# The University of Texas at Tyler
## Master of Science in Computer Science
### Course Syllabus

**Course Title:** Fundamentals of Modeling and Distributed Simulation of Complex Systems

**Course Number:** COSC 5377

**Course Description:** (Catalog) This course aims to teach the fundamentals of modeling, simulation, distributed simulation, and large-scale asynchronous distributed simulation of real systems on parallel processors. Examples from the real-world include CAD of digital systems, IVHS, etc.

<table>
<thead>
<tr>
<th>Pre-requisites:</th>
<th>Graduate standing</th>
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<tbody>
<tr>
<td>Credits:</td>
<td>3.0</td>
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**Languages Used:** None

**Topics:**
1. The Nature of Physical and Natural Systems
2. The Nature of Simulation
3. The Role of Time and Causality in Simulation
5. Principles of Simulation -- Time-Based, Event Driven
6. Synthesis of Uniprocessor Simulations
7. Principles of Large-Scale Distributed Simulation
8. Monitoring, Data Acquisition and Analysis, Meta-Performance Analysis

**Additional Materials:** None

**Evaluation Method:** (only items in dark print apply)

1. Examination/Quiz
2. Homework
3. Paper/Report
4. Computer Program
5. Project
6. Presentation
7. Class Participation
8. Peer Review
9. Presentation
10. Report
Course Objectives: By the end of this course students are expected to:

1. Modeling real-world systems (1,5,7)
2. Simulation of real-world systems (1,5,7)
3. Time-based simulation (1,5,7)
4. Discrete-event simulation (1,5,7)
5. Performance analysis (1,5,7)

Numbers in round brackets refer to method(s) used to evaluate the course objective.

Relationship to Program Outcomes: (only items in dark print apply)

This course supports the following computer science graduate program outcomes, which state that our students at the time of graduation are expected to:

1. possess an enhanced breadth of knowledge in computer science, combined with a depth of knowledge in critical core areas of computing; (1,2,3,4,5)
2. possess the skills and knowledge for lifelong learning in computer science; (1,2,3,4,5)
3. possess knowledge of the theoretical foundations of computing and have strong practical application experience; (1,2,3,4,5)
4. possess and demonstrate oral and written communication skills; (1,2,3,4,5)
5. understand and respect the professional standards of ethics expected of a computer scientist and be knowledgeable concerning the history of computing field;
6. possess a knowledge of computer security and computer security management;
7. analyze and compare relative merits of alternative software design, algorithmic approaches, and computer system organization, with respect to a variety of criteria relevant to the task (e.g. efficiency, scalability, security); and
8. implement algorithms in multiple programming languages, on multiple hardware platforms, and multiple operating system environments.

Numbers in brackets refer to course objective(s) that address the Program Outcome.