

**SIMON FRASER UNIVERSITY
MEMORANDUM**

TO: Senate

**FROM: J. Munro
Chair, Senate
Cttee on Academic
Planning**

**SUBJECT: Graduate Curriculum Revisions -
Faculty of Applied Sciences -
MRM Program**

DATE: December 11, 1990

**SGSC Reference: Mtg. of Nov. 26, 1990
SCAP Reference: SCAP 90-59**

Action undertaken by the Senate Committee on Academic Planning and the Senate Graduate Studies Committee, gives rise to the following motion:

MOTION: *that Senate approve and recommend approval to the Board of Governors, as set forth in S.91-4 curriculum revisions in the Faculty of Applied Sciences as follows:

Natural Resource Management Program -

- Change to description of program
- Change to degree requirements re credit hours and elective courses
- New course - MRM 658-5
- Change of title and description - MRM 650-5
- Change of description and addition of prerequisite - MRM 670-5
- Change of title - MRM 615-5

SIMON FRASER UNIVERSITY
FACULTY OF APPLIED SCIENCES
NATURAL RESOURCES MANAGEMENT PROGRAM

MEMORANDUM

TO: Faculty of Applied Sciences
Graduate Studies Committee
Attn: Alison Beale

FROM: Mark Jaccard, Chairman
Graduate Studies Committee
MRM Program

SUBJECT: Proposed changes to
SFU Calendar

DATE: October 24, 1990

Please find attached the following changes and additions to the SFU calendar entry for the Natural Resource Management Program.

A. Change to Description of Program

Insert this paragraph before the final paragraph.

NRM has launched a Co-operative (Co-op) Education program which allows students to work in a resource management agency (government or private) to gain professional experience in applied problem solving. The Co-op program is optional, but in many cases the work can lead directly into the student's MRM 699 Research Project.

B. Degree Requirements

Old description

Seventy-eight (78) credit hours are prescribed for the program, 48 of which are from the required group and 30 are from the electives. With the approval of the program director, up to seven courses (35 credit hours) may be transfer credits from another institution.

It should now read:

Seventy-three (73) credit hours are prescribed for the program, 48 of which are from the required group and 25 are from the electives. With the approval of the program director, up to seven courses (35 credit hours) may be transfer credits from another institution.

Old description for Elective Courses

Students normally select 30 credit hours (usually 6 courses) to strengthen an area of expertise. A series of possible electives are shown below under each of the five areas of specialization currently offered by the Natural Resources Management program. However any combination of elective courses may be taken.

It should now read:

Elective Courses**

Students normally select 25 credit hours (usually 5 courses) to strengthen an area of expertise. A series of possible electives are shown below under each of the five areas of specialization currently offered by the Natural Resources Management program. However any combination of elective courses may be taken.

Justification

Analysis by the Dean of Graduate Studies indicates that the work load of a Masters of Resource Management Degree (13 courses plus a research project) is far above the average of other masters' degrees in this university and elsewhere. While the interdisciplinary nature of the MRM degree will always require considerable coursework, the performance of our students should be improved, not diminished, by this relatively small reduction in workload.

C. New Courses

1. MRM 658-5 Energy Systems Modelling.
(see attached forms)

D) Changes in Courses

1. MRM 650-5 - Revision to title and course description

Old title and description:

MRM 650-5 Energy Use and Policies Integration of energy and demand analysis in order to formulate comprehensive energy management policies.

New title and description:

MRM 650-5 Energy Management and Policy. Integration of energy supply and energy demand management to formulate cohesive and efficient energy policies; topics include thermodynamics, modelling, conservation, energy pricing, oil markets, project assessment, the environment and energy planning in developing countries.

2. MRM 670-5 - Revision to course description

Old description:

MRM 670-5 Introduction to Forestry. Examines the theory and practice of forest management, based on an understanding of the linkages between forest ecosystem dynamics, economics, policy and social concerns. Principles are illustrated with reference to contemporary forestry issues.

New title and description:

MRM 670-5 Introduction to Forestry. Examines the theory and practice of forest management, based on an understanding of the linkages between forest ecosystem dynamics, economics, policy and social concerns. Principles are illustrated with reference to contemporary forestry issues. (Prereq.: MRM 611, or permission of instructor)

3. MRM 615-5 Correction to title

Old title

MRM 615-5 Natural Resources Management Program

New Title

MRM 615-5 Management of Aquaculture Resources
(The course description remains the same)


Mark Jaccard

MJ/jr

(ca190)

Course Outline

Objective

The acquisition, transformation, distribution and use of energy are pervasive in modern society. The energy systems established to meet this end have a wide ranging influence on several key characteristics of society such as aggregate social debt, pollution, technological evolution, institutional arrangements, international trade and urban form.

The complexity of energy systems generally requires, therefore, some type of systems analysis modelling approach, if researchers are to successfully evaluate the total effects of energy-specific policies as well as other public and private policies. The goal of this course is to provide in-depth understanding of, and practical experience with, the major techniques of energy systems modelling.

This is a seminar course, not a lecture course. It is designed for students specializing in energy systems modelling. It is divided into units organized around the various energy systems modelling techniques that will be analyzed. Students will be expected to make a significant contribution to each seminar, sometimes by leading the seminar sometimes by contributing via exercises and background reading.

Course Content

The course is ambitious. It requires an interdisciplinary knowledge of thermodynamics, economics, engineering, systems analysis and ecology. Following is a preliminary listing of the course units. Others may be added later.

1. Marginal cost pricing
 - Principles (Turvey and Anderson)
 - Application to BC (Osler)
2. Methodological issues in data collection and verification in an end-use industrial technology simulation model.
 - the focus will be on the ISTUM-PC model (Jaccard)
3. Survey of alternative end-use industrial technology simulation models.
 - IN-DEPTH of the Electric Power Research Institute
 - MEDEE-3 of the Institute of Energy Economics and Policy
 - MARKAL of GERAD in Montreal (also reviewed in LP below)
 - Composite model used by the NWPPC

4. Method and applications of linear programming.
 - BC Hydro's electricity supply system
 - Product allocation of oil refinery production
 - Oil exploitation planning
 - Total system planning (the state of Maine)
 - Demand forecasting - MARKAL
5. Econometric modelling of the industrial sector.
 - Equipment stock models
 - Aggregate production function and cost models (Berndt)
 - Single equation models (BC Hydro's latest)
 - Macro-economic / energy models (Helliwell)
6. Energy / environment modelling.
 - Extending CBA (Jaccard, Makinen and Nyboer)
 - Aggregate CO2 economy models (Edmonds - US National Energy Strategy)
7. Input-output modelling
 - Comparative employment studies (Margolick - Sims)
 - SERF (Robinson)
8. Methodology of scenario modelling
 - scenario construction (Chateau and Lapillonne)
 - backcasting (Lovins)
9. Integrated resource analysis and energy planning
 - complete review of NWPPC documentation
 - review of latest bidding literature
10. Future energy systems / technology assessment
 - the Goldemberg et al. thesis
 - Swedish electricity policies and planning (Johansson)
 - the solar / hydrogen / fuel cell system (Morrison)

Student Evaluation

1. Participation - in a small group participation is crucial; if a student may be required to miss a seminar, they should notify the instructor well in-advance and attempts will be made to reschedule the seminar; in brief, no seminars should be missed and students should clearly demonstrate that they have completed all the readings for each seminar.
2. Research project - although a paper is not required the student should set semester goals and demonstrate significant advancement of the 699 research project during the semester.
3. Mid-term exam - an exam sometime in weeks 9 to 11 will ensure that students have grasped key concepts and techniques.
4. Seminar direction - students will be required to lead at least one seminar and actively participate in all others.

5. Assignments - the group will do assignments practically applying many of the techniques.

Participation	10%
Research	20%
Mid-term	25%
Seminar direction	20%
Assignments	25%

Reading List

The reading list will be developed during the first two weeks of class. At this time a list of guest lecturers will also be prepared.

Appendix to New Graduate Course Proposal Form

b) Competence of faculty member to give the course

Dr. Mark Jaccard has a Ph.D. in energy economics from the Institute of Energy Policy and Economics in Grenoble France. In his doctoral thesis he developed a model which simulates technological evolution in the industrial sector for the purpose of energy demand forecasting. At Simon Fraser University he has continued this work. His model, ISTUM-PC, is now used for industrial forecasting by B.C. Hydro and the B.C. Ministry of Energy, Mines and Petroleum Resources. He has placed graduates in modelling positions in both these agencies. He has published several articles in refereed journals on this work. He is now adopting the model for pollution emissions forecasting in projects funded by the B.C. Ministry of Environment and the Canada Department of Forests.

Dr. Jaccard has taught this course twice before under the Special Topics course number. It is considered essential for his modelling students.

c) Library Resources

It is desirable that the Library subscribe to more energy journals. Nonetheless, at least the following journals are currently available at the SFU Library.

1. Annual Review of Energy
2. Energy Abstracts for Policy Analysis
3. Energy Policy
4. Energy Systems and Policy
5. Engineering Economicst
6. Futures
7. Natural Resources Forum
8. Natural Resources Journal
9. Public Utilities Fortnightly
10. Resources Policy
11. Technological Forecasting and Social Change
12. Technology Review

SIMON FRASER UNIVERSITY

New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: Natural Resource Management Program Course Number: MRM 658-5

Title: Energy Systems Modelling

Description: Training and practical experience in the use of the range of techniques for modelling energy systems: linear programming, econometrics, input-output, energy service models, integrated systems.

Credit Hours: 5 Vector: 5-0-0 Prerequisite(s) if any: MRM 621, MRM 650

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 5-10 When will the course first be offered: 1991

How often will the course be offered: When warranted by demand.

JUSTIFICATION:

Dr. Jaccard's research specialty is in energy system modelling. He has an established research group of graduate students. This course was taught under Special Topics in Spring 1987 and 1990. Currently there is only one course in energy management and policy (MRM 650) for these students. A system modelling course is indispensable in their training. None of the components in this course are covered in MRM 612, Simulation Modelling.

RESOURCES:

Which Faculty member will normally teach the course: Dr. Mark Jaccard

What are the budgetary implications of mounting the course: None

Are there sufficient Library resources (append details): Yes

- Appended: a) Outline of the Course
- b) An indication of the competence of the Faculty member to give the course.
- c) Library resources

Approved: Departmental Graduate Studies Committee: Mark Jaccard Date: Oct. 24/90.

Faculty Graduate Studies Committee: Ann C. Bull Date: Oct. 28/90

Faculty: _____ Date: _____

Senate Graduate Studies Committee: B.P.C. Date: 27 Nov /90

Senate: _____ Date: _____

SIMON FRASER UNIVERSITY

New Graduate Course Proposal Form
REVISED GRADUATE COURSE PROPOSAL FORM

CALENDAR INFORMATION:

Department: Natural Resource Management Program Course Number: MRM 650-5
Title: Energy Management and Policy
Description: Integration of energy supply and energy demand management to formulate
cohesive and efficient energy policies; topics include thermodynamics, modelling,
conservation, energy pricing, oil markets, project assessment, the environment and
energy planning in developing countries.
Credit Hours: 5 Vector: 5-0-0 Prerequisite(s) if any: _____

ENROLLMENT AND SCHEDULING:

Revision of course
already offered

Estimated Enrollment: 5-10 When will the course first be offered: _____
How often will the course be offered: Once per year

JUSTIFICATION:

Inclusion of examples of issues covered in the course reduces ambiguity in the
course description.

RESOURCES:

Which Faculty member will normally teach the course: Dr. Mark Jaccard

What are the budgetary implications of mounting the course: none

Are there sufficient Library resources (append details): Yes

- Appended: a) Outline of the Course
b) An indication of the competence of the Faculty member to give the course.
c) Library resources

Approved: Departmental Graduate Studies Committee: Mark Jaccard Date: Oct. 17/90

Faculty Graduate Studies Committee: David C. Bull Date: Oct. 28/90

Faculty: _____ Date: _____

Senate Graduate Studies Committee: B.P. Clay Date: 27 Nov/90

Senate: _____ Date: _____

SIMON FRASER UNIVERSITY

New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: Natural Resource Management Program Course Number: MRM 670-5

Title: Introduction to Forestry

Description: Examines the theory and practice of forest management, based on an understanding of the linkages between forest ecosystem dynamics, economics, policy and social concerns. Principles are illustrated with reference to contemporary forestry issues.

Credit Hours: 5 Vector: _____ Prerequisite(s) if any: MRM 611-5

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 15 When will the course first be offered: Revision of course already offered.

How often will the course be offered: Once a year -- each Fall semester.

JUSTIFICATION:

We wish to add MRM 611 as a prerequisite to MRM 670 as it will facilitate teaching of the course if all participants have a basic understanding of ecological principles prior to taking MRM 670.

RESOURCES:

Which Faculty member will normally teach the course: Advertising position

What are the budgetary implications of mounting the course: n/a

Are there sufficient Library resources (append details): n/a

- Appended: a) Outline of the Course
- b) An indication of the competence of the Faculty member to give the course.
- c) Library resources

Approved: Departmental Graduate Studies Committee: [Signature] Date: Oct. 24/90

Faculty Graduate Studies Committee: [Signature] Date: Oct. 28/90

Faculty: _____ Date: _____

Senate Graduate Studies Committee: [Signature] Date: 27 Nov 90

Senate: _____ Date: _____