



The UNIVERSITY of OKLAHOMA  
GALLOGLY COLLEGE OF ENGINEERING  
SCHOOL OF COMPUTER SCIENCE

**READ ME**  
1. This Document Details the Course Content (Syllabus)  
2. Cells with a red triangle contain a note; hover to read it.

1	Course Code	CS4223								
2	Course Name	Software Quality and Testing								
3	Version	1.3								
4	Name(s) of Academic Staff	Instructor	Mansoor Abdulhak	Email	<a href="mailto:m.hak@ou.edu">m.hak@ou.edu</a>					
		Teaching Assistant	Ajisejiri SJ	Email	<a href="mailto:oluwasiibomi.ajisejiri@ou.edu">oluwasiibomi.ajisejiri@ou.edu</a>					
		Teaching Assistant		Email						
5	Semester	Spring								
6	Year	2026	Start Date	1/19/26						
7	Program Level	BS								
8	Prerequisite Course	C S 3203, and C S major or C S minor								
9	Contact Hours	<b>Delivery Methods</b>		<b>Hour per week</b>	<b>Implementation</b>	<b>Date</b>	<b>Time</b>	<b>Location</b>		
		In-Person (Student Center Learning) Activities	Lecture	3 units	(3 hour(s) per week)	MWF	12:00 pm - 12:50 pm	Gallogly Hall 127		
			Tutorial	0 units	(0 hour(s) per week)					
			Laboratory	0 units	(0 hour(s) per week)					
			Supervision	0 units	(0 hour(s) per week)					
			Online Learning	0 units	(0 hour(s) per week)					
			Out Class	6 units	(6 hour(s) per week)					
		Students Hour□ (Instructor)	2 units	(2 hour(s) per week)	MW	09:50 am - 10:50 am	<a href="#">Devon Energy Hall 234 or Virtually</a>			
		Students Hour□ (Teaching Assistant)	2 units	(2 hour(s) per week)	MW	02:00 pm - 03:00 pm	<a href="#">Virtually</a>			
Final Exam	0 units	(2 hour(s) per Sem)	W May 13	01:30 pm - 03:30 pm	Gallogly Hall 127					
10	Course Synopsis	This course delves deeply into software quality assurance, examining various testing processes, methodologies, techniques, and tools. Covered topics encompass formal review techniques, black box and white box testing, integration testing, acceptance testing, regression testing, and performance testing. Through hands-on activities, students will acquire the necessary skills to verify the accuracy and quality of developed systems.								
11	ABET Student Outcomes	By the end of semester, students should be able to:								
		ASO 1	Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.							
		ASO 4	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.							
		ASO 6	Apply computer science theory and software development fundamentals to produce computing-based solutions.							
		N/A	N/A							
		N/A	N/A							
12	Assessment Methods	<b>Methods</b>	<b>Item</b>	<b>Weighting</b>	<b>ASO 1</b>	<b>ASO 4</b>	<b>ASO 6</b>	<b>N/A</b>	<b>Letter Grades</b>	
		Assignments	Assignment 0	5%	√				≥ 90	A
			Assignment 1	5%	√				80-89	B
			Assignment 2	5%		√			70-79	C
			Assignment 3	5%		√			60-69	D
			Assignment 4	5%				√	< 60	F
			Assignment 5	5%				√		
			Assignment 6	5%				√		
		Assignment 7	5%				√			
		Tickets	<a href="#">Ticket1 Software Test Plan (STP)</a>	15%				√		
<a href="#">Ticket2 Presentation</a>	15%					√				
Midterm	Multiple Choice	10%	√	√						
Final Exam	Free Response	20%	√	√						
<b>Total</b>			<b>100%</b>							
13	Learning References	Required 1	<a href="#">David Kung. (2024). Software Engineering, 2nd Edition. McGraw Hill.</a>							
		Supplementary 2	<a href="#">Leoudas, P. (2023). Testing in Agile Environment. In: Introduction to Software Testing. A press, Berkeley, CA.</a>							
		Supplementary 3	<a href="#">Pressman, R. S., &amp; Maxim, B. R. (2019). Software Engineering: A Practitioner's Approach.</a>							

**Notes:** Instructor reserves the right to modify or update the content on this platform at any time without prior notice. Users are encouraged to check for updates regularly. Your continued use of the platform after changes are made constitutes acceptance of those changes.



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1. This Document Details the:  
 a) **Week:** Indicates the number of the week., b) **Chapter:** The chapter from the required textbook., c) **Syllabus:** The specific topic to be discussed.,  
 d) **Class Activity:** We have 3 sessions each week; the number indicates the session (e.g., 1 indicates activities during the 1st session).  
 e) **SWEBOK v4.0:** Refers to the Software Engineering Body of Knowledge, version 4.0, which outlines the knowledge areas covered this week.,  
 f) **Assessment Method:** The type of assessment (e.g., quiz, assignment) assigned for this week, g) **Total Marks:** The weight or points assigned to this week's activities  
 2. Cells with a red triangle contain a note; hover to read it.

Week	Chapter/Topic	Syllabus	Class Activity	SWEBOK v4.0	Assessment Method	Total Marks	
1	System Engineering	1.3 Software Engineering Ethics 2.1 Challenges of System Development 2.3 Theory of Wicked Problems 3.6 System Integration, Testing, and Deployment 3.7 System Configuration Management	1: Do the Chapters-Reading 2: Prepare 3 unique Multiple Choice Questions 3: Form Groups	Software Construction (KA)			
2	Implementation Consideration	18.1 Coding Standard 18.2 Organizing the Implementation Artifacts 18.6 Test-Driven Development	1: Do the Chapters-Reading 2: Prepare 3 unique Multiple Choice Questions 3: Do Assignment 0	Software Construction (KA)	Assignment 0 Principles of Ethical and Reliable Software Development	5	
3	Software Quality Assurance	19.1 Benefits of Software Quality Assurance 19.2 Software Quality Attributes 19.3 Quality Measurements and Metrics	1: Do the Chapters-Reading 2: Prepare 3 unique Multiple Choice Questions 3: Do Assignment 1	Software Quality (KA)	Assignment 1 Implementation Considerations	5	
4	Software Quality Assurance	19.4 Software Verification and Validation Techniques 19.5 Verification and Validation in the life Cycle 19.6 Software Quality Assurance Functions	1: Do the Chapters-Reading 2: Prepare 3 unique Multiple Choice Questions 3: Do Assignment 2	Software Quality (KA)	Assignment 2 Quality Assurance - Measurement & Metrics	5	
5	Software Testing	20.1 What is Software Testing? 20.2 Why Software Testing? 20.3 Conventional BLACK-BOX Testing 20.4 Conventional WHITE-BOX Testing	1: Do the Chapters-Reading 2: Prepare 3 unique Multiple Choice Questions 3: Do Assignment 3	Software Testing (KA)	Assignment 3 Quality Assurance - Verification & Validation	5	
6	Software Testing	20.5 Test Coverage 20.6 A Generic Software Testing Process 20.7 Object-Oriented Software Testing	1: Do the Chapters-Reading 2: Prepare 3 unique Multiple Choice Questions 3: Do Assignment 4	Software Testing (KA)	Assignment 4 Conventional Testing	5	
7	Software Testing	20.8 Testing Web Application 20.9 Testing for Nonfunctional Requirements 20.10 Software Testing in the Life Cycle	1: Do the Chapters-Reading 2: Prepare 3 unique Multiple Choice Questions 3: Do Assignment 5	Software Testing (KA)	Assignment 5 Object-Oriented Testing	5	
8	Optimization Strategies	20.11 Regression Testing 20.12 When To Stop Testing 23.5 Process Improvement	1: Do the Chapters-Reading 2: Prepare 3 unique Multiple Choice Questions 3: Do Assignment 6	Software Maintenance (KA) Software Quality (KA)	Assignment 6 Web Application Testing	5	
9	Spring Break	Spring Break	Spring Break	Spring Break	Midterm	10	
10	Case Study System Understanding & Quality Context	1. Analyze system architecture, component boundaries, and interdependencies across multiple contributors. 2. Identifying system-level challenges, quality risks, and ethical considerations.	1: Codebase walkthrough & Component ownership mapping 2. Identify system-level quality risks and Assign student teams to components 3: Do Assignment 7		Assignment 7 Nonfunctional Testing	5	
11	Case Study: Quality Attributes & Metrics	1. Define relevant software quality attributes (e.g., reliability, maintainability, safety) 2: Select appropriate quality metrics to evaluate them.	1: Define quality goals per component 2: Identify measurable indicators 3: Peer discussion on metric validity		Ticket1_Software Test Plan (STP)	15	
12	Case Study: Verification, Validation & Test Planning	1. Design verification and validation strategies aligned with the system life cycle. 2: Test planning, traceability, and alignment with system requirements.	1: Create component-level test plans 2: Map tests to quality attributes 3: Peer review of test plans				
13	Case Study: Test Design & Execution	1. Design and execute black-box, white-box, and object-oriented tests for their assigned component. 2. Test coverage and defect identification.	1: Implement tests 2: Measure coverage 3: Analyze test results				
14	Case Study: Nonfunctional & Regression Testing	1. Design and execute nonfunctional tests and regression tests, 2. Evaluating system behavior under realistic constraints.	1: Nonfunctional testing scenarios 2: Regression test selection 3: Failure analysis				
15	Case Study: Process Improvement & Reflection	1. Evaluate testing effectiveness, quality outcomes, and development processes. 2. Identifying improvement opportunities and lessons learned.	1: Retrospective discussion 2: Process improvement proposals 3: Final presentation				
16	Pre-finals week	Relax Week	Do nothing		Ticket2_Presentation	15	
17	Exam	Relax Week	Do nothing		Final Exam	20	
18	<b>Class Points</b>					<b>Total Marks</b>	<b>100</b>
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Read Me

1. This document outlines the policies for the course, school, and university.
2. Please review it thoroughly before beginning the course or reaching out to the instructor.
3. Note: If any text is in white color, it indicates content not related to this specific course.

1	Instructor	1	About Instructor	<a href="#">Mansoor Abdulhak</a>
		2	Teaching Philosophy	My teaching methods include a variety of up-to-date techniques including active participation via an inverted classroom and experiential learning through project-based instruction and assessment. Through these methods, I seek to make courses imitate the work environment as much as possible in order to best prepare students for their careers.
2	Course	1	Home Page	This class will use Canvas software for our home page. The URL for the home page is <a href="http://canvas.ou.edu">http://canvas.ou.edu</a> . Login with your 4+4 using your standard OU password. If you have difficulty logging in, call 325-HELP. This software provides a number of useful features, including a list of assignments and announcements, an electronic mailing list, and grade book. The Canvas course site will be used for all updates. You should check the site regularly.
		2	Grade Checking	Canvas is equipped with a grade book that preserves the raw data utilized for computing your course grade. It is crucial that you routinely verify the accuracy of your recorded grades. In the event of any identified discrepancies or disagreement, promptly notify me via email (follow the policy of <b>Communication</b> ), and I shall promptly address and rectify the matter. Keep in mind Notifications must be submitted within the same week as the grade release; otherwise, changes will not be processed.
		3	Deadlines	Unless explicitly stated otherwise specified in writing, please ensure all assignments are submitted by the designated date in the Ticket instructions. <b>In the event of a delay, a 10% deduction will be applied for each class beyond the specified deadline.</b> This policy is in place to maintain fairness and consistency. It's worth noting that, as software engineering professionals, it's our responsibility to ensure timely submission, avoiding any delays that may result in fines for our workplace.
		4	AI Tools	In recognizing the lasting impact of AI tools, I encourage their use to improve your skills on using them. However, given that AI tools are not fully matured, it is the responsibility of the student to evaluate the content generated and learn how to effectively work with AI tools to achieve optimal results. This approach reflects our commitment to adapting and utilizing emerging technologies responsibly in the learning environment. It is essential to note that any direct copy-pasting without reading, understanding, analyzing, and actively working to enhance your skills will be considered academic misconduct.
		5	Exams	<a href="#">Follow the University Final Exam Policies</a>
		6	Ownership of Course Materials	All original content used in this course is owned by Mansoor Abdulhak. This includes but is not limited to exams, lectures, quizzes, handouts, protocols, electronic documents, and syllabi. Original or transcribed content may not be copied, recorded, retransmitted, posted online, or sold without her and/or her expressed, written consent.
3	Class	1	Communication	<ol style="list-style-type: none"> <li>1. The primary method of communication outside of class will be through a Discord server. The server link will be shared on Canvas. All general questions related to the learning outcomes of the class are encouraged to be discussed openly within the appropriate channels on Discord. However, for questions involving personal matters, participants are welcome to send private messages within the Discord server for a more confidential interaction.</li> <li>2. Urgent announcements will be communicated through Canvas. It is your responsibility to regularly check Canvas for updates.</li> <li>3. For formal communication, please use email to contact me. To facilitate this communication PLEASE, Ensure that you include the semester, the course code ID, the group ID and your Sooner ID (e.g. Spring26-CS4273-GroupA-123456789) before the subject in your email. Without this information, your message may not be noticed or entertained.</li> </ol>
		2	Class Attendance	<p>As part of our commitment to student success, I offer two attendance tracks to accommodate diverse circumstances. The first track follows a traditional attendance policy. The second track, known as the double exam policy, is designed to support students who may face challenges in regular attendance. This alternative option allows students to demonstrate their understanding through exams, providing flexibility for those who may have commitments that prevent consistent attendance. Our aim is to ensure that all students have an opportunity to succeed, regardless of their individual circumstances. It's important to note that the cut-off for selecting your attendance track will be in week one, and switching tracks won't be allowed unless exceptional circumstances arise.</p> <p>Attendance (Track 1): This course follows a synchronous format, requiring your attendance at all scheduled class sessions and labs in person. Exceptions are made for illness, unforeseen caretaking duties, or if you feel uncomfortable being in group settings at the moment.</p> <p>In addition to the aforementioned policy, you have the option to opt for the Double Exam (Track 2) policy.</p> <p>Double Exam (Track 2): Attendance to classes and participation in group activities are not mandatory and won't be calculated. However, your final grade will be determined by a combination of an individual assignments scores and twice the exam score. This calculation will contribute to your overall assessment for the course, with the maximum achievable grade capped at a 'C'. As you will only be evaluated based on the ASO 4 &amp; ASO 6 outcomes. <b>Update your group ID in 3.2 Student List By Week ONE.</b></p>
		3	Classroom Conduct	Disruptions of class will not be permitted. In the case of disruptive behavior, you will be asked to leave the classroom and may charge you with a violation of the Student Code of Responsibilities and Conduct.
		4	Grade	<p>Your final grade will be determined by:</p> <ol style="list-style-type: none"> <li>1. The assessment methods outlined in the sheet 1. Course Syllabus.</li> <li>2. Peer evaluations of teamwork, which consider:                             <ul style="list-style-type: none"> <li>• Your contributions to team assignments</li> <li>• Your support in enabling others to contribute effectively</li> </ul> </li> </ol> <p>Peer evaluations may significantly impact your final letter grade.</p>
		5	Academic Integrity and Plagiarism	<p>The goal of this course is your learning, so the work you submit must be your own. Write in your own words and cite sources to avoid plagiarism. Group work, tutoring, campus resources, or online tools (including AI) are fine, but your submissions must show your understanding. If you're unsure about academic integrity, ask me. Serious violations can mean a zero on the assignment or even expulsion, so please know the expectations.</p> <p><a href="#">Visit the OU Integrity Office for more information on what constitutes plagiarism.</a></p>

## University Policies

In this section, you will find the recommended University policies.

### **Mental Health Support Services: (required)**

Support is available for any student experiencing mental health issues that are impacting their academic success. Students can either be seen at the University Counseling Center (UCC) located on the second floor of Goddard Health Center or receive 24/7/365 crisis support from a licensed mental health provider through [TimelyCare](#). To schedule an appointment or receive more information about mental health resources at OU please call the UCC at 405-325-2911 or visit [University Counseling Center](#). The UCC is located at 620 Elm Ave., Room 201, Norman, OK 73019.

### **Title IX Resources and Reporting Requirement (required)**

The University of Oklahoma faculty are committed to creating a safe learning environment for all members of our community, free from sex-based discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking, in accordance with Title IX. There are resources available to those impacted, including: speaking with someone confidentially about your options, medical attention, counseling, reporting, academic support, and safety plans. If you have (or someone you know has) experienced any form of sex-based discrimination or violence and wish to speak with someone confidentially, please contact [OU Advocates](#) (available 24/7 at 405-615-0013) or [University Counseling Center](#) (M-F 8 a.m. to 5 p.m. at 405-325-2911). Because the University of Oklahoma is committed to the safety of you and other students, and because of our Title IX obligations, I, as well as other faculty, Graduate Assistants, and Teaching Assistants, are mandatory reporters. This means that we are obligated to report sex-based violence that has been disclosed to us to the Institutional Equity Office. This means that we are obligated to report sex-based violence that has been disclosed to us to the Institutional Equity Office. This includes disclosures that occur in: class discussion, writing assignments, discussion boards, emails and during Student/Office Hours. You may also choose to report directly to the Institutional Equity Office. After a report is filed, the Title IX Coordinator will reach out to provide resources, support, and information and the reported information will remain private. For more information regarding the University's Title IX Grievance procedures, reporting, or support measures, please visit [Institutional Equity Office](#) at 405-325-3546.

### **Reasonable Accommodation Policy (required)**

The University of Oklahoma (OU) is committed to the goal of achieving equal educational opportunity and full educational participation for students with disabilities. If you have already established reasonable accommodations with the Accessibility and Disability Resource Center (ADRC), please log into iAdvise to request your semester accommodations as soon as possible and contact me privately, so that we have adequate time to arrange your approved academic accommodations.

If you have not yet established services through ADRC, but have a documented disability and require accommodations, please complete [ADRC's pre-registration form](#) to begin the registration process. ADRC facilitates the interactive process that establishes reasonable accommodations for students at OU. For more information on ADRC registration procedures, please review their [website](#). You may also contact them at (405)325-3852 or [adrc@ou.edu](mailto:adrc@ou.edu), or visit [www.ou.edu/adrc](http://www.ou.edu/adrc) for more information.

Note: disabilities may include, but are not limited to, mental health, chronic health, physical, vision, hearing, learning and attention disabilities, pregnancy-related. ADRC can also support students experiencing temporary medical conditions.

### **Religious Observance (required)**

It is the policy of the University to excuse the absences of students that result from religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays, without penalty.

[\[See Faculty Handbook 3.15.2\]](#)

### **Adjustments for Pregnancy and Related Issues (required)**

Should you need modifications or adjustments to your course requirements because of pregnancy or a pregnancy-related condition, please request modifications via the [Institutional Equity Office website](#) or call the Institutional Equity Office at 405/325-3546 as soon as possible. Also, see the Institutional Equity Office [FAQ on Pregnant and Parenting Students' Rights](#) for answers to commonly asked questions.

### **Final Exam Preparation Period (required)**

Pre-finals week will be defined as the seven calendar days before the first day of finals. Faculty may cover new course material throughout this week. For specific provisions of the policy please refer to OU's [Final Exam Preparation Period policy](#).

### **Emergency Protocol (required)**

During an emergency, there are official university [procedures](#) that will maximize your safety.

**Severe Weather:** If you receive an OU Alert to seek refuge or hear a tornado siren that signals severe weather.

1. Look for severe weather refuge location maps located inside most OU buildings near the entrances.
2. Seek refuge inside a building. Do not leave one building to seek shelter in another building that you deem safer. If outside, get into the nearest building.
3. Go to the building's severe weather refuge location. If you do not know where that is, go to the lowest level possible and seek refuge in an innermost room. Avoid outside doors and windows.
4. Get in, Get Down, Cover Up

5. Wait for official notice to resume normal activities.

Additional [Weather Safety Information](#) is available through the Department of Campus Safety.

### **The University of Oklahoma Active Threat Guidance (required)**

The University of Oklahoma embraces a Run, Hide, Fight strategy for active threats on campus. This strategy is well known, widely accepted, and proven to save lives. To receive emergency campus alerts, be sure to update your contact information and preferences in the account settings section at [one.ou.edu](http://one.ou.edu).

**RUN:** Running away from the threat is usually the best option. If it is safe to run, run as far away from the threat as possible. Call 911 when you are in a safe location and let them know from which OU campus you're calling from and location of active threat.

**HIDE:** If running is not practical, the next best option is to hide. Lock and barricade all doors; turn off all lights; turn down your phone's volume; search for improvised weapons; hide behind solid objects and walls; and hide yourself completely and stay quiet. Remain in place until law enforcement arrives. Be patient and remain hidden.

**FIGHT:** If you are unable to run or hide, the last best option is to fight. Have one or more improvised weapons with you and be prepared to attack. Attack them when they are least expecting it and hit them where it hurts most: the face (specifically eyes, nose, and ears), the throat, the diaphragm (solar plexus), and the groin.

*Please save OUPD's contact information in your phone.*

**NORMAN** campus: *For non-emergencies call (405) 325-1717. For emergencies call (405) 325-1911 or dial 911.*

**TULSA** campus: *For non-emergencies call (918) 660-3900. For emergencies call (918) 660-3333 or dial 911.*

### **Fire Alarm/General Emergency: (required)**

If you receive an OU Alert that there is danger inside or near the building, or the fire alarm inside the building activates:

1. *LEAVE* the building. Do not use the elevators.
2. *KNOW* at least two building exits
3. *ASSIST* those that may need help
4. *PROCEED* to the emergency assembly area
5. *ONCE safely outside, NOTIFY first responders of anyone that may still be inside building due to mobility issues.*
6. *WAIT* for official notice before attempting to re-enter the building.

[OU Fire Safety on Campus](#)

### **Office of Access and Opportunity's Belonging Statement (optional)**

Why You Belong at the University of Oklahoma: The University of Oklahoma fosters an inclusive culture of respect and civility, belonging, and access, which are essential to our collective pursuit of excellence and our determination to change lives. The unique

talents, perspectives, and experiences of our community enrich the learning, and working environment at OU, inspiring us to harness our innovation, creativity, and collaboration for the advancement of people everywhere.

### **Course Reflection Survey (optional)**

You'll receive a Course Reflection Survey at the end of each semester for each course that you are enrolled in. I strongly encourage you to complete this survey. Your feedback can help me adjust my class for future semesters to help other students be successful. Your feedback is confidential and I will only receive it after final grades are due. Course Reflection Survey results may also factor into teaching evaluations and annual performance reviews and are shared with department and program chairs.

### **Copyright Statement, for in-person or online courses (optional)**

Sessions of this course may be recorded or live-streamed. These recordings are the intellectual property of the individual faculty member and may not be shared or reproduced without the explicit, written consent of the faculty member. In addition, privacy rights of others such as students, guest lecturers, and providers of copyrighted material displayed in the recording may be of concern. Students may not share any course recordings with individuals not enrolled in the class or upload them to any other online environment.

### **Pre-Finals Week Policy (optional)**

During pre-finals week, all normal class activities will continue; however, no assignment, test, or examination accounting for more than 3% of the course grade may be assigned, unless it is assigned in advance of pre-finals week and worth less than 10%, or scheduled at least 30 days prior if worth more than 10%. No activity or field trip may be scheduled that conflicts with another class. There are some exceptions and nuances, so please review the [Final Exam Policies](#) prior to designing your course schedule.