**ABET Course Syllabus – CS4635**

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| **Code** | CS4635 | **Credits** | 3 |
| **Title** | Modeling and Simulation | **Coordinator** | Russ Abbott |

**Course Information**

1. **Catalog Description:** An examination of the four primary approaches to modeling and simulation; discrete event simulation; agent-based modeling; stock and flows modeling; actor-based modeling.
2. **Prerequisites:** CS3112, CS3660.
3. **Contact Hours:** Lecture 3 hours.
4. **Required/Elective:** This course is an elective course in the BS program.

**Textbook**

Borshchev, Andrei. *The Big Book of Simulation and Modeling*. AnyLogic, 2013.

**Course Goals**

The Student Learning Outcomes that are addressed by the course are:

*SLO1. Students will be able to apply concepts and techniques from computing and mathematics to both theoretical and practical problems.*

*SLO2. Students will be able to demonstrate fluency in at least one programming language and acquaintance with at least three more.*

*SLO5. Students will have the training to analyze problems and identify and define the computing requirements appropriate to their solutions.*

*SLO9. Students will have the ability to analyze the local and global impact of computing on individuals and society.*

Other outcomes of instruction. At the end of the course, students are able to

* Use tools for the four primary approaches to modeling and simulation to construct models and simulations.
* Determine which approach to modeling and simulation best fits a given problem.
* Understand the theory underlying the implementations of the various approaches to modeling and simulation.

**Topics covered**

* Introduction to modeling and simulation
* Discrete event modeling and simulation
* Agent-based modeling
* System dynamics (stocks and flows) modeling and simulation
* Actor-based modeling and simulation.
* Example systems: AnyLogic, Mason, NetLogo, Ptolemy, Repast, TRUE.