



Prescription

Simulation and modelling of stochastic systems, covering examples from Operations Research and Computer Science, including queues, networks and computer systems. Design, analysis and validation of simulation experiments. Previous experience with computer programming is required before starting this course. Co-taught with DATA 304.

Course learning objectives

Students who pass this course should be able to:

1. Use an appropriate queue or queueing network to model a given service facility or congestion situation.
2. Build simulation models of practical networks and systems.
3. Design, analyse and validate simulation experiments.
4. Evaluate and optimise performance characteristics of queues and queueing networks.

Course content

The course is primarily offered in-person, and there are components such as tests, labs, tutorials, and marking sessions which require in-person attendance. There will be remote alternatives for all the components of the course, but these are only available to students studying from outside the Wellington region. The remote option for tests will use a Zoom-based system for online supervision of the tests.

Students taking this course remotely must have access to a computer with camera and microphone and a reliable high speed internet connection that will support real-time video plus audio connections and screen sharing. Students must be able to use Zoom; other communication applications may also be used. A mobile phone connection only is not considered sufficient. The computer must be adequate to support the programming required by the course: almost any modern windows, macintosh, or unix laptop or desktop computer will be sufficient, but an Android or IOS tablet will not.

Simulation topics from:

- Discrete-event computer simulation
- The SimPy simulation language
- Simulation model structures
- Simulation experiments and analysing simulation output

Stochastic Models topics from:

- The Poisson process, the Erlang, Coxian, and Phase-type distributions
- Little's Law for queue models
- Steady-state solution and performance measures of M/M/1 queue
- Queues of different types: multi- and infinite-server, finite capacity

- Numerical solutions for steady-state Markovian queues
- M/G/1 queues: the Pollaczek-Khintchine formula
- Jackson-type queue networks
- Closed queue networks: the MVA method of solution

Withdrawal from Course

Withdrawal dates and process:

<https://www.wgtn.ac.nz/students/study/course-additions-withdrawals>

Lecturers

Prof Alejandro Frery (Coordinator)

alejandro.freryorgambide@vuw.ac.nz

CO 537 Cotton Building (All Blocks), Gate 7, Kelburn Parade, Kelburn

Dr Binh Nguyen

b.nguyen@vuw.ac.nz 04 886 4489

CO 362 Cotton Building (All Blocks), Gate 7, Kelburn Parade, Kelburn

Teaching Format

Student feedback

Student feedback on University courses may be found at:

www.cad.vuw.ac.nz/feedback/feedback_display.php

Dates (trimester, teaching & break dates)

- Teaching: 28 February 2022 - 03 June 2022
- Break: 11 April 2022 - 24 April 2022
- Study period: 06 June 2022 - 09 June 2022
- Exam period: 10 June 2022 - 25 June 2022

Class Times and Room Numbers

28 February 2022 - 10 April 2022

- **Monday** 16:10 - 17:00 – LT002, Hugh Mackenzie, Kelburn
- **Tuesday** 16:10 - 17:00 – LT002, Hugh Mackenzie, Kelburn
- **Thursday** 16:10 - 17:00 – LT002, Hugh Mackenzie, Kelburn
- **Friday** 16:10 - 17:00 – LT002, Hugh Mackenzie, Kelburn

25 April 2022 - 05 June 2022

- **Monday** 16:10 - 17:00 – LT002, Hugh Mackenzie, Kelburn
- **Tuesday** 16:10 - 17:00 – LT002, Hugh Mackenzie, Kelburn
- **Thursday** 16:10 - 17:00 – LT002, Hugh Mackenzie, Kelburn
- **Friday** 16:10 - 17:00 – LT002, Hugh Mackenzie, Kelburn

Set Texts and Recommended Readings

Required

There are no required texts for this offering.

Mandatory Course Requirements

If you believe that exceptional circumstances may prevent you from meeting the mandatory course requirements, contact the Course Coordinator for advice as soon as possible.

Assessment

Assessment Item	Due Date or Test Date	CLO(s)	Percentage
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Penalties

The team project must be completed and a satisfactory level of attainment gained, i.e., achieving mark of at least 50%.

Late or missing assignments or quizzes will receive a mark of zero, because model answers are given out, unless illness, bereavement or other substantial causes occur and have been discussed with the course coordinator and proper documentation (e.g. a medical certificate) has been provided.

Workload

Teaching Plan

Communication of Additional Information

All online material for this course can be accessed at https://ecs.wgtn.ac.nz/Courses/COMP312_2022T1

Links to General Course Information

- Academic Integrity and Plagiarism: <https://www.wgtn.ac.nz/students/study/exams/integrity-plagiarism>
- Academic Progress: <https://www.wgtn.ac.nz/students/study/progress/academic-progress> (including restrictions and non-engagement)
- Dates and deadlines: <https://www.wgtn.ac.nz/students/study/dates>
- Grades: <https://www.wgtn.ac.nz/students/study/progress/grades>
- Special passes: Refer to the Assessment Handbook, at <https://www.wgtn.ac.nz/documents/policy/staff-policy/assessment-handbook.pdf>
- Statutes and policies, e.g. Student Conduct Statute: <https://www.wgtn.ac.nz/about/governance/strategy>
- Student support: <https://www.wgtn.ac.nz/students/support>

- Students with disabilities: https://www.wgtn.ac.nz/st_services/disability/
- Student Charter: <https://www.wgtn.ac.nz/learning-teaching/learning-partnerships/student-charter>
- Terms and Conditions: <https://www.wgtn.ac.nz/study/apply-enrol/terms-conditions/student-contract>
- Turnitin: <http://www.cad.vuw.ac.nz/wiki/index.php/Turnitin>
- University structure: <https://www.wgtn.ac.nz/about/governance/structure>
- VUWSA: <http://www.vuwsa.org.nz>

Offering CRN: [10444](#)

Points: 15

Prerequisites: one course from (COMP 102, 112, 132, DATA 202); one course from (ENGR 123, MATH 177, 277, STAT 292), 15 further 200-level COMP, DATA, MATH, NWEN, STAT or SWEN pts;

Restrictions: OPRE 354;

Duration: 28 February 2022 - 26 June 2022

Starts: Trimester 1

Campus: Kelburn