# CS 5385 Software Requirements
**Master of Science in Software Engineering (MSSwE)**

## Course Description

This course facilitates the discussion of key Software Engineering (SwE) and Requirements Engineering concepts, processes, and activities performed by software engineers. The course addresses what Software Engineering is about as well as its reference domains, types of lifecycles, and major authoritative sources. The course addresses the major activities of requirements engineering, customer and technical requirements, Operational Concept document, prototyping, software requirements specification, verification and validation of software requirements, support tools for requirements engineering including requirements traceability. Finally, the ethical aspects to be considered when writing software requirements specifications and soft skills to interview and present technical work are reviewed.

## Course Goal

The course goal is to prepare students to become proficient in applying software requirements engineering methods and techniques, working in cooperative teams, and managing projects. This course is also designed to promote your overall success, inside and outside the classroom. The coursework helps you to improve in key areas such as Communication, Confidence, Critical Thinking, Leadership, Problem Solving, Social Responsibility, and Teamwork.  To find out more about the university's plan to improve student engagement and learning, visit the UTEP Edge.

| Contact Information | |
|---|---|
| *Instructor name* | Dr. Oscar A. Mondragon |
| *Location* | CCSB 3.1020 |
| *Phone* | (915) 747 – 8015 |
| *e-mail* | oamondragon@utep.edu |
| *class* | *Tuesday 6:00 to 8:45 PM at* <br> Chemistry Computer Sci Bldg G.0208 |
| *Remote office hours* | Monday 09:00 to 09:50 am; Wednesday 5:30 to 6:20 pm <br> On Blackboard Collaborate |

Personal inquiries should be done through e-mail messages. Course inquiries should be done through the Class Discussion Board by creating a new thread.

COVID-19 PRECAUTION STATEMENT

Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to covidaction@utep.edu, so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID-19 testing.

The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area, and will be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit epstrong.org.

**Required Readings Material**

You will need the following reading materials throughout this course:

- Bourque, P. and Fairly, R. (2014). *Guide to the Software Engineering Body of Knowledge (SWEBOK) V3.0*. IEEE Computer Society. Retrieved from https://ieeecs-media.computer.org/media/education/swebok/swebok-v3.pdf

- ISO/IEC/IEEE (2018). *Systems and software engineering — Life cycle processes — Requirements engineering* (Standard 29148 (E)). IEEE. Retrieved from https://0-ieeexplore-ieee-org.lib.utep.edu/stampPDF/getPDF.jsp?tp=&arnumber=8559686&ref=aHR0cHM6Ly9saWludXRlc5lZHUvd2FtdFsaWRhdGU/dXJsPWh0dHBzJTNBJTJGJTJGMC1pZWVleHBsb3JlLWllZWUtb3JnLmxpYi51dGVwLmVkSUzQTQ0MyUyRnN0YW1wJTJGc3RhbXAuanNwJTNGdHAlM0QlMjZhcm51bWJlciUzRDg1NTk2ODY=&tag=1

- ISO/IEC/IEEE (2015). *Systems and software engineering — Systems Life cycle processes — Requirements engineering* (Standard 15288 (E)). IEEE. Retrieved from https://0-ieeexplore-ieee-org.lib.utep.edu/stamp/stamp.jsp?tp=&arnumber=7106435

- CMMI Product Team. (2010). *CMMI for Development. Version 1.3*. CMMI Institute. There is a link in BB to download this resource.

- International Council on Systems Engineering. (2015). *INCOSE systems engineering handbook: A guide for system life cycle processes and activities.* Fourth edition. Eds. Forsberg, K. Roedler, G., Walden, D. et. al. Hoboken, NJ: Wiley.
  Note: UTEP is an INCOSE Corporate Advisory Board (CAB) member. You can get a free Associate Member/Student Account here.

see the "Readings" section for the readings assigned in each discussion board, individual assignment, or group assignment.

**Summary of Course Structure**

Content is provided in modules that are released every two weeks. Each module will have a menu to guide students through the content and identify discussion board postings and/or individual and group assignments to be completed on Blackboard's course shell. The first module provides a course overview, facilitates attendee introductions, and discusses Software Engineering, lifecycles, and requirements engineering main concepts. The modules for this course are as follow:

| # | Module Name |
|---|---|
| 1 | Lifecycles and TSP principles for Teamwork |
| 2 | Problem scope, assuring quality, and customer needs |
| 3 | Customer Requirements and Requirements Traceability |
| 4 | Customer Requirements Validation & Config. Management & Decision Analysis |
| 5 | Software Requirement Specification and Analysis views |
| 6 | Refining requirements & Class diagram and Sequence diagram |
| 7 | Analyzing Behavior & Managing requirements in Agile |
| 8 | Refining Prototype and Final Presentation |

**Being Successful On Remote sessions or Team Meetings**

This section has some tips and tricks about how to be successful in your remote sessions/meetings. Online learning is not a spectator sport. It is everyone's responsibility to participate as much as they can so everyone can get the most from the experience. Here are some simple rules to follow to ensure your participation and engagement in the learning process:

- Ask questions: If you don't know the answer, someone else will. The discussion board is the area for asking questions related to the content OR any problems (related to the class) you are having. Make sure that you have indicated the subject of your message.
- Reach out to others: Offer a fact, article, link, or another item that can help others learn.
- Be appropriate: The remote classroom is not the place for insulting or insensitive comments, attacks, or venting. Inappropriate behavior can be subject to disciplinary action.
- Be diplomatic: When sending messages on emotionally charged topics, I recommend that you write the message and then walk away for at least an hour before re-reading the message and then sending it. Re-reading emotionally charged messages ensures that they are constructive instead of destructive. Think of the person on the other end.
- Stay focused: Stay on topic to increase the efficiency of your learning.

## Grading Criteria

The following scale is used for assigning letter grades.

| A | [90 % and above] |
|---|---|
| B | [80 % - 89 %] |
| C | [70 % - 79%] |
| D | [60 % - 69 %] |
| F | [0 % - 59%] |

Note that there will be no "rounding up" automatically but the instructor does reserve the right to lower the grade scale if it is deemed appropriate.

## Point Distribution

| 10 | Discussion |
|---|---|
| 10 | Individual Assignment |
| 10 | Start of class quiz & class exercise |
| 20 | Module exams |
| 40 | Group Assignment (Project work) |
| 10 | Assessment of team feedback & Instructor evaluation |

**Assignments. No late homework will be accepted.**

Problems that have been assigned as individual work can be discussed with other students in a general way, but the solutions must be done independently and the work must be unmistakably your own. Assignments completed as a team must include all student names on the first sheet. By signing your name, you are stating that you agree with the answers and can explain them to the TA or instructor. Students are expected to read assigned sections of the book and to be prepared to discuss the material in class. Quizzes will be given at the start of the class to check for a general understanding of the material.

**Project.** Each deliverable of the project is graded independently. Please be pro-active in asking questions about the deliverables and comments by the guidance team.

Each team member is responsible for **documenting his/her work on the project** in the weekly schedule. The percentage of the project grade calculated towards the final course grade is determined through this documentation and the individual's contribution toward creating an effective team environment. **No late project work will be accepted.**

**Exams.** **No make-up exams or** *start of class* **quiz.**

**Participation:** You must have active participation in the class forum, customer forum, group assignments, and synchronous blackboard sessions. Your participation is evaluated by your team members and by your instructor and it is part of your grade.

## *TECHNOLOGY REQUIREMENTS*

Course content is delivered via the Internet through the Blackboard learning management system. Ensure your UTEP e-mail account is working and that you have access to the Web and a stable web browser. Google Chrome and Mozilla Firefox are the best browsers for Blackboard; other browsers may cause complications. When having technical difficulties, update your browser, clear your cache, or try switching to another browser.

You will need to have access to a computer/laptop, scanner, webcam, and microphone. You will need to download or update the following software: Microsoft Office, Adobe Acrobat Reader, Windows Media Player, QuickTime, and Java. Check that your computer hardware and software are up-to-date and able to access all parts of the course.

If you do not have word-processing software, you can download Word and other Microsoft Office programs (including Excel, PowerPoint, Outlook, and more) for free via UTEP's Microsoft Office Portal. Click the following link for more information about Microsoft Office 365 and follow the instructions.

IMPORTANT: If you encounter technical difficulties beyond your scope of troubleshooting, please contact the UTEP Help Desk as they are trained specifically in assisting with the technological needs of students. **Please do not contact me for this type of assistance**. The Help Desk is much better equipped than I am to assist you!

## *Course Communication:*
### *How we will stay in contact with each other*

We see each other during class time, small group meetings, and office hours:
- **Office Hours**: I will hold office hours for your questions and comments about the course during the following times:
  > Mondays: 09:00 to 09:50 am
  > Wednesdays: 5:30 to 6:20 pm. Mountain Time
- **Email**: UTEP e-mail is the best way to contact me.  I will make every attempt to respond to your e-mail within 24-48 hours of receipt.  When e-mailing me, **be sure to email from your UTEP student account**, and please **put the course number in the subject line**. In the body of your e-mail, clearly state your question.  At the end of your e-mail, be sure to put your first and last name, and your university identification number.
- **Discussion Board**: If you have a question that you believe other students may also have, please post it in the Class Forum (a discussion board in Blackboard). Please respond to other students' questions if you have a helpful response.
- **Announcements**: Check the Blackboard announcements and the class forum frequently for any updates, deadlines, or other important messages.

## *NETIQUETTE*

As we know, sometimes communication online can be challenging. It's possible to miscommunicate what we mean or to misunderstand what our classmates mean given the lack of body language and immediate feedback. Therefore, please keep this netiquette (network etiquette) guidelines in mind. Failure to observe them may result in disciplinary action.

- **Always consider the audience.** This is a graduate-level course; therefore, all communication should reflect polite consideration of other's ideas.

- **Respect and courtesy** must be provided to classmates and the instructor at all times. No harassment or inappropriate postings will be tolerated.

- **When reacting to someone else's message,** address the ideas, not the person. Post only what anyone would comfortably state in a face-to-face situation.

- **Blackboard is not a public internet venue;** all postings to it should be considered private and confidential. Whatever is posted in these online spaces is intended for classmates and professors only. Please do not copy documents and paste them to a publicly accessible website, blog, or other space.

### *Course Policies:*
### *What do you need to do to be successful in the course?*

### *Empowering self-directed teams (policy):*

Students will work on teams. Students should develop soft skills to properly and effectively work as team members. Team members are expected to have a positive attitude, deliver quality work on time, participate in peer reviews, and support other team members. Because you are working in a self-managed team, your team has empowerment and it is expected that the team should use it professionally and ethically. If a team member starts not working, performing poorly, breaking ground rules, or being irresponsible, the team must let the member know about the problem and acknowledge a warning as soon as possible (verbally during a meeting or by sending an email). If the team member is continuously breaking ground rules and negatively affecting the team, the team must let the member know about the problem and acknowledge a yellow card by sending him/her an email and copying the instructor (show a yellow card). The team member should let the team know a strategy to improve performance and request help from the team and instructor if needed. If the team member continues performing poorly or irresponsible negatively affecting the team, the team has the empowerment to remove him/her from the team by showing him/her a red card (show a red card). *A student can only receive credit for the team project work if he/she is a contributing member of a team*. Yellow and red cards are designated by consensus by all the team members but the affected party. The team leader shall send an e-mail to the instructor and all team members including the affected team member with a brief explanation of the circumstances.

### *ATTENDANCE AND PARTICIPATION*
Attendance in the course is determined by participation in the learning activities of the course. Your participation in the course is important not only for your learning and success but also to create a community of learners. Participation is determined by completion of the following activities:

o   Reading/Viewing all course materials to ensure understanding of assignment requirements
o   Participating in an engaging discussion with your peers on the discussion boards (grading rubric provided in the "grading information" area of each forum)
o   Active Participation in scheduled Blackboard Collaborate sessions (synchronous remote sessions)
o   Other activities as indicated in the weekly modules

Because these activities are designed to contribute to your learning each week, they cannot be made up after their due date has passed.

## EXCUSED ABSENCES AND/OR COURSE DROP POLICY

According to UTEP Curriculum and Classroom Policies, "When, in the judgment of the instructor, a student has been absent to such a degree as to impair his or her status relative to credit for the course, the instructor may drop the student from the class with a grade of "W" before the course drop deadline and with a grade of "F" after the course drop deadline." See academic regulations in the UTEP Undergraduate Catalog for a list of excused absences. Therefore, if I find that, due to non-performance in the course, you are at risk of failing, I will drop you from the course. I will provide 24 hours advance notice via email.

## CLASS COLLABORATE SESSIONS

This class requires that you participate during class time. The purpose of these sessions is for you to view live demonstrations of the course material and/or to participate in small discussion groups with your classmates.

## DEADLINES, LATE WORK, AND ABSENCE POLICY

**Major Project Assignments**

- Major project assignments will be due before class (5:00 PM). No late work will be accepted if the reason is not considered excusable.

**Discussion Board Assignments & Module Exams**

- Discussion Board Assignments require an initial post due on Thursdays at 11:59 pm MST and two peer review technical feedbacks on Sunday. You must provide a reference name and pg. # in both initial posts and peer reviews.

- Module exams will be due before class (5:00 PM). No late work will be accepted if the reason is not considered excusable.

## MAKE-UP WORK

Make-up work will be given *only* in the case of a *documented* emergency.  Note that make-up work may be in a different format than the original work, may require more intensive preparation, and maybe graded with penalty points. If you miss an assignment and the reason is not considered excusable, you will receive a zero. It is therefore important to reach out to me—in advance if at all possible—and explain with proper documentation why you missed a given course requirement. Once a deadline has been established for make-up work, no further extensions or exceptions will be granted.

## ALTERNATIVE MEANS OF SUBMITTING WORK IN CASE OF TECHNICAL ISSUES

I strongly suggest that you submit your work with plenty of time to spare if you have a technical issue with the course website, network, and/or your computer. I also suggest you save all your work (answers to discussion points, quizzes, exams, and essays) in a separate Word document as a back-up. This way, you will have evidence that you completed the work and will not lose credit. If you are experiencing difficulties submitting your work through the course website, please contact the UTEP Help Desk. You can email me your back-up document as a last resort.

## *INCOMPLETE GRADE POLICY*

Incomplete grades may be requested only in exceptional circumstances after you have completed at least half of the course requirements. Talk to me immediately if you believe an incomplete is warranted. If granted, we will establish a contract of work to be completed with deadlines.

## ACCOMMODATIONS POLICY

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services, and activities with documented disabilities to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University.  Students requesting an accommodation based on a disability must register with the [UTEP Center for Accommodations and Support Services](#) (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at [cass@utep.edu](#), or apply for accommodations online via the [CASS portal](#).

### COVID-19 Accommodations

Students are not permitted on campus when they have a positive COVID-19 test, exposure, or symptoms.  If you are not permitted on campus, you should contact me as soon as possible so we can arrange necessary and appropriate accommodations.

## *SCHOLASTIC INTEGRITY*

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as ones' own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the [Office of Student Conduct and Conflict Resolution (OSCCR)](#) for possible disciplinary action. To learn more, please visit [HOOP: Student Conduct and Discipline.](#)

## *TEST PROCTORING SOFTWARE*

Exams make use of Respondus LockDown Browser and Respondus Monitor inside of Blackboard to promote academic integrity. You are encouraged to learn more about how to use these programs before the first test.

### Please review the following guidelines for start of the class quiz:

- It is only be available at the beginning of the class.

- It is based on the assigned readings for that class so do your readings before the class starts.
- You only have ONE attempt to take the test. You shall not take it multiple times. Only the first attempt is recorded.
  Note: if there are technical problems and you are kicked out from the exam, then you should retake the exam from the start. A log of the technical issue is recorded by BB.
- Respondus Lockdown Browser will require that all internet tabs are closed before the start of the test.
- Hand written notes are permitted only for this quiz and not allowed for midterm or final.
- You should not have conversations with other people and/or leave and return to the area during the test.

## *PLAGIARISM DETECTING SOFTWARE*

Some of your course work and assessments may submit to SafeAssign, a plagiarism detecting software. SafeAssign has used review assignment submissions for originality and will help you learn how to properly attribute sources rather than paraphrase.

## *COPYRIGHT STATEMENT FOR COURSE MATERIALS*

All materials used in this course are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for this course. They may not be further disseminated.

## *COVID-19 PRECAUTIONS*

You must STAY AT HOME and REPORT if you (1) have been diagnosed with COVID-19, (2) are experiencing COVID-19 symptoms, or (3) have had recent contact with a person who has received a positive coronavirus test. Reports should be made at screening.utep.edu. If you know of anyone who should report any of these three criteria, you should encourage them to report. If the individual cannot report, you can report on their behalf by sending an email to COVIDaction@utep.edu.

## *Course Resources:*
### *Where you can go for assistance*

UTEP provides a variety of student services and support:
Technology Resources
- Help Desk: Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in-person if on campus.

Academic Resources
- **UTEP Library: Access a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.**
- **University Writing Center (UWC): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.**

- **Math Tutoring Center (MaRCS):** **Ask a tutor for help and explore other available math resources.**
- **History Tutoring Center (HTC):** **Receive assistance with writing history papers, get help from a tutor and explore other history resources.**
- **RefWorks:** **A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide.**

**Individual Resources**
- Military Student Success Center: Assists personnel in any branch of service to reach their educational goals.
- Center for Accommodations and Support Services: Assists students with ADA-related accommodations for coursework, housing, and internships.
- Counseling and Psychological Services: Provides a variety of counseling services including individual, couples, and group sessions as well as career and disability assessments.

**Important Dates.**

| | |
|---|---|
| Aug 23rd | Fall classes begin |
| Aug 23rd-27th | Late Registration (Fees are incurred) |
| **Sept 6th** | Labor Day Holiday - **University Closed** |
| Sept 8th | Fall Census Day<br>Note: This is the last day to register for classes. If payment is not received by this day, students will be dropped. |
| Sept 20th | 20th Class Day |
| Oct 1st | Graduation application deadline for degree conferral |
| Oct 29th | Fall Drop/Withdrawal Deadline |
| Nov 12th | Deadline to submit candidates' names for degree conferral |
| **Nov 25-26th** | Thanksgiving Holiday - **University Closed** |
| Dec 2nd | Fall – Last day of classes |
| Dec 3rd | Dead day |
| **Dec 6-10th** | **Fall Final Exams** |
| Dec 11-12th | Fall Commencement |
| Dec 15th | Grades are Due |
| Dec 16th | Grades are posted to student records; |

**Learning Outcomes**
**Level 1. Knowledge and Comprehension**

Level 1 outcomes are those in which the student has been exposed to the terms and concepts at a basic level and can supply basic definitions. The material has been presented only at a superficial level. Upon successful completion of this course, students will be able to:
   a. Define software engineering, software characteristics, reference disciplines of software (computing, Engr., Math & Statistics, social sciences, and management sciences), concepts and principles (abstraction, the anticipation of change, modularity, stepwise refinement, and separation of concerns).
   b. Define quality attributes such as availability, correctness, efficiency, interoperability, maintainability, portability, reliability, security, modifiability, availability, testability, and usability.

c.  Describe the structure and main purpose of authoritarian sources for Software lifecycle processes, requirements engineering process, and Software Engineering (SWEBOK, CMMI, ISO/IEC/IEEE 15288 Std, ISO/IEC/ISO 29148, and INCOSE SE Handbook)
d.  Define security design principles and the rule of least astonishment.


## Level 2: Application and Analysis

Level 2 outcomes are those in which the student can apply the material in familiar situations, e.g., can work a problem of familiar structure with minor changes in the details. Upon successful completion of this course, students will be able to:
a.  Determine the main characteristics of a life cycle (stages, gates, processes, recursion, and iteration) and which life cycle model (waterfall, incremental, iterative, prototyping, RAD, Spiral, Agile) to use by analyzing the project and business constraints.
b.  Apply techniques for eliciting requirements including interviews.
c.  Analyze requirements to determine if they meet the attributes of well-written requirements.
d.  Identify risks in software development and requirements engineering activities.
e.  Analyze the course project and determine the local and global impact on computing on individuals, organizations, and society, including consideration of professional software engineering code of ethics.
f.  Relate the importance of professional societies (e.g., ACM, IEEE-CS, CMMI, INCOSE).
g.  Engage in self-directed study to learn new techniques and tools for software requirements definition.

## Level 3:  Synthesis and Evaluation
Level 3 outcomes are those in which the student can apply the material in new situations.   This is the highest level of mastery. Upon successful completion of this course, students will be able to:
a.  Construct a Software Operational Concept (OpsCon) document that provides an operational description of the system from the user's point of view.
b.  Conduct verification and validation using techniques such as inspections or walkthroughs following a review process with checklists and a defect log (e.g., Personal Software Process (PSP) review technique).
c.  Construct a prototype, which adheres to basic HCI principles and applicable security design principles, to validate the user interface.
d.  Construct a software requirements specification.
e.  Analyze and model aspects of a problem by applying various modeling techniques (e.g., Use cases, Context diagrams, OOA class diagrams, Requirements diagrams, Data flow diagrams, state transition diagrams, and interaction diagrams).
f.  Demonstrate an ability to assemble and orally present technical work and compose technical documents that are grammatically correct and technically sound.
g.  Apply effective techniques for project management, collaboration, and problem-solving by building a high-performance team (e.g., applying principles of Team Software Process (TSP) to build and congeal the team).