

**The University of Texas at El Paso**  
**Department of Industrial, Manufacturing, and Systems Engineering**  
**Syllabus**

|                                  |  |
|----------------------------------|--|
| <b>Course Title</b>              | Computer Simulation Application                            |
| <b>Course No.</b>                | IE 5357  |
| <b>CRN</b>                       | 23932  |
| <b>Term</b>                      | Spring 2024  |
| <b>Delivery Method</b>           | In-Person  |
| <b>Meeting Day and Time</b>      | Wednesday: 6.00 PM – 8.50 PM                               |
| <b>Location</b>                  | Health Science/School of NURS, Room 135                    |
| <b>Instructor</b>                | Dr. Md Fashiar Rahman, Assistant Professor                 |
| <b>Phone Number</b>              | (915) 747 6903   |
| <b>Office Location</b>           | Engineering Building, Room A 243                           |
| <b>Instructor's Office Hours</b> | Tuesday and Thursday: 12 PM to 1.00 PM                     |
| <b>Email</b>                     | <a href="mailto:mrahman13@utep.edu">mrahman13@utep.edu</a> |
| <b>TA's Office Hours</b>         | TBD  |

**1 COURSE WEB PAGE**

We will use Blackboard as the platform to share the course contents. So, students must check the course homepage regularly through Blackboard using the following link using their UTEP credentials.

<https://blackboardlearn.utep.edu/>

**2 COURSE MOTIVATION:**

Simulation modeling solves real-world problems safely and efficiently. It provides an efficient method of analysis for easy verification, communication, and understanding. Simulation modeling provides valuable solutions across industries and other disciplines by giving clear insights into complex systems. It enables experimentation on a valid digital representation of a system. Unlike physical experiments, simulation modeling is computer-based and uses algorithms and equations. Simulation software provides a dynamic environment for the analysis of computer models with an interactive view of 2D and 3D representations. The uses of simulation in industries are varied, and it is often utilized when conducting experiments on a real system is impossible or impractical because of cost or time.

**3 COURSE DESCRIPTION (3 CREDITS)**

As to this significant usage of simulation, we designed this advanced course for graduate students. As an advanced course on simulation, this course introduces the different concepts and methods of simulation. Students will investigate the use of discrete-event simulation (DES) to solve complex systems such as healthcare or manufacturing processes. The course emphasizes the fundamental concepts of and proper interpretation of results from process and




agent-centric models. The course includes topics such as 1) basic concepts of modeling and simulation, 2) Queuing theory, 3) statistical distribution, 4) working with simulation software, 5) solving case studies, 6) healthcare systems modeling, 7) Statistical result analysis of simulation output, 8) Presenting simulation using Graphical User Interface (GUI), and 9) Model verification and validation.

**4 PREREQUISITES:**

Basic engineering probability and statistics. Having basic programming knowledge would be an advantage. However, this is not a course in mathematical probability or advanced statistics.

**5 COURSE OBJECTIVES AND LEARNING OUTCOMES:**

By the end of the course, students will be able to:

| Student Learning Objective   | Outcome   |                          |
|--|---|--------------------------|
| Evaluate and synthesize diverse simulation methodologies, including discrete-event simulation, to analyze and solve complex systems. |  | Critical-thinking skills |
| Apply discrete-event simulation techniques to formulate and solve real-world problems in the healthcare and manufacturing sectors.   |  | Problem-Solving skills   |
| Collaborate effectively within a team to design, implement, and present a comprehensive semester-long simulation project.            |  | Teamwork skills          |

**6 REQUIRED BOOK REFERENCES:**

- Applied Simulation: Modeling and Analysis using FlexSim, 5th Edition (Beaverstock, Greenwood, and Nordgren) ( <https://www.flexsim.com/store/> )
- FlexSim Simulation Software Primer by Allen G Greenwood – Click [HERE](#) to download the pdf version.

**7 TECHNOLOGY REQUIREMENTS:**

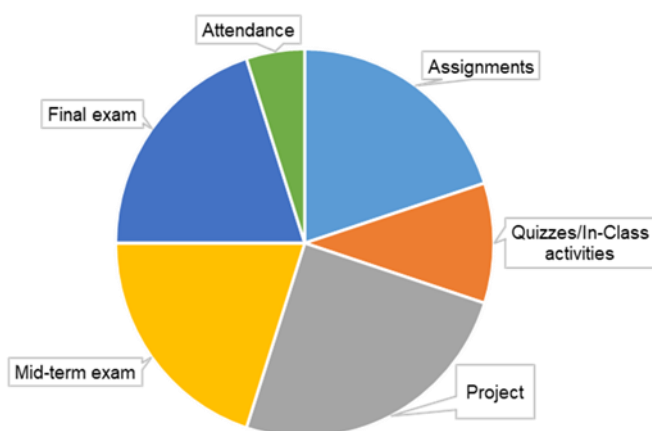
This course has been designated as a laptop course. Most class activities will be conducted using laptops. You will need to bring your laptop (Windows OS) to every class unless otherwise noted explicitly. In general, I assume that each student has a laptop with the appropriate software. You will need 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. Suppose you do not have word-processing software. In that case, 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.

Students also need to install **FlexSim simulation** software on their laptops with Windows Operating Systems. Click [HERE](#) to visit the FlexSim software webpage and click **Try FlexSim** to download the software and install it on your computer. The instructor will provide more detailed information about the licensing of the software during the class time.

IMPORTANT: If you encounter technical difficulties beyond your scope of troubleshooting, please contact the [UTEP Help Desk](#) as they are explicitly trained 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!

## 8 COURSE CONDUCTING PROCEDURE AND COURSE MATERIALS

The instructor will meet every Wednesday (6.00 PM to 8.50 PM) in the Health Science/School of NURS building, Room 135. Before the class, the instructor will post lectures, links to other relevant reading materials, homework questions, and project details on Blackboard. Each week, we will cover a set of learning materials and progress through the semester according to the tentative course schedule mentioned on Page 8. As we progress through the semester, students' performance will be evaluated based on six (6) measurable activities – 1) Assignments/Homework, 2) quizzes/In-class activities, 3) course projects, 4) mid-term exams, 5) final exam, and 6) Attendance. All submissions (except the mid-term and final exams) MUST be submitted through Blackboard unless advised to submit a hard copy. Paper submissions or submissions through email will not be accepted. The point distribution of each of the assessment activities is shown below.



| Graduate Student            |      |
|-----------------------------|------|
| Assignment                  | 20%  |
| Quizzes/In-class activities | 10%  |
| Mid-Term Exam               | 20%  |
| Final Exam                  | 20 % |
| Course Project              | 25%  |
| Attendance                  | 5%   |

### 8.1 Homework/Assignments (20%):

There will be four (4) Homework/Assignments in this course. The homework will be posted at least one week before the due date. You will be required to submit your work through the Blackboard submission link. The instructor will create the submission link and notify you in due time. You can compose your answer using a computer or handwrite it on paper to prepare your assignment submission. If you write your answer, you need to take clear photos and screenshots and compile them in a Word file or scan them into a PDF file. Remember that I will accept only PDF or Word files for your submission (no image file will be acceptable).

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 may be graded with penalty points. You will receive a zero if you miss an assignment and the reason is not considered excusable. It is, therefore, essential to reach out to me—in advance if possible—and explain with proper documentation why you missed the due date. Once a deadline has been established for make-up work, no further extensions or exceptions will be granted.

## 8.2 Quizzes/In-class activities (10%)

The quizzes/In-class activities will be in class without previous notice. The contents of the quiz will be covered in the same class. Students must submit the in-class activities by the end of class as instructed. So, all the students are suggested to be regular in class. Note that there will be no make-up for the quizzes/in-class activities. So, if you miss a quiz without any reasonable excuse, you will receive a zero.

## 8.3 Course project (25%)

All students must complete a group project on a specific problem as instructed by the instructor. As this will be a group project, students must form a group of 2/3 members. The term project aims to provide an opportunity for an in-depth understanding and application of simulation in a real-world problem. A brief description of the course project is described below.

Project Description: The problem statement and description of the project will be discussed in class. The instructor will advise students on the different project stages as the semester progresses. Upon completing the final stage, you will be required to submit.

- a. A final project report describing the simulation procedure (instructions will be given during the class)
- b. PowerPoint presentation file on your results, outcomes, and decision (instructions will be given during the class)
- c. FlexSim source file.

## 8.4 Mid-term (20%) and final (20%) exams

There will be two (2) significant exams in this course. The mid-term exam will be conducted on March 06, 2024, and the final exam will be on May 08, 2024. Both exams will be paper-based and conducted during class time on the specified date. There will be 25 to 30 questions, including multiple-choice (MCQs), true/false, short answer questions, fill-in-the-blanks, word pooling, calculated numeric, etc. The exam will be in a closed-book format, and you will not be allowed to discuss and communicate with your friends/peers. Any indication/proof of peer discussion and sharing answers will be considered a violation of academic integrity. If there are any changes, the exam date will be announced well ahead of time, so manage your schedule accordingly. There will be no make-up exams.

## 8.5 Attendance (5%)

To be successful in this course, it is strongly recommended that you do not skip any class. Student attendance will be recorded using a sign-in sheet. Please remember that any student with attendance below 60% of the total class will receive zero (0) points for the attendance category.

## 9 ASSESSMENT OF FINAL GRADE

Your final grade will be determined based on the points you achieved in the above-mentioned five categories of submissions – 1) Assignments/homework, 2) Weekly tests, 3) Mid-term exam, 4) Final exam, and 5) Course project. The points of each category will be scaled to 20%, and thus, we will get a total of 100 points from the five categories. In the end, your final grade will be as follows:

| Grade A     | Grade B  | Grade C  | Grade D  | Grade F |
|-------------|----------|----------|----------|---------|
| 90 or above | 80 to 89 | 70 to 79 | 60 to 69 | 0 to 59 |

## **10 BLACKBOARD SUBMISSION**

Students must submit all the assignments and deliverables through the Blackboard. Submission through email will only be accepted if it is asked for or pre-approved. I strongly suggest you submit your work with plenty of time to spare if you have a technical issue with the course website, network, or computer. If you are experiencing difficulties submitting your work through the course website, please get in touch with the UTEP Help Desk. It is your responsibility to submit the assignments on Blackboard before the due date.

## **11 COURSE COMMUNICATION**

The instructor's office hours are scheduled each Tuesday and Thursday from 12.00 PM to 1.00 PM. The instructor will host office hours in person. My office number is A-243, located on the 2nd floor of the Engineering Building. You can take the stairs beside the dean's suite and turn left to find my office.

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 emailing me, 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, put your first and last name and university identification number. I am not active via MS Team. So, asking questions through the MS Team will not guarantee my reply.

## **12 ILLNESS PRECAUTION**

Please stay home if you have symptoms of a communicable illness. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations.

## **13 EXCUSED ABSENCES AND/OR COURSE DROP POLICY**

According to UTEP Catalog, "At the discretion of the instructor, a student can be dropped from a course because of excessive absences or lack of effort. A grade of "W" will be assigned before the course drop deadline and a grade of "F" after the course drop deadline." See Policies and Regulations in the UTEP Undergraduate Catalog for a list of excuse 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.

OR

I will not drop you from the course. However, if you feel that you are unable to complete the course successfully, please let me know and then contact the [Registrar's Office](#) to initiate the drop process. If you do not, you are at risk of receiving an "F" for the course.

## **14 ACCOMMODATIONS POLICY**

The University is committed to providing reasonable accommodations to students with documented disabilities. Students who become pregnant may also request reasonable accommodations in accordance with state and federal laws and regulations and University policy. Accommodations that constitute undue hardship are not reasonable. To make a request, please register with the UTEP Center for Accommodations and Support Services (CASS). Contact CASS at 915-747-5148, email them at [cass@utep.edu](mailto:cass@utep.edu), or apply for accommodations online via the CASS portal.

## **15 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.

## 16 GUIDANCE ON ARTIFICIAL INTELLIGENCE

### AI prohibited

Use of AI technologies or automated tools, particularly generative AI such as [ChatGPT](#) or [DALL-E](#), is **not allowed** for assignments in this class. Each student is expected to use critical and creative thinking skills to complete tasks and not rely on computer-generated ideas. Any direct use of AI-generated materials submitted as your own work will be treated as plagiarism and reported to the Office of Student Conduct and Conflict Resolution (OSCCR).

### AI allowed only with prior permission from instructor

Use of AI technologies or automated tools, particularly generative AI such as [ChatGPT](#) or [DALL-E](#), is **only allowed with approval from the instructor BEFORE being used**. Without permission, you will be expected to think creatively and critically to complete assignments without assistance from these tools.

If given permission to use any of these tools, students must properly cite and give full credit to the program used upon submission of every relevant assignment. For example, text generated using ChatGPT must be cited:

Chat-GPT(version). Date of query (year/month/day). "Text of your query."  
Generated using OpenAI. <https://chat.openai.com/>

A short paragraph describing how the tool(s) was/were used for the assignment must be included.

### AI allowed with proper acknowledgement

Use of AI technologies or automated tools, particularly generative AI such as [ChatGPT](#) or [DALL-E](#), is **only allowed with proper attribution given for its use**.

Students must properly cite and give full credit to the program used upon submission of every relevant assignment. For example, text generated using ChatGPT must be cited:

Chat-GPT(version). Date of query (year/month/day). "Text of your query."  
Generated using OpenAI. <https://chat.openai.com/>

A short paragraph describing how the tool(s) was/were used for the assignment must be included.

### Using AI for brainstorming

Some AI technologies or automated tools, particularly generative AI such as [ChatGPT](#) or [DALL-E](#), can be beneficial during the early brainstorming stages of an activity, and you are welcome to explore them for that purpose. However, keep in mind that AI-generated ideas are not your own and may hinder your ability to think critically and creatively about a problem. It is also important to remember that these technologies often “hallucinate” or produce materials and information that are inaccurate or incomplete—even providing false citations for use.

That said, you are not allowed to submit any AI-generated work in this course as your own. If you use any information or materials created by AI technology, you are required to cite it like you would any other source. Consider how this will affect your credibility as a writer and scholar before doing so. Any direct use of AI-generated materials submitted as your own work will be treated as plagiarism and reported to the Office of Student Conduct and Conflict Resolution (OSCCR).

#### Free use of AI without acknowledgement

Use of AI technologies or automated tools, including generative AI such as [ChatGPT](#) or [DALL-E](#), is permitted in this class. Students must include a short paragraph, with each relevant assignment, explaining how the tool was used.

### **17 PLAGIARISM DETECTING SOFTWARE**

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

### **18 COURSE RESOURCES**

Where you can go for assistance

UTEP provides a variety of student services and support. Please refer to the QR code below for a listing of campus resources.



### **19 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 the purpose of this course. They may not be further disseminated.

### **20 CLASS RECORDINGS**

Class may be recorded if needed. The use of recordings will give you access to class lectures and group discussions in the event you miss a synchronous or in-person meeting due to illness or other extenuating circumstances. Our use of such technology is governed by the Federal Educational Rights and Privacy Act (FERPA) and UTEP's acceptable-use policy. A recording of class sessions will be kept and stored by UTEP in accordance with FERPA and UTEP policies. I will

not share the recordings of our class activities outside of course participants. You may not share recordings outside of this course. Doing so may result in disciplinary action

**21 TENTATIVE COURSE SCHEDULE (IT MAY CHANGE, BASED ON FEEDBACK OR PROGRESS)**

| Week | Date     | Topics   |
|------|----------|--|
| 1    | 01/17/24 | Discussion on syllabus<br>Introduction to modeling and simulation  |
| 2    | 01/24/24 | Introduction to queuing theory<br>Understanding analytical and manual Solutions<br>Basic statistical distribution and random number generation                                     |
| 3    | 01/31/24 | <b>Spring census day</b><br>FlexSim installation and intro to user interface with basic modeling<br>Building basic simulation models in FlexSim<br>Discussion on semester project. |
| 4    | 02/07/24 | Modeling simulation logic and managing data  |
| 5    | 02/14/24 | Improving system representation  |
| 6    | 02/21/24 | Resource availability and Reliability  |
| 7    | 02/28/24 | Project follow-up and mid-term review  |
| 8    | 03/06/24 | <b>Mid-Term Exam</b>   |
| 9    | 03/13/24 | Spring break   |
| 10   | 03/20/24 | Understanding simulation output and presentation   |
| 11   | 03/27/24 | <b>Spring drop/withdrawal deadline</b><br>Multi-scenario experimentation and optimization  |
| 12   | 04/03/24 | Logical relationships among objects - I  |
| 13   | 04/10/24 | Logical relationships among objects - I  |
| 14   | 04/17/24 | Customizing models - I   |
| 15   | 04/24/24 | Customizing models - II  |
| 16   | 05/01/24 | <b>Final project presentation and report due</b>   |
| 17   | 05/08/24 | <b>Final exam</b>  |
| 18   | 05/15/24 | Grades due   |