

Environmental Modelling Major

Third year courses (at least three)

- Environmental Maths (compulsory) MATH3134
- Landscape Ecology GEOG 3011
- Modelling for Environmental management SRES 3003
- Applied Geographic Information Systems GEOG 3009
- Climatology GEOG 3013
- Scientific and Industrial Modelling MATH3501

Environmental Modelling Major

Second year Courses

- Foundations of Computational Science (Modelling and visualisation etc.) MATH 2501
- Differential Equations and Applications MATH2305 or 2405
- Partial Differential Equations Honours MATH 2406

First Year

- First Year Mathematics MATH 1013 or 1115
- First Year Mathematics MATH 1014 or 1116

ENVIRONMENTAL ISSUES

Methods and applications

- Identifying system drivers and magnitudes of environmental and socioeconomic impacts
- Predicting effects of policy and management changes on impacts

Example

- The relation between salinity (and/or sediments and nutrients) in streams and land management and climate inputs

SUBJECT/PROJECT AREAS IN ENVIRONMENTAL MODELLING FOR MATHS STUDENTS

GENERAL ISSUES IN MODELLING

- Inverse problems
- Characterisation of uncertainty/sensitivity analyses of complex models
- Formulation and Solution of ODEs, PDEs and transfer function models in the environmental sector

SUBJECT/PROJECT AREAS IN ENVIRONMENTAL MODELLING FOR MATHS STUDENTS

SURFACE HYDROLOGY

- Model identification for rainfall-runoff problems
- Streamflow routing and contaminant transport techniques (salt, sediments, nutrients, pesticides)
- Water quality processes

SUBSURFACE HYDROLOGY

- Groundwater problems (flow, recharge, parameter estimation)
- Representation of surface-ground water-stream interactions for flow and salinity

SUBJECT/PROJECT AREAS IN ENVIRONMENTAL MODELLING FOR MATHS STUDENTS

MATHEMATICAL PROGRAMMING/OPTIMISATION

- Solution of linear and dynamic programming formulations (economic and environmental)

METHODS FOR INTEGRATING MODELS

- Integrating models and data from different disciplines (eg hydrology, climatology, ecology and socioeconomics) for addressing sustainability issues

Opportunities at ANU

- Honours projects
- Research assistants
- Masters
- PhD

Current students

PhD

Paul Carlile

Karen Ivkovic

Prachi Jain

Amir Saddodin

Celina Smith

Jessica Spate

Jennifer Ticehurst

Others

Felix Andrews (RA)

Ben Hicks
(RA/Honours)

Cong Cong Wu (RA)

Who are the employers?

- Research organisations
 - CSIRO
 - Research arms of government agencies
eg. BRS, AFFA, EA, MDBC
 - Universities
- Policy positions - state and federal government
- Consultants - eg. Sinclair Knight Merz

Advantages of a good quantitative background

- Maths students do well in environmental science applications
- Many interesting opportunities
- Techniques and understanding gained in environmental applications apply to other areas eg. Model building, analytical skills

Contacts

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