represent undue burden.

### 2. Additional class rules:

- a) Students are expected to attend every class meeting online. 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 document submissions. Any unexcused absence or excessive tardiness may result in a loss of participation points in the individual assessment.
- 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, etc.) sits with the instructor. Students are encouraged to work directly with me regarding their absence(s) or submission delays. The Dean of Students Office can assist in the verification of a student's class absence(s) for documented situation related to medical, psychological, personal crisis, or military absences.
- c) If the instructor is late in arriving to a class session, please wait a full 15 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 arguments can proceed in an orderly fashion. You should expect that if your conduct during class discussions seriously disrupts the atmosphere of mutual respect, you may 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 smart phones to answer quiz questions). Except in emergencies, those using such devices may be asked to step out.
- f) **Students are expected to use computers during class** for class-related work only. Those using computers during class for work not related to that class will be asked to step out.
- g) This 3-credit course requires 3 hours of classroom or direct faculty instruction and typically 4-6 hours of out-of-class student work each week for approximately 15 weeks.

### 3. COVID 19 Campus Policy

Face coverings: It is the current policy of UNC Charlotte that as a condition of on-campus enrollment, all students are required to engage in safe behaviors to avoid the spread of COVID-19 in the 49er community. Such behaviors specifically include the requirement that all students properly wear CDC-compliant face coverings [in all indoor spaces on campus](#), including classrooms and labs, **regardless of vaccination status**. Failure to comply with this policy in the classroom or lab may result in dismissal from the current class session. If the student refuses to leave the classroom or lab after being dismissed, the student may be referred to the Office of Student Conduct and Academic Integrity for charges under the [Code of Student Responsibility](#).

Students are encouraged to work directly with their instructors regarding their absence(s). For absences related to COVID-19, please adhere to the following:

- **Complete your [Niner Health Check](#)** each morning.
- **Do not come to class if you are sick.** Please protect your health and the health of others by staying home. Contact your healthcare provider if you believe you are ill.
- **If you are sick:** If you test positive or are evaluated by a healthcare provider for [symptoms of COVID-19](#), indicate so on your [Niner Health Check](#) to alert the University. Submit a copy of your Niner Health Check notification email to your instructors. Upon learning that you have tested positive or have been diagnosed for symptoms of COVID-19, either from your reporting or from Student Health Center testing or diagnosis, representatives from Emergency Management and/or the Student Health Center will follow up with you, and your instructors will be notified of the need for accommodations, as necessary.
- **If you have been exposed** to COVID-19 positive individuals and/or have been notified to self-quarantine due to exposure, indicate so on your [Niner Health Check](#) to alert the University. Representatives from Emergency Management and/or the Student Health Center will follow up with you as necessary. Submit a copy of your Niner Health Check notification email to your instructors. If you need any additional support verifying your absence after you have communicated with your professors, contact [Student Assistance and Support Services](#).

To return to class after being absent due to a period of **self-quarantine**, students should submit a copy of their Niner Health Check clearance email to their instructor(s). To return to class after being absent due to a COVID-19 **diagnosis**, students should submit an [online request form](#) to Student Assistance and Support Services (SASS). Supporting documentation can be attached directly to the request form and should be from a student's health care provider or the Student Health Center, clearly indicating the dates of absences and the date the student is able to return to class. Instructors will be notified of such absences.

If you are absent from class as a result of a COVID-19 diagnosis or quarantine, as instructor I will do the following to help you continue to make progress in the course:

- Your deliverable deadlines will be adjusted to allow extra time;
- If most team members are absent due to Covid at the same time, team deliverables may be delayed too.

The final decision for approval of all absences and missed work is determined by the instructor.

### 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.

This is a team-based class, so the responsibilities should be equitably shared among team members. **Plagiarism or downloading of project solutions will not be tolerated. If detected, the entire team will receive the grade zero (0%), regardless of individual responsibility. Since project grades are major part of the class, this would likely lead to an F in the class.**

### 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](https://counselingcenter.uncc.edu), 7-0311); (2) Student Health Center ([studenthealth.uncc.edu](https://studenthealth.uncc.edu), 7-7400); or (3) Center for Wellness Promotion ([wellness.uncc.edu](https://wellness.uncc.edu), 7-7407). Additional information about your options is also available at [titleix.uncc.edu](https://titleix.uncc.edu) under the “Students” tab.

## IX. Social Justice Statement

UNC Charlotte is committed to access to education. If you have a disability and need academic accommodations, please provide a letter of accommodation from Disability Services early in the semester. For more information on accommodations, contact the Office of Disability Services at 704-687-0040 or visit their office at Fretwell 230.

## X. Food Insecurity Statement

Food insecurity is defined by the USDA as “a lack of access to enough food for an active, healthy life.” Food insecure categories include: reduced caloric intake, reduced food quality, lack of variety in diet, disrupted eating patterns, and hunger. Research shows that college students experience food insecurity at higher rates than the American household rate, and that food insecurity can negatively impact academic performance and persistence. In recognition of this problem, UNC Charlotte offers assistance to students facing food insecurity through an on-campus food pantry. The Jamil Niner Student Pantry (JNSP) is located on the east edge of campus at 1224 John Kirk Road. It has regular hours which may change from semester to semester; please see the website at <https://ninerpantry.uncc.edu/> for schedule and details on its services, as well as resources about hunger and food insecurity among college students.