Course Title:	**Mathematical Modelling and Simulation**
Course Code:	**MATH803**
Descriptor Start Date:	**01/01/2022**
Descriptor End Date:	**14/07/2024**
POINTS:	**15.00**
LEVEL:	**8**
PREREQUISITE/S:	**None**
COREQUISITE/S:	**None**
RESTRICTION/S:	**None**

LEARNING HOURS

Hours may include lectures, tutorials, online forums, laboratories. Refer to your timetable and course information in Canvas for detailed information.

Total learning hours: 150

PRESCRIPTOR

Investigates mathematical methods for building models suitable for problems in natural sciences, engineering and social sciences. Mathematical software packages and computing algorithms are used to analyse and simulate mathematical models. This course will be taught using SAS and MATLAB software or equivalents

LEARNING OUTCOMES

1. Model scientific and industry problems from the biological, physical, engineering and social sciences.
2. Critically analyse and simulate mathematical models utilising appropriate computational methods.

CONTENT

- General principles of mathematical modelling of systems
- Time series analysis using autocorrelation and probability density
- Time series analysis using Fourier transform
- Time series numerical analysis using basic coding, e.g. regression, spline, of fast Fourier transform
- Forecasting
- Applications of mathematical software packages
- Introduction to probability models
- Exponential distribution and Poisson process
- Queueing theory
- Simulation and Monte Carlo sampling
- Case studies and modelling of problems from business, industry, science and engineering

LEARNING & TEACHING STRATEGIES

Lectures, independent research, laboratory exercises, assignments, case studies.

ASSESSMENT PLAN

Assessment Event	Weighting %	Learning Outcomes
Assignment 1	30.00	1,2
Assignment 2	30.00	1,2
Project	40.00	1,2

Grade Map **MAP1**

A+ A A- Pass with Distinction
B+ B B- Pass with Merit
C+ C C- Pass
D Fail

Overall requirement/s to pass the course:

To pass the course, the student must achieve a minimum overall grade of C-

LEARNING RESOURCES

A list of recommended readings will be provided.

For further information, contact: Te Ara Auaha - Faculty of Design & Creative Technologies

Principal Programme: **DJ1037, Master of Science (Research)**

Related Programme/s: **AK1321**
AK1038
AK1039
AK2037

Disclaimer: Course descriptors may be amended between teaching periods/semesters