

SIMON FRASER UNIVERSITY

MEMORANDUM

S.453

To..... Mr. H. Evans, Secretary

..... of Senate

Subject..... Course Proposals - Mathematics

From..... B. L. Funt

..... Dean of Science

Date..... November 19, 1970
..... Our File F-8-4

The attached new course proposals from the Department of Mathematics were passed by Faculty at its meeting on November 19, 1970.

I enclose them for submission to the December meeting of Senate.



—B. L. Funt

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SIMON FRASER UNIVERSITY

MEMORANDUM

To..... Dr. B. L. Funt, Chairman
..... Undergraduate Studies Committee
..... Faculty of Science

From..... Dr. D. L. Sharma
..... Mathematics Department

Subject NEW APPLIED MATHEMATICS COURSE PROPOSALS Date November 9, 1970

I wish to point out that the attached proposals for new courses in applied mathematics do not constitute an increase in course offerings. The existing upper level applied mathematics courses, Mathematics 467 and 468 are offered in alternate semesters. The Department intends to offer these new courses, together with the existing courses, on a rotating basis at the rate of one per semester.

D. L. Sharma

NEW COURSE PROPOSALS -- MATHEMATICS

Mathematics 469-4 (Fluid Dynamics), 470-4 (Variational Calculus) and 471-4 (Special Relativity) have been considered by the Undergraduate Curriculum Committee and are recommended to Faculty for approval. These courses represent additional selections to round out the choice of program available for the student in applied mathematics.

In addition, two directed study courses, 493-4 and 494-4, have been considered and approved. And two special topics courses, 495-4 and 496-4, entitled Selected Topics in Mathematics, have similarly received consideration and approval. The contents and composition of the last four courses will vary depending upon the interest of the student and the sequential offerings in the Department of Mathematics.

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B. L. Funt

Passed by the Faculty of Science, November 19, 1970

FACULTY OF SCIENCE

NEW COURSE PROPOSALI CALENDAR INFORMATION

Department: Mathematics

Course Number: 469-4 Title: Fluid Dynamics

Sub-title or Description:

Kinematics, sources and sinks; vorticity. Navier-Stokes equations of motion. Viscous flows, dynamical similarity, Reynolds number. Boundary layer theory.

Credit Hours: 4

Vector Description: 4-1-0

Pre-requisite(s): Mathematics 261-3. Mathematics 411-4 or Physics 382-4 should precede or be taken concurrently.

II ENROLMENT AND SCHEDULING

Estimated Enrolment: 10

Semester Offered (e.g. Yearly, every Spring; twice yearly, Fall and Spring):

Once every two years

When course will first be offered:

Spring 1973

III JUSTIFICATION

A. What is the detailed description of the course including differentiation from lower level courses, from similar courses in the same department and from courses in other departments in the University?

The course will include the topics listed in calendar information (above). None of these topics are taught in any other course in this department or in other departments in the University.

B. What is the range of topics that may be dealt with in the course?

C. How does this course fit the goals of the department?

With the addition of this course, the students in Applied Mathematics will have more choice in the selection of upper level courses.

D. How does this course effect degree requirements?

No effect on degree requirements

E. What are the calendar changes necessary to reflect the addition of this course?

New entry

F. What course, if any, is being dropped from the calendar if this course is approved?

None

G. What is the nature of student demand for this course?

Some students in Applied Mathematics have expressed the desire to be exposed to more fields where Mathematics is applied to solve problems relating to natural science.

H. Other reasons for introducing the course.

IV

BUDGETARY AND SPACE FACTORS

A. Which faculty will be available to teach this course?

Dr. R. Lardner, Dr. D.L. Sharma, Dr. E.M. Shoemaker

SENATE PAPERS

B. What are the special space and/or equipment requirements for this course?

None

C. Any other budgetary implications of mounting this course:

Nil

APPROVAL - Faculty Undergraduate Curriculum Committee:

NOV. 12, 1970

Faculty: November 19, 1970

Senate:

FACULTY OF SCIENCE

NEW COURSE PROPOSALI CALENDAR INFORMATION

Department: Mathematics

Course Number: 470-4 Title: Variational
Calculus

Sub-title or Description:

Procedures of Euler, Lagrange and Hamilton. Extremum problems, stationary values of integrals. Canonical equations of motion, phase space, Lagrangian and Poisson brackets.

Credit Hours: 4

Vector Description: 4-1-0

Pre-requisite(s):

Mathematics 261-3 or Physics 203-2. Mathematics 411-4 or Physics 382-4 must precede or be taken concurrently.

II ENROLMENT AND SCHEDULING

Estimated Enrolment: 10

Semester Offered (e.g. Yearly, every Spring; twice yearly, Fall and Spring):

Once every two years

When course will first be offered:

Spring 1972

III JUSTIFICATION

A. What is the detailed description of the course including differentiation from lower level courses, from similar courses in the same department and from courses in other departments in the University?

This course will include the topics listed in calendar information (above).

B. What is the range of topics that may be dealt with in the course?

C. How does this course fit the goals of the department?

With the addition of this course, the students in Applied Mathematics will have more choice in the selection of upper level courses.

D. How does this course effect degree requirements?

No effect on degree requirements.

E. What are the calendar changes necessary to reflect the addition of this course?

New entry

F. What course, if any, is being dropped from the calendar if this course is approved?

None

G. What is the nature of student demand for this course?

Some students in Applied Mathematics have expressed the desire to be exposed to more fields where Mathematics is applied to solve problems relating to natural science.

H. Other reasons for introducing the course.

IV

BUDGETARY AND SPACE FACTORS

A. Which faculty will be available to teach this course?

Dr. G.A.C. Graham, Dr. D. Shadman, Dr. M. Singh

SENATE PAPERS

B. What are the special space and/or equipment requirements for this course?

None

C. Any other budgetary implications of mounting this course:

None

APPROVAL - Faculty Undergraduate Curriculum Committee:

Nov. 12, 1970

Faculty: November 19, 1970

Senate:

FACULTY OF SCIENCE

NEW COURSE PROPOSAL

I CALENDAR INFORMATION

Department: Mathematics

Course Number: 471-4 Title: Special Relativity

Sub-title or Description:

Space-time continuum, separation between events, Lorentz transformation. Mechanics of discrete system and of continuum. Electromagnetic field in vacuo.

Credit Hours: 4

Vector Description: (4-1-0)

Pre-requisite(s): Mathematics 261-3 or Physics 203-2. Mathematics 411-4 must precede or be taken concurrently.
or Physics 382-4

II ENROLMENT AND SCHEDULING

Estimated Enrolment: 10

Semester Offered (e.g. Yearly, every Spring; twice yearly, Fall and Spring):

Once every two years

When course will first be offered:

Fall 1972

III JUSTIFICATION

A. What is the detailed description of the course including differentiation from lower level courses, from similar courses in the same department and from courses in other departments in the University?

The course will include the topics listed in calendar information (above).

B. What is the range of topics that may be dealt with in the course?

Special Theory of Relativity

- C. How does this course fit the goals of the department?

With the addition of this course, the students in Applied Mathematics will have more choice in the selection of upper level courses.

- D. How does this course effect degree requirements?

No effect on degree requirements.

- E. What are the calendar changes necessary to reflect the addition of this course?

New entry.

- F. What course, if any, is being dropped from the calendar if this course is approved?

None

- G. What is the nature of student demand for this course?

Some students in Applied Mathematics have expressed the desire to be exposed to more fields where Mathematics is applied to solve problems relating to natural science.

- H. Other reasons for introducing the course.

IV

BUDGETARY AND SPACE FACTORS

- A. Which faculty will be available to teach this course?

Dr. A. Das, Dr. E. Pechlaner

B. What are the special space and/or equipment requirements for this course?

None

C. Any other budgetary implications of mounting this course:

None

APPROVAL -

Faculty Undergraduate Curriculum Committee:

Nov. 12, 1970

Faculty: November 19, 1970

Senate:

FACULTY OF SCIENCE

NEW COURSE PROPOSALI CALENDAR INFORMATION

Department: MATHEMATICS Course Number: Title:
 Sub-title or Description: 493-4 DIRECTED STUDY

Independent reading or research in topics selected in consultation with the supervising instructor.

Credit Hours: 4 Vector Description: None

Pre-requisite(s):

This course can only be taken with the permission of the Department.

II ENROLMENT AND SCHEDULING

Estimated Enrolment: Enrollment may vary from one to five students per semester.

Semester Offered (e.g. Yearly, every Spring; twice yearly, Fall and

The course will be offered when there are interested students and faculty available and willing to supervise.

When course will first be offered:

When requested.

III JUSTIFICATION

A. What is the detailed description of the course including differentiation from lower level courses, from similar courses in the same department and from courses in other departments in the University?

This course will enable junior and senior mathematics students to work with faculty members in areas not covered by the regular mathematics course offerings, at a level more advanced than is possible in the first two years. No similar courses are offered by other departments in the University.

B. What is the range of topics that may be dealt with in the course?

The range of topics may include material from pure mathematics, applied mathematics or probability and statistics.

C. How does this course fit the goals of the department?

This course, together with the other directed study courses, the honors essay course and the selected topics course, create a flexibility in course offerings which might not otherwise be possible.

D. How does this course effect degree requirements?

This course has no effect on degree requirements.

E. What are the calendar changes necessary to reflect the addition of this course?

The only calendar change necessary is the addition of the course to the listing of mathematics course offerings.

F. What course, if any, is being dropped from the calendar if this course is approved?

None

G. What is the nature of student demand for this course?

The Department has received many requests from interested junior and senior mathematics students for additional directed study courses.

H. Other reasons for introducing the course.

In view of the fact that it is not possible for a student to take a course with a specific number more than once for credit additional directed study course numbers are required.

BUDGETARY AND SPACE FACTORS

IV

A. Which faculty will be available to teach this course?

Any of the faculty members in the Mathematics Department.

The course will not be counted as part of any faculty member's teaching load.

B. What are the special space and/or equipment requirements for this course?

None

C. Any other budgetary implications of mounting this course:

None

APPROVAL -

Faculty Undergraduate Curriculum Committee:

Nov. 12, 1970

Faculty:

November 19, 1970

Senate:

FACULTY OF SCIENCE

NEW COURSE PROPOSALI CALENDAR INFORMATION

Department: MATHEMATICS

Course Number:

Title:

Sub-title or Description:

494-4

DIRECTED STUDY

Independent reading or research in topics selected in consultation with the supervising instructor.

Credit Hours: 4

Vector Description: None

Pre-requisite(s):

This course can only be taken with the permission of the Department.

II ENROLMENT AND SCHEDULING

Estimated Enrolment: Enrollment may vary from one to five students per semester.

Semester Offered (e.g. Yearly, every Spring; twice yearly, Fall and

The course will be offered ^{Spring} when there are interested students and faculty available and willing to supervise.

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When requested.

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Any of the faculty members in the Mathematics Department.

The course will not be counted as part of any faculty member's teaching load.

B. What are the special space and/or equipment requirements for this course?

None

C. Any other budgetary implications of mounting this course:

None

APPROVAL -

Faculty Undergraduate Curriculum Committee:

Nov. 12, 1970

Faculty:

November 19, 1970

Senate:

FACULTY OF SCIENCE

NEW COURSE PROPOSALI CALENDAR INFORMATION

Department: MATHEMATICS

Course Number:

Title:

Sub-title or Description:

495-4

SELECTED TOPICS IN
MATHEMATICS

The topics included in this course will vary from semester to semester depending on faculty availability and student interest.

Credit Hours: Four

Vector Description: (4-1-0)

Pre-requisite(s):

This course can only be taken with the permission of the Department.

II ENROLMENT AND SCHEDULING

Estimated Enrolment: 5 to 10 students.

Semester Offered (e.g. Yearly, every Spring; twice yearly, Fall and Yearly. Spring):

When course will first be offered:

Fall 1971 or Spring 1972

III JUSTIFICATION

A. What is the detailed description of the course including differentiation from lower level courses, from similar courses in the same department and from courses in other departments in the University?

This course will be like a standard upper level mathematics course and the prerequisites will be set according to the subject matter covered. The course will be open only to junior and senior mathematics students, and will not include material from existing courses in the Mathematics Department or any other department in the University.

B. What is the range of topics that may be dealt with in the course?

The range of topics will include material from pure mathematics, applied mathematics, or probability and statistics.

- C. How does this course fit the goals of the department?

In view of the fact that the Department does not have enough faculty to set-up a program which would include courses other than the basic core program courses, these selected topics courses will allow the Department to offer those courses which do not fit into the basic program but which are a necessary part of the basic knowledge of a mathematics student.

- D. How does this course effect degree requirements?

This course has no effect on degree requirements.

- E. What are the calendar changes necessary to reflect the addition of this course?

New entry.

- F. What course, if any, is being dropped from the calendar if this course is approved?

None

- G. What is the nature of student demand for this course?

The Department has received several requests for courses not included in present course offerings.

- H. Other reasons for introducing the course.

The Department is requesting approval for two selected topics course numbers as it is not possible for a student to receive credit for a course with a specific number more than once.

IV

BUDGETARY AND SPACE FACTORS

- A. Which faculty will be available to teach this course?

Any of the Faculty Members in the Department.

B. What are the special space and/or equipment requirements for this course?

NONE

C. Any other budgetary implications of mounting this course:

NONE

APPROVAL -

Faculty Undergraduate Curriculum Committee:

Nov. 12, 1970

Faculty:

November 19, 1970

Senate:

FACULTY OF SCIENCE

NEW COURSE PROPOSALI CALENDAR INFORMATION

Department: MATHEMATICS

Course Number:
496-4

Title:

Sub-title or Description:

SELECTED TOPICS IN
MATHEMATICS

The topics included in this course will vary from semester to semester depending on faculty availability and student interest.

Credit Hours: Four

Vector Description: (4-1-0)

Pre-requisite(s):

This course can only be taken with the permission of the Department.

II ENROLMENT AND SCHEDULING

Estimated Enrolment: 5 to 10 students.

Semester Offered (e.g. Yearly, every Spring; twice yearly, Fall and Yearly. Spring):

When course will first be offered:

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C. Any other budgetary implications of mounting this course:

NONE

APPROVAL -

Faculty Undergraduate Curriculum Committee:

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Faculty:

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