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| School Semester: | Fall 2023 |
| Instructor: | Ashok Gupta |
| Office: | Hodge 254 |
| Office Hours: | TTh 12:05 – 1:00 PM |
| Office Phone: | virtual |
| Email | [ashokg@uscupstate.edu](mailto:ashokg@uscupstate.edu) |
| Class Time: | TTh 10:50 – 12:05 |
| Classroom: | Hodge 254 |

**Expectations:** I want each and every one of you to do well in the class and learn all the necessary software engineering tools to succeed in your chosen career. If you have any questions, concerns or need clarifications, contact me as soon as you can, and we will together come up with a plan to address them. Be prepared and be collaborative. Do not let your team members down.

**Attendance is mandatory.** You will learn from discussions in class with your classmates that you may miss from just working by yourself.

# Fall 2023 COVID-19 Information

Students who show symptoms of COVID (fever, cough, shortness of breath) or who test positive for COVID-19 must inform USC Upstate Health Services (864-503-5191). Students with academic concerns while in quarantine or isolation should contact Susannah Waldrop, Executive Director of the Student Success Center [(swaldrop@uscupstate.edu,](mailto:(swaldrop@uscupstate.edu) 864-503-5414).

# Course Information:

**CSCI U540. Software Engineering (3)** Methods and tools of software engineering, software life cycle, iterative development processes including the Agile Method and Unified Process, object-oriented analysis and design of software, software testing, cost and effort estimation, project management, risk analysis, and documentation. A relatively large software system is developed in a team environment.

# Prerequisites:

C or better in CSCI U321 or consent of instructor.

# Textbook:

**Software Engineering, 10th Edition**

Authors: Ian Sommerville ISBN: 9780133943030

# Status: Recommended

**Technology Needs and Resources** **Technology Requirements**

**This course will require students to have consistent access to a computer and the Internet.**

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# Minimum Technical Skills Needed

To be successful in this course, students should be proficient in at least one programming language and have the ability to learn new languages with little guidance.

# Technical Support

If you have problems with your computer, technology, IT-related questions, support, including Blackboard, please contact the Division of Information Technology Help Desk at 864.503.5257 or email [helpdesk@uscupstate.edu.](mailto:helpdesk@uscupstate.edu) The Help Desk in the lower level of the John D. Stockwell Administration Building is open Monday-Thursday from 8:00 AM-10:00 PM, 8-5 on Fridays, and 5-10 on Sundays. The USC Upstate Library also has a 24-hour computer lab just inside the main entrance.

# Learning and Classroom Environment Spartan Creed and Conduct Codes

USC Upstate students adhere to the Spartan Creed printed in its entirety in the [USC Upstate Student](https://www.uscupstate.edu/globalassets/current-students/dean-of-students/usc-upstate-student-planner-2019-2020.pdf)

[Handbook](https://www.uscupstate.edu/globalassets/current-students/dean-of-students/usc-upstate-student-planner-2019-2020.pdf) (p. 4) available in your student planner and online on the [Academic Resources Web page.](https://www.uscupstate.edu/current-students/academic-resources/) The handbook also outlines the Spartan Code of Conduct for the Classroom (p. 146) and Code of Student Behavior (p.145).

# Academic Integrity

You are expected to practice the highest possible standards of academic integrity, meaning at the most basic level that you have created, and produced all work that you submit as your own. Academic integrity issues may arise by improperly citing sources, using another student's work or work for hire, looking up or paying for answers on Web services, re-using work from one course in another course, and any other form of academic misrepresentation. Acting unethically may result in failure of the assignment or course and could result in additional disciplinary measures. The USC Upstate Code of Academic Integrity appears in full in the [USC Upstate Student Handbook](https://www.uscupstate.edu/current-students/academic-resources/) (p. 148).

# Online Academic Integrity

The USC Upstate [Code of Academic Integrity](https://www.uscupstate.edu/current-students/academic-resources/) prohibits bribery, cheating, lying, and plagiarism. All elements of the USC Upstate Code of Academic Integrity apply to students regardless of course modality (online, blended, or in-person). Students should complete the Plagiarism Prevention Module provided by the USC Upstate Library at [https://uscupstate.libwizard.com/f/PlagiarismPreventionModule.](https://uscupstate.libwizard.com/f/PlagiarismPreventionModule) Note that the Code of Academic Integrity prohibits the unauthorized use of any electronic or mechanical device. In this course the unauthorized use of an electronic device includes accessing the Web for any resource used to complete an assessment unless the instructor specifically authorizes that resource.

Please ask early and often if you have any questions about what is permitted and what is not. Communication is one of the keys to maintaining academic integrity. It must be stated that I do not consider you to be dishonest. I want you to succeed and for your grade to be a result of your own hard work. These controls are necessary to protect the value of the degree that you are working to earn.

# Use of Technology to Ensure Academic Integrity

This course uses a variety of tools to maintain academic integrity in course evaluation. All uploaded writing assignments will be scanned using Safe Assign software though Blackboard. Safe Assign helps the instructor detect plagiarism, which is prohibited under the [Code of Academic Integrity in the Student](https://www.uscupstate.edu/current-students/academic-resources/) [Handbook.](https://www.uscupstate.edu/current-students/academic-resources/) I may use other means to detect plagiarism in student work.

**USC Upstate offers counseling services, medication management, psychological testing, and outreach services, along with 24/7 after-hours crisis support for enrolled students. You can contact Counseling Services at (864) 503-5195. Email:** [**counselingservice@uscupstate.edu**](mailto:counselingservice@uscupstate.edu)

# Course Requirements, Assignments, and Grading

**Course Topics**

* **Introduction to Software Engineering.** The purpose of this topic is to describe what software engineering is and why it is important.
* **Software Process Models.** Software processes are a set of activities used for software production. Software process models serve as a guide to the necessary processes required for software production.
* **Agile Software Development.** Introduces a type of development method that has become popular in many projects today.
* **Requirements Engineering.** Discusses the processes involved in discovering and documenting requirements for a software system.
* **System Modeling.** Describes how graphical models can be used to represent software systems.
* **Architectural Design.** Describes what an architectural design is and why it is important.
* **Data Management.** Describes what is data management - and why do you need it in interdisciplinary life sciences. Types of data management.
* **Design & Implementation.** Describes processes for developing software systems and the key issues that should be considered when implementing a software system.
* **Software Testing.** Introduce software testing processes, including understanding the various stages of the testing process.
* **Software Evolution.** Helps to shed light on the inevitable changes in the software system and the impact these changes have on costs and schedule.

# Course Goals:

You will leave the course:

* Understanding the role of software in systems
  + Understanding why SE practices are important.
  + Reading and analyzing historical SE failures
  + Being exposed to situations that require good SE practices.
  + Using SE practices is enough to see value in them.
  + Reflecting on influence of SE practices in course project
* Knowing good basic SE practices
  + Software process and project management techniques
  + Requirements elicitation
  + Design and Architecture techniques
  + Coding best practices
  + Testing and analysis of code
* Able to make simple engineering tradeoffs.
  + Exposure to multiple techniques with benefits/drawbacks
  + Making decisions in practice and reflecting on consequences
  + Evaluation of tradeoffs in historical SE projects and in peer class projects
* Possessing basic skills using SE tools and practices (I.E., version control, backing up databases, etc.)

# Team Project:

A primary requirement of this course is the delivery of a software solution developed as a group project. This project will reinforce Software Engineering concepts introduced in class in a “real-life” setting. The deliverables will include a Project status reports, checklists on all major milestones and a working program solution.

Students will be required to form their own teams of **four to five students (four is preferred, but if class size requires a couple groups of five, I will allow that).** Each team will come up with a project idea which must be approved by the instructor. Each team will then develop a detailed Requirements documentation and implement the software.

Alternatively, the other option is that I form the teams randomly of four to six students per team. I will also list some projects that each team can pick from.

# Late Work/Missed Exam Policy

I recognize that airborne pathogens create conditions that may cause absences, including extended absences, for a variety of reasons. Students who are required to quarantine or seek medical treatment due to a direct diagnosis should contact the instructor as soon as possible so a suitable equivalent makeup arrangement can be provided. Students should also provide documentation to the Dean of Students Office when possible. The Dean’s Office will notify me of the general circumstances of your absence without compromising your privacy with respect to the specific issue. Students directly exposed to someone who has tested positive for an airborne pathogen may also need to quarantine themselves. Anyone within 6 feet for >15 minutes (mask or no mask) is considered exposed. In this event, students should contact me as soon as possible to discuss makeup arrangements. Absences due to care obligations arising from airborne pathogens should be discussed with me as soon as possible to determine the appropriate course of action. Prompt communication with me is critical and expected in each of these situations.

# Evaluation:

The evaluation for this course will be a combination of individual assignments, tests, and a large group project. The breakdown of each of these components are as follows:

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| Individual Assignments | 30% (6 to 8 assignments) |
| Exams | 40% (Midterm and Final. Two Quizzes) |
| Group Project | 30% (6 teams of 4 students each or 4 teams of 6) |

# Grading Scale

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| --- | --- | --- | --- |
| A | >= 90% | D+ | 66 … 69 |
| B+ | 86 … 89% | D | 60 … 65% |
| B | 80 … 85% | F | <= 59% |
| C+ | 76 … 79% |  |  |
| C | 70 … 75% |  |  |

**Project Evaluation**

Students are expected to attend all group meetings and contribute to the progress of the group. Every student must implement a piece of the software. There will be an individual grade for each member of the group, so one student who is not participating in or contributing to the group will receive a considerably worse grade than the members of the group who are participating.

**You will be submitting a weekly timesheet and summary of work you completed that week towards the project. That, along with the end deliverables and peer review sheets, will be how individual grades are determined.**

# Student Support Services, Policies, and Resources Student Services

As a USC Upstate student, you have access to a range of support services and resources to support your

academic progress, physical and mental health, basic needs, food security, career management, and much more. Links to the full range of student services are available on the [Virtual Student Services page](http://www.uscupstate.edu/vss) or Current Students Web site.

# Accessibility and Accommodations

In keeping with university policy, any student with a disability who requests academic accommodation should contact Disability Services at 864.503.5195 to arrange a confidential appointment with the Disability Services Coordinator. Students are encouraged to seek an appointment as early in the semester as possible, as accommodation is not provided retroactively. Letters of accommodation must be signed and printed on letterhead from the [Disability Services](https://www.uscupstate.edu/current-students/disability-services/) office. It is the student’s responsibility to provide these letters to professors in a timely manner so that accommodation may be put in place.

# Student Success Center and Other Academic Support Services

In partnership with USC faculty, the [Student Success Center](http://www.uscupstate.edu/studentsuccess) offers several programs to assist you in better understanding your course material and to aid you on your path to success. A detailed list of resources is available at [http://www.uscupstate.edu/studentsuccess.](http://www.uscupstate.edu/studentsuccess)

* **Peer Tutoring:** You can make an online appointment with a peer tutor. To sign up for the first time, call 864.503.5070 for assistance.
* **Supplemental Instruction (SI):** Student SI Leaders are assigned to specific sections of courses and hold weekly study sessions. Sessions focus on the most difficult content being covered in class.
* **Writing Center:** Improve your college-level writing skills by bringing writing assignments from any of your classes to a Peer Writing Tutor. Find out more at [http://www.uscupstate.edu/writing.](http://www.uscupstate.edu/writing)

**Career Management**: Connect your learning and degree to the career goals that motivate you.

# Course Schedule of Topics, Assignments, and Due Dates

Find a [detailed academic calendar](https://www.uscupstate.edu/current-students/registration-records/academic-calendar/) of University breaks, start/end dates, final exam dates, and deadlines for withdrawal, tuition payments, and graduation applications online.

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| Schedule for Learning Modules | |
| **Week of** | **Topic** |
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| August 24th Thursday | Introductions, Syllabus, Ground rules and Introduction to Software Engineering. |
| August 29th Tuesday | Introduction to Software Engineering. |
| August 31st Thursday | Introduction to Software Engineering. |
| September 5th Tuesday | Software Process Models. |
| September 7th Thursday | Software Process Models. |
| September 12th Tuesday | Group project assigned. Discussion on ground rules. Agile Software Development. |
| September 14th Thursday | Agile Software Development. |
| September 19th Tuesday | Agile Software Development. |
| September 21st Thursday | Agile Software Development. |
| September 26th Tuesday | Requirements Engineering. |
| September 28th Thursday | Requirements Engineering. |
| October 3rd Tuesday | Requirements Engineering. |
| October 5th Thursday | Midterm #1 |
| October 10th Tuesday | System Modeling. |
| October 12th Thursday | System Modeling. |
| October 17th Tuesday | System Modeling. |
| October 19th Thursday | Fall Break No classes |
| October 24th Tuesday | Architectural Design. |
| October 26th Thursday | Architectural Design. |
| October 31st Tuesday | Data Management. |
| November 2nd Thursday | Data Management and quiz # 1 |
| November 7th Tuesday | Election Day. No Classes |
| November 9th Thursday | Design & Implementation. |
| November 14th Tuesday | Design & Implementation. |
| November 16th Thursday | Software Testing. |
| November 21st Tuesday | Software Testing. |
| November 23rd Thursday | Thanksgiving No Classes |
| November 28th Tuesday | Software Evolution. |
| November 30th Thursday | Presentation of Project (Two Teams) |
| December 5th Tuesday | Presentation of Project (Two Teams) |
| December 7th Thursday | Presentation of Project (Two Teams) |
| December 14th Thursday | Final Exam 11:30 am to 2:30 pm. Cumulative |
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| Assessment Schedule and Deliverables | | |
| **Week of** | **Assessments** | |
|  | **Assigned** | **Due** |
| August 24th Thursday | Assignment # 1 |  |
| August 29th Tuesday |  | Assignment # 1 |
| September 7th Thursday | Assignment # 2 |  |
| September 12th Tuesday |  | Assignment # 2 |
| September 14th Thursday | Team Formation. Selection and approval of Project. |  |
| September 21st Thursday | Assignment # 3 |  |
| September 26th Tuesday |  | Assignment # 3 |
| October 5th Thursday | Midterm #1 |  |
| November 2nd Thursday | Quiz #1 and Assignment # 4 |  |
| November 14th Tuesday |  | Assignment # 4 |
| November 21st Tuesday | Quiz #2 and Assignment # 5 |  |
| November 28th Tuesday |  | Assignment # 5 |
| December 14th Thursday | Final Exam 11:30 am to 2:30 pm. Cumulative | |

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| Class Project Schedule and deliverables. | | | |
| **Week of** | **Status Report on Group Project Due** | **Checklist and project deliverable** | **Comments** |
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| September 7th Thursday |  |  | Team Formation. Selection and approval of Project started. |
| September 14th Thursday | Report # 1 |  | Team Formation. Selection and approval of Project finalized. |
| September 21st Thursday | Report # 2 | Scope of project |  |
| September 28th Thursday | Report # 3 | Requirements |  |
| November 7th Tuesday | Report # 4 | Modeling, Architecture, and data |  |
| November 28th Tuesday | Report # 6 | Testing & maintenance |  |
| November 30th Thursday | Presentation of Project (Two Teams) |  |  |
| December 5th Tuesday | Presentation of Project (Two Teams) |  |  |
| December 7th Thursday | Presentation of Project (Two Teams) |  |  |