COMP312/DATA304/DATA474
Simulation & Stochastic Models

The Very Beginning

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What is it about?

This course is all about describing systems that are governed by stochastic (non-deterministic) elements. In particular, we will see queues.

Queues are among the most irritating things that we may face as customers, but they are fundamental for imposing some order or discipline in systems that do not have infinitely many resources.

The course has two components: models and coding.

Resources I

The Nuku web page is already active. Use it.

We strongly advice the use of the dedicated Discussion Board rather than emails. In order to make it a good experience for all of us (lecturers, TA, and students), we request you to have a constructive and engaged attitude towards the course.

We need to define two Class Representatives: one from COMP and another from DATA. Volunteers? If not, they will be randomly chosen and informed later.

Resources II

The models will require that you use that part of your body most sought after by zombies. Also, paper, pencil, and rubber. Additional resources: R, RStudio, Mathematica, LaTeX and BibTeX for your reports.

Coding will be performed in Python, with the usual tools for scientific software development.

Regarding the workload, it varies from week to week but, on average, you should expect to spend $12\,\mathrm{h}$ per week.

ACF likes the books listed in the References, but you should check the University's Library catalogue with the keywords `queue`, `operations research`, `optimisation`, and `simulation`.

Course Objectives

Students that pass this course are expected to be able to:

- using a queueing model to describe a process;
- simulating queueing models;
- designing, analysing, and validating simulation experiments;
- evaluate and optimise queueing systems.

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Course Delivery I

You know, we are living challenging times.

- This is an in-person course. Your presence and participation are **strongly** advised.
- The Models/Queues lectures (Mondays and Tuesdays) will be delivered in the HMLT002 and HULT220 rooms, respectively.
- The Tutorials (Fridays, HMLT002) serve to discuss. No solutions to the Tutorial problems will be given out. Your participation is fundamental.
- The Labs (on Thursdays) will be held in the CO246 lab.

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Course Delivery II

- All the labs will be in CO246, from 10:00 AM to 10:50 AM, except for the two programming tests that will be in the lecture room (MYLT101).
- Dr. Binh will be in charge of all the lab sessions, except for Lab 2 that will be in coordinated by Hoang.
- The students should read the lab instructions before coming to the labs. Dr. Binh will provide guidelines and help, but you need to try doing all the questions by yourselves. Solutions will be provided. There will be no Zoom recording for live demonstrations although remote students can ask questions via Zoom.
- The two programming and the two queues tests are open book and paper-based. Using computers, laptops, phones, or Internet access etc. is not allowed.

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Course Delivery III

- Unless otherwise stated, the Assignments must be uploaded as a single PDF file before the deadline.
- There will be a dedicated page with information about the Project, but all projects must be the result of a joint and balanced effort of all team members.
- There are no lectures, labs or tutorials during the last three weeks. You must work on the project and take the Practical Test (Week 10) and the Models Test (Week 11).

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Course Delivery IV – Calendar

Week	Starting	Monday (HMLT002)	Tuesday (HULT220)	Thursday (CO246)	Friday (HMLT002)	Note
1	27-Feb	Q	Q	P	QT	
2	6-Mar	Q	Q	P	QT	
3	13-Mar	Q	Q	P	QT	**A1 due**
4	20-Mar	Q	P (SimPy)	P	QT	
5	27-Mar	Q	P (SimPy)	**P Test 1 (MYLT101)**	QT	**A2 due**
6	3-Apr	Q	**Q Test 1**	P	Holiday	
	10-Apr	Mid-Trimester break				
	17-Apr					
7	24-Apr	Q	Holiday	P	QT	**A3 due**
8	1-May	Q	Q	P	QT	
9	8-May	Q	Q	P	QT	**A4 due**
10	15-May	Project	Project	**P Test 2 (MYLT101)**	Project	
11	22-May	Project	**Q Test 2**	Project	Project	
12	29-May	Project	**Project Presentation**	**Project Presentation**	**Project Presentation**	**Report due**

Assessment for COMP312 and DATA304

The final mark will be computed as:

$$60\,\%\text{Tests} + 20\,\%\text{Assignments} + 20\,\%\text{Project}.$$

Assessment for DATA474

The final mark will be computed as

$$50\,\%\text{Tests} + 20\,\%\text{Assignments} + 20\,\%\text{Project} + 10\,\%\text{Individual Project}.$$

Integrity and Plagiarism

Plagiarism: presenting someone else's work as if it were yours, whether you mean to or not. "Someone else's work" means anything that is not your own idea, e.g.:

- material from books, journals, or any other source
- the work of other students or staff
- information from the internet (including ChatGPT)
- software programs and other electronic material
- designs and ideas
- the way material is organised or structured.

Academic integrity: staff and students should always treat others honestly, fairly, and with respect. Plagiarism is dishonest. It's a form of cheating and it goes against our ethical standards.

Source: `https://www.wgtn.ac.nz/students/support/student-interest-and-conflict-resolution/academic-integrity/plagiarism`.

References

Bunday, B. D. (1986), *Basic Queueing Theory*, Edward Arnold, London.

Cox, D. R. & Smith, W. L. (1961), *Queues*, Methuen & Co., and John Wiley & Sons Inc., London & New York.

Hillier, F. S. & Lieberman, G. J. (2001), *Introduction to Operations Research*, 7 edn, McGraw-Hill, New York.