
Course and Contact Information:

Course: EMSE 6760.10 - Discrete Systems Simulation

Semester: **SPRING 2019** # of Credit Hours: 3.0

Meeting Time: Tuesdays from 3:30pm to 6:00PM

Location: Tompkins Hall 405

Instructor:

Name: J. René van Dorp, Professor

Campus Address: 800 22nd Street, Office 2800, Washington DC 20052

Phone: 202-994-6638

E-mail: dorprj@gmail.com

Office hours: Mondays 2:00PM to 4:00PM (by appointment via link on [my faculty-page](#))

Course Description:

An introduction will be provided to the application and theoretical background of systems simulation. Topics include modeling systems dynamics using discrete events, the modeling of service systems through simulation. Theoretical topics include random variable generation, model verification and validation, statistical analysis of output. Simple simulation problems will be introduced using Microsoft Excel. A high-level simulation package SIMIO will be utilized for more complex simulation problems.

Total of 112.5 Student Engagement Hours are divided over: 2.5 hours of class instruction + two exams over 15 weeks. Homework and reading assignment is estimated at a minimum of 4.5 hours per week over 13 weeks of class preparation. Studying/preparing for each exam is estimated at a minimum of 8 hours per each exam (Midterm Exam + Final Exam). Each exam is a 2 and a half hour long exam. **Total estimated minimum student engagement: 112.5 hours.**

Prerequisite Requirement:

APSC 3115 Engineering Analysis III

Required Text:

“Simio and Simulation, Modeling, Analysis, Applications” 4th Edition by
W.David Kelton, Jeffrey S. Smith and David T. Sturrock.

<http://www.simio.com/publications/SASMAA/purchase-options.php>

Required Software:

MS EXCEL – Available in Tompkins 405.

SIMIO – Available in Tompkins 405. A student version of the software is available from:

<http://www.simio.com/academics/simio-academic-simulation-products.php>

Recommended Text:

“Discrete Event Simulation” by Banks, Carson and Nelson, Prentice Hall.

<https://www.amazon.com/Discrete-Event-System-Simulation-Jerry-Banks/dp/0136062121>

Learning Outcomes:

As a result of completing this course, students will be able to:

1. Use MS EXCEL to simulate a simple queuing system
2. Model dynamic service systems, e.g. an ATM operation or an Urgent Care Clinic, using the SIMIO simulation software environment
3. Use data to specify probability distributions for the input parameters of the service system
4. Verify a simulation model using known queuing theoretical results.
5. Evaluate systems design scenarios by applying statistical methods on output metrics

Method of Instruction:

One hour and 20 minutes lecture including homework discussion, followed by a 10 minute break. One hour lecture including breakout session to start with simulation exercises in class. **Students are expected to spend a minimum of 4.5 hours (i.e. 1.5 hours per credit hour) on reading and homework assignments outside the class-room. Reading assignments will have to be completed before class. Homework will have to be completed and handed-in on Blackboard and as per the assignment schedule on Blackboard.**

Grading:

10% - Class Attendance

20% - Homework

30% - Midterm Exam

40% - Final Exam

Homework Policy: For each homework problem a student may be called upon to discuss their solution, so you must be prepared! The rest of the class should be involved in the discussion. Your level of effort will be graded. Not handing in a homework problem will result in **0 points**. Homework problems that are handed in on-time and demonstrating an adequate level of effort will be awarded **1 point** or **more points** depending on the level of effort required to complete a homework assignment and as indicated in the homework set assignment. Partial points can be awarded for homework problems. Homework problems that are handed more than one day late will be awarded **0 points**. Homework problems that are handed in late, but less than one day late can only receive a maximum of 50% of their total possible effort points. You should each bring electronic files of your homework to class in case you are called upon to show your work to the rest of the class.

Reading Assignments:

Reading will be assigned according to the class schedule in this syllabus.

Midterm and Final Exam:

Students will complete an **in-class simulation Midterm Exam using Microsoft Excel + SIMIO** (using a lab computer or the student's laptop) and **an in-class Final Exam using SIMIO**. Students will submit with their Midterm Exam and Final Exam electronic files that will be graded. Theoretical questions will be answered in an exam booklet.

Grade Feedback:

I will provide regular feedback on home work and exam grades via a graph and table with the grades. Your percentage grade scores will be posted in Blackboard so you can compare your performance to that of the class overall performance.

Lecture Notes:

Electronic copies of the lecture notes can be downloaded from my Faculty web-page at:

<http://www.seas.gwu.edu/~dorpjr/EMSE273/Intro.html>



Class Schedule: Subject to change, please check the schedule regularly

Session	Date		Class Topic	Reading Assignments	Homework Assignments
1	1/15/2019	Tuesday	Basic Probability Review, Intro to Simulation, Basics of Queuing Theory	Chapter 1, Chapter 2	Homework Set 1
2	1/22/2019	Tuesday	Basics of Queuing Theory, Kinds of Simulation, Simple Queue Simulation in Excel	Chapter 2	Homework Set 2
3	1/29/2019	Tuesday	Simulating a Simple Queue in MICROSOFT EXCEL	Chapter 3	Homework Set 3
4	2/5/2019	Tuesday	SIMIO - ATM Simulation	Chapter 4	Homework Set 4
5	2/12/2019	Tuesday	SIMIO - Intermediate Modeling	Chapter 5	Homework Set 5
6	2/19/2019	Tuesday	SIMIO - Intermediate Modeling	Chapter 5	Homework Set 6
7	2/26/2019	Tuesday	MIDTERM REVIEW		
8	3/5/2019	Tuesday	Midterm Exam - in Class (Session 1 - 6 + Handouts and Spreadsheets)		
	3/12/2019	Tuesday	NO CLASS - SPRING BREAK		
9	3/12/2019	Tuesday	Discuss Midterm Solution, Input Specification	Chapter 6	Homework Set 7
10	3/19/2019	Tuesday	Input Analysis	Chapter 6	Homework Set 8
11	3/26/2019	Tuesday	Pseudo Random Number Generation	Chapter 7- BCN, Notes RN Generation	Homework Set 9
12	4/2/2019	Tuesday	SIMIO - Modeling an EMERGENCY DEPARTMENT	Chapter 7	Homework Set 10
13	4/9/2019	Tuesday	SIMIO - Modeling an EMERGENCY DEPARTMENT	Chapter 7	Homework Set 11
13	4/16/2019	Tuesday	SIMIO - Animation and Entity Movement	Chapter 8	Homework Set 12
14	4/23/2019	Tuesday	FINAL REVIEW		
15	5/7/2019	Tuesday	Final Exam - In Class (Sessions 7, 9 - 14)		

University Policy on Religious Holidays:

1. Students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance.
2. Faculty should extend to these students the courtesy of absence without penalty on such occasions, including permission to make up examinations.
3. Faculty who intend to observe a religious holiday should arrange at the beginning of the semester to reschedule missed classes or to make other provisions for their course-related activities

Support for Students outside the Classroom:

- **Disability Support Services (DSS)**

Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Rome Hall, Suite 102, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to: gwired.gwu.edu/dss/

- **Mental Health Services 202-994-5300**

The University's Mental Health Services offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include: crisis and emergency mental health consultations confidential assessment, counseling services (individual and small group), and referrals.

counselingcenter.gwu.edu/

Academic Integrity Code

Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information. For the remainder of the code, see:

studentconduct.gwu.edu/code-academic-integrity