BUDT758Z-Simulation with ARENA

Course Information

Course Title: BUDT758Z: Simulation with ARENA
Professor: Dr. Melanie L. De Grano
Pronouns: She/her/hers
Reachable at: mdegrano@umd.edu
Office Hours: Wednesdays 4:30-5:30 pm via Zoom (Meeting ID: 912 0247 9082 Passcode: 758Z)

Term: Spring 2021 Term D
Credits: 2
Course Dates: March 23 – May 6, 2021
Course Times and Time Zone: Tuesdays & Thursdays 2:00 pm EST
Course Location: Zoom (Meeting ID: 967 6816 5504 Passcode: 758Z)

Teaching Assistant: Cindy Chang
Reachable at: cindyc@umd.edu
Office Hours: Mondays 11:00 am-12:00 pm via Zoom (Meeting ID: 928 4187 8411 Passcode: 758Z)

Course Description

This course covers the use of discrete-event simulation as a decision support tool for modeling and analyzing business problems. Through this course, students will gain experience in formulating simulation models, implementing simulation models using computer software, performing experiments, and interpreting simulation output. Real-world examples and readings from literature will be incorporated as much as possible.

Prerequisites

A basic understanding of probability and statistics (equivalent to BMGT230 or BUS1758B). Exposure to computer programming (e.g., MATLAB, Python, R, etc.) is useful, but is not required.

Course Structure and Time Expectations

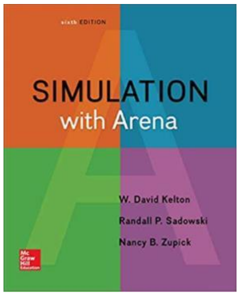
The course is structured into weekly modules. Each module starts on Monday morning and ends on Friday night. Quizzes will typically be posted on Wednesday night and due before the start of class on Thursday.

Each week, in addition to any scheduled live class time, you should expect to spend 1-3 hours online watching videos, taking quizzes, and completing learning activities. This time does not include regular homework such as reading the text, completing problems, and studying.

Course Webpage

The Canvas course page is accessible on ELMS-Canvas. Please plan to check Canvas regularly for the most up-to-date information, and make sure you have Canvas notifications turned on. The course lecture recordings, handouts, assignments, solutions, and other course materials will be posted on the website. The course website must be used to submit assignments. Please type up your assignments using Microsoft Word or whatever other package you use for word processing. You should design any spreadsheets so that they are easy to follow. When you submit an assignment, if it is a single file, name your file your login name under the course website system followed by the assignment number; for example: mdegrano_Assignment1.doc. If you have more than one file, create a single .zip file containing all your files. In this case, name your file your login name followed by the assignment number and the extension .zip; for example, mdegrano_Assignment1.zip. Please submit only one file for each assignment.

Textbook



Simulation with Arena, 6th ed.
W. David Kelton, Randall P. Sadowski, and Nancy Swets
McGraw-Hill Science/Engineering/Math
ISBN-IO: 0073401315 (6th ed.)
ISBN-13: 978-0073401317 (6th ed.)

Software Requirements

We will use **Arena Simulation Software Version 16.10.00** (32 bit) in this class. Arena Simulation Software is available to download (at no cost) from https://www.arenasimulation.com/simulation-software-download. You will have to register with your University e-mail address in order to download the software. Simulation Software is only Windows-compatible; therefore, Mac OS users will need to install a virtual instance of Windows on their machines. The University of Maryland provides licenses to students for the latest version of VMWare Fusion, which is a virtualization software package that can be used to run Windows (and any other operating system) in Mac OS. Alternatively, you could use Boot Camp (included in Mac OS), VirtualBox (open source), or Parallels Desktop ($80 after free trial), but these options will require more effort or money on your part to configure. Arena Simulation software is also available on vsmith under student desktop. The best way to learn software is with hands-on experience! **Please have Arena installed or plan to access Arena via vsmith from your laptop**.

Note: currently, vsmith has an older version of Arena (15.1). Arena 15.1 should suffice for the problems we are doing in class. I am working on getting Arena upgraded on vsmith to 16.1.

Attendance

Due to the nature of online instruction, it may be difficult for students to attend all live sessions. I will be providing pre-recorded lectures, external video links, and/or handouts prior to the course meeting time to allow students with connectivity issues, time zone differences, and potential home responsibilities and distractions more time to complete the work. Our live sessions (Tues & Thurs at 2 pm) will be informal (some shorter, but no longer than 60 minute) meetings. If there is something you would like to discuss during the designated course time, you may email me with a list of questions.

Course Outline & Assignments

Full Course Outline:

Note: Order of presentation may vary from the sequence stated below based on student questions/interest.

1. Introduction and basic modeling concepts
2. Basic simulation concepts
3. Introduction to Arena
4. Input Data Analysis
5. Random variable and variate generations
6. Verification and validation
7. Output analysis
8. Conducting successful simulation projects
9. Simulation applications in industry

Grading Structure

Some assignments will be group assignments and others will be independent learning activities. There will be no make-ups for any assignments or quizzes. The only exception is for students with an emergency and proper documentation. Quizzes will be given on most weeks. **You may drop your lowest quiz score.**

Assignment	Percentage %
Quizzes	**30%**
Individual Assignments	**20%**
Group Assignments	**20%**
Final Exam (Group Project)	**30% Due by Thursday, May 13th 2021**
Total	**100%**

Questions

All students are encouraged to bring questions, concerns and comments to my attention as soon as they arise. Please do not wait! I will consider errors in grading for up to one week after the grade is posted on Canvas. After that, the grade will not be changed. Once final course grades are submitted, changes to grades will only be made to correct errors in tallying scores.

Course Policies

University Class Policies

Students are responsible for knowing their rights and reviewing all course related policies found at this link to **UMD's Office of Undergraduate Studies website** or **UMD's Graduate Schools list of Course Policies.**

Here are some guides that may be useful for the transition to online instruction

- **Campus Resources for Students**
- **Resources for Students Learning Online**
- **Best Practice for Learning Online**
- **Navigating Zoom as a Student**
- **Managing Technical Difficulties**

Netiquette

Netiquette is the social code of online classes. Students share a responsibility for the course's learning environment. Creating a cohesive online learning community requires learners to support and assist each other. To craft an open and interactive online learning environment, communication has to be conducted in a professional and courteous manner at all times, guided by common sense, collegiality and basic rules of etiquette. Please be sure to pause and interact a little more slowly than you normally would to allow for internet speed differences and audio quality. Ensure you're being heard before continuing to present or speak for extended periods. Also please use the interaction buttons in our online tool to participate in class!

Online Privacy

It is not necessary to have your camera on but in order to keep the class interactive, you are welcome to:

- Keep both your video and audio on and contribute (mute is recommended if there is background noise)
- Keep just your audio on and contribute - stating your name first can help your classmates
- You can use the chat box if you have contributions you'd like to be seen and read but don't feel comfortable sharing your own voice.
- Ensure you're using the participation tools e.g. yes/no/hand-raise and participating in polls

Please reach out to me at any point if you feel you're falling behind or struggling to participate.

Resources & Accommodations

Accessibility and Disability Services

The University of Maryland is committed to creating and maintaining a welcoming and inclusive educational, working, and living environment for people of all abilities. The University of Maryland is also committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of the University, or be subjected to discrimination. The **Accessibility & Disability Service (ADS)** provides reasonable accommodations to qualified individuals to provide equal access to services, programs and activities. ADS cannot assist retroactively, so it is generally best to request accommodations several weeks before the semester begins or as soon as a disability becomes known. Any student who needs accommodations should contact me as soon as possible so that I have sufficient time to make arrangements.

For assistance in obtaining an accommodation, contact Accessibility and Disability Service at 301-314-7682, or email them at **adsfrontdesk@umd.edu**. Information about **sharing your accommodations with instructors**, **note taking assistance** and more is available from the **Counseling Center**.

Student Resources and Services

Taking personal responsibility for your own learning means acknowledging when your performance does not match your goals and doing something about it. I hope you will come talk to me so that I can help you find the right approach to success in this course, and I encourage you to visit **UMD's Student Academic Support Services website** to learn more about the wide range of campus resources available to you.

In particular, everyone can use some help sharpening their communication skills (and improving their grade) by visiting **UMD's Writing Center** and schedule an appointment with the campus Writing Center.

You should also know there are a wide range of resources to support you with whatever you might need (**UMD's Student Resources and Services website** may help). If you feel it would be helpful to have someone to talk to, visit **UMD's Counseling Center** or **one of the many other mental health resources on campus**.

Basic Needs Security

If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live, please visit **UMD's Division of Student Affairs website** for information about resources the campus offers you and let me know if I can help in any way.

Statement on Diversity and Inclusion

As part of the **Smith School's commitment to diversity and inclusion**, we recognize the importance of a diverse student body as necessary to a THRIVING environment. We are committed to fostering inclusive and equitable classroom environments. The Robert H. Smith School of Business strives to ensure all members of the Smith community feel welcomed, valued, and proud of every aspect of who they are. Through education, knowledge creation, advocacy, programming, and support, Maryland Smith commits to building an inclusive community that fosters a sense of belonging among all stakeholders.

I invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). The pronouns someone indicates are not necessarily indicative of their gender identity. Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

Technology Policy

Please refrain from using cellphones and other electronic devices during live class sessions.

Absences and Late Policy

Late assignments require prior permission from the instructor and must be accompanied by a legitimate reason for not meeting a target deadline. For late assignments that were not pre-approved, a 10% penalty will be applied per hour of late submission.

The complete university policy on absences can be found here.

Academic Integrity

The University's **Code of Academic Integrity** is designed to ensure that the principles of academic honesty and integrity are upheld. In accordance with this code, the Smith School does not tolerate academic dishonesty. Please ensure that you fully understand this code and its implications because all acts of academic dishonesty will be dealt with in accordance with the provisions of this code. All students are expected to adhere to this Code. It is your responsibility to read it and know what it says, so you can start your professional life on the right path. **As future professionals, your commitment to high ethical standards and honesty begins with your time at the Smith School.**

It is important to note that course assistance websites, such as CourseHero, are not permitted sources for Smith School courses, unless the instructor explicitly gives permission for you to use one of these sites. Material taken or copied from these sites can be deemed unauthorized material and a violation of academic integrity. These sites offer information that might not be accurate and that shortcut the learning process, particularly the critical thinking steps necessary for college-level assignments.

Finally, on each exam or assignment you must write out and sign the following pledge:

"I pledge on my honor that I have not given or received any unauthorized assistance on this exam/assignment."

To help you avoid unintentional violations, ***the following table*** lists levels of collaboration that are acceptable for each type of assignment. If you ever feel pressured to comply with someone else's academic integrity violation, please reach out to me straight away. Also, ***if you are ever unclear*** about acceptable levels of collaboration, ***please ask***!

	Open Notes	**Use Book**	**Ask Friends**	**Search Online**	**Work in Groups**
	Students may look at their class notes while they complete this deliverable	Students may look at the assigned course textbook/readings while they complete this deliverable	Students may get help from classmates, friends, or others to complete this deliverable	Students may search the web for related ideas or information while they complete this deliverable	Students may complete the deliverable through joint work with others
Quizzes					
Individual Assignments	√	√		√	
Group Assignments	√	√		√	√
Final Project	√	√			√

Copyright Notice

Right to change Information
Although every effort has been made to be complete and accurate, unforeseen circumstances arising during the semester could require the adjustment of any material given here. Consequently, given due notice to students, the instructor reserves the right to change any information on this syllabus or in other course materials.

About the Instructor
Dr. Melanie De Grano is a Senior Managing Consultant and Coach in IBM's Cognitive and Analytics Practice. She has 13+ years of research and consulting experience applying discrete-event simulation, statistics, and mathematical modeling to assist clients with decision-making and policy formulation. She has extensive experience in designing, developing, and testing decision support software for government agencies. She received her B.S., M.S., and Ph.D. degrees in Industrial Engineering and Operations Research from Penn State University. Melanie has taught courses in simulation, process quality engineering, engineering statistics, and engineering economics. She is a member of INFORMS. She joined the Robert H. Smith School of Business at University of Maryland as an Adjunct Professor in Spring Semester of 2020.