

SIMON FRASER UNIVERSITY

MEMORANDUM

S.80-110

To..... Senate

From Office of the Dean of Graduate Studies.

Subject Graduate Curriculum Changes - Department of Physics

Date..... July 14, 1980.....

MOTION: That Senate approve and recommend approval to the Board, as set forth in S.80-110 - Graduate Curriculum Changes in the Department of Physics.

These changes were approved by the Senate Graduate Studies Committee on July 14, 1980.

Bryan P. Beirne
Dean of Graduate Studies

mm/
attachs.

SIMON FRASER UNIVERSITY

MEMORANDUM

To..... Senate Graduate Studies Committee

From..... N. Heath
Administrative Assistant
to the Dean of Science

Subject..... REVISIONS TO PHYSICS
GRADUATE CURRICULUM

Date..... 1980 06 10

At the meeting of 1980 06 05, the Faculty of Science approved the following motion:

"That the proposed revisions to the Physics graduate curriculum and degree requirements, as described in F-80-12, be approved and forwarded to the Senate Graduate Studies Committee and Senate for consideration and approval."

The paper referred to in the above motion is attached. Please note that the revisions include:

1. Deletion of all existing PHYS graduate courses with the exception of PHYS 801-2, 898 and 899.
2. New course proposals:

PHYS 810-3	Fundamental Quantum Mechanics
PHYS 811-3	Advanced Topics in Quantum Mechanics
PHYS 812-3	Relativistic Quantum Mechanics and Elementary Particle Theory
PHYS 821-3	Electromagnetic Theory
PHYS 841-3	Equilibrium Statistical Mechanics
PHYS 845-3	Nonequilibrium Statistical Physics
PHYS 861-3	Introduction to Solid State Physics
PHYS 862-3	Solid State Physics II
PHYS 871-3	Introduction to Elementary Particle Physics
PHYS 880-3	Applications of Group Theory to Physics
PHYS 881-3	Special Topics I
PHYS 882-3	Special Topics II
PHYS 883-3	Special Topics III
PHYS 884-2	Special Topics IV
PHYS 885-2	Special Topics V
PHYS 886-2	Special Topics VI
3. Changes to the amounts of credit required for the M.Sc. and Ph.D. degrees.
4. Discontinuance of the comprehensive examination.
5. Changes to the Language Requirements.

RECEIVED

JUN 11 1980

REGISTRAR'S OFFICE
MAIL DESK

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Please refer to pp. 184-188 of the 1979-80 Graduate Studies Calendar for the current requirements and list of courses.



N. Heath

NH/mgj

Encls./

SIMON FRASER UNIVERSITY

F-80-12

MEMORANDUM

To..... Dr. J. M. Webster
Dean of Science

From..... M. Plischke, Chairman
Graduate Program Committee
Physics Department

Subject..... Graduate Program Revisions
in Physics

Date..... 1980 05 20

The Physics Department is proposing several revisions to the program requirements for both the M.Sc. and Ph.D. degree. In addition, it is proposed that all courses listed in the 1979-1980 Graduate Studies Calendar (pages 186-188), with the exception of PHYS 801-2, PHYS 898 and PHYS 899, be dropped and replaced with the new courses described in the appended pages.

Program changes

a) M.Sc. program

The only change proposed in the degree requirements for the M.Sc. degree is a lowering of the minimum number of hours of course credit from 18 semester hours to 17 semester hours.

b) Ph.D. program

- (i) It is proposed that the minimum course requirement for the Ph.D. degree shall be 9 semester hours beyond the M.Sc. level rather than 10 semester hours as in the present program.
- (ii) The comprehensive examination is discontinued.
(See p.185 of 1979-1980 calendar for statement of old requirement).
- (iii) The Ph.D. language requirement is modified. It is proposed that the new calendar entry shall read:

Language Requirement

In certain areas of research, familiarity with languages other than English may be important. In such cases a student's supervisory committee may require him to attain reading knowledge of one such language.

(See p.185 of the 1979-1980 Graduate Calendar for the existing requirement).

M. Plischke

MP/ml

SIMON FRASER UNIVERSITY

New Graduate Course Proposal FormCALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 810-3
Title: Fundamental Quantum Mechanics
Description: Review of Foundations of Quantum Mechanics; states and observables, measurement theory; angular momentum, time reversal; stationary perturbation theory; variational methods; time dependent perturbation.
Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: PHYS 415-3 or equivalent

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: 80-3
How often will the course be offered: Once a year

JUSTIFICATION:

To provide, together with PHYS 811-3, a solid grounding in non-relativistic quantum mechanics.

RESOURCES:

Which Faculty member will normally teach the course: Any member of department
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: Michael Philke Date: 1980-05-09

Faculty Graduate Studies Committee: David C. Bomke Date: 13 May 80

Faculty: [Signature] Date: 10 June 1980

Senate Graduate Studies Committee: 3/11/80 Bane Date: 14 July 80

Senate: _____ Date: _____

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 811-3
Title: Advanced Topics in Quantum Mechanics
Description: A continuation of PHYS 810-3; scattering theory, identical particles, spin statistics, creation and annihilation operators, diagrammatic perturbation theory, Hartree Fock theory.
Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: PHYS 810-3 or equivalent

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: 81-1
How often will the course be offered: Once a year

JUSTIFICATION:

To provide, with PHYS 810-3, a solid grounding in nonrelativistic quantum mechanics.

RESOURCES:

Which Faculty member will normally teach the course: Dr. L. E. Ballentine, Dr. K. S. Viswanathan, and others.
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: Michael Plick Date: 1980-05-09
Faculty Graduate Studies Committee: Dan C. Brooke Date: 13 May 80
Faculty: [Signature] Date: 10 June 1980
Senate Graduate Studies Committee: Bruce Beane Date: 14 July 80
Senate: _____ Date: _____

SIMON FRASER UNIVERSITY

CALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 812-3

Title: Relativistic Quantum Mechanics and Elementary Particle Theory

Description: Lorentz group and representations; Dirac and Klein Gordon Equations, Maxwell Equations and Quantization; perturbation theory; Feynman diagrams and rules; strong and weak interactions.

Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: PHYS 811-3

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: _____
How often will the course be offered: On demand; probably-once every 2 years.

JUSTIFICATION:

To provide an introduction to field theory and elementary particle theory for students intending to carry out research in this area.

RESOURCES:

Which Faculty member will normally teach the course: Dr. K. S. Viswanathan, Dr. L. E. Ballentine

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: Richard Phillips Date: 1980-05-09
Faculty Graduate Studies Committee: Dennis G. Broucke Date: 13 May 80
Faculty: [Signature] Date: 10 June 1980
Senate Graduate Studies Committee: Bruce Broucke Date: 14 July 80
Senate: _____ Date: _____

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 821-3
Title: Electromagnetic Theory
Description: Advanced topics in classical electromagnetic theory; review of Maxwell's equations, wave propagation, radiation theory, special relativity and electromagnetic theory, magnetohydrodynamics and plasma physics; radiation damping.
Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: PHYS 425-3 or equivalent

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: 80-3
How often will the course be offered: Once or twice a year

JUSTIFICATION:

This course is intended as a basic graduate course for all students in the M.Sc. program.

RESOURCES:

Which Faculty member will normally teach the course: All members of the department
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: Michael Maslin Date: 1980-05-09

Faculty Graduate Studies Committee: Danny C. Brooks Date: 15 May 80

Faculty: [Signature] Date: 10 June 1980

Senate Graduate Studies Committee: Bruce Beane Date: 14 July 80

Senate: _____ Date: _____

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 841-3
Title: Equilibrium Statistical Mechanics
Description: Review of ensembles and thermodynamics; Ideal gases, Imperfect classical gases, classical and modern theories of phase transitions, Renormalization group.
Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: PHYS 345-3 or equivalent

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: 81-1
How often will the course be offered: Once a year

JUSTIFICATION:

This course is intended for all students in the M.Sc. program
and should provide a good grounding in statistical physics.

RESOURCES:

Which Faculty member will normally teach the course: Any member of the department
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: *Michael P. Hinchey* Date: 1980-05-09
Faculty Graduate Studies Committee: *Donny C. Brooks* Date: 13 May 80
Faculty: *[Signature]* Date: 10 June 1980
Senate Graduate Studies Committee: *Bryan Blume* Date: 14 July 80
Senate: _____ Date: _____

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 845-3
Title: Nonequilibrium Statistical Physics
Description: Boltzmann equation and applications; H-theorem, conservation laws, Navier Stokes equation; Fluctuation-dissipation theorem, Kubo formalism; systems far from equilibrium, stability theory, stochastic analysis.
Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: PHYS 840-3

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: _____
How often will the course be offered: On demand; probably every second year

JUSTIFICATION:

To provide an introduction to the growing field of nonequilibrium statistical mechanics.

RESOURCES:

Which Faculty member will normally teach the course: Dr. B. L. Jones, Dr. L. E. Ballentine, Dr. B. Plischke
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: [Signature] Date: 1980-05-09

Faculty Graduate Studies Committee: [Signature] Date: 13 May 1980

Faculty: [Signature] Date: 10 June 1980

Senate Graduate Studies Committee: [Signature] Date: 14 July 80

Senate: _____ Date: _____

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 861-3

Title: Introduction to solid state physics: free electron theory, crystal

Description: structure, band theory, Bloch's theorem, electron dynamics, Phonons,
semiconductors.

Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: PHYS 465-3
or equivalent and
PHYS 415-3

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: 81-1

How often will the course be offered: Once a year

JUSTIFICATION:

To provide an introduction to solid state physics
for graduate students.

RESOURCES:

Which Faculty member will normally teach the course: Any member of the department

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: Michael P. Burke Date: 1980-05-09

Faculty Graduate Studies Committee: Robert C. Bonner Date: 13 May 1980

Faculty: [Signature] Date: 10 June 1980

Senate Graduate Studies Committee: Byron Beane Date: 14 July 80

Senate: _____ Date: _____

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 862-3
Title: Solid State Physics II
Description: Special topics in solid state physics such as superconductivity,
magnetism, optical properties of solids, electron correlations.
Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: PHYS 861-3

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: _____
How often will the course be offered: On demand; perhaps two times every 3 years

JUSTIFICATION:

Advanced course for students carrying out research in
solid state physics.

RESOURCES:

Which Faculty member will normally teach the course: Any member of the department
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: Michael H. Hulse Date: 1980-05-09
Faculty Graduate Studies Committee: Robert C. Parniske Date: 13 May 80
Faculty: [Signature] Date: 10 June 1980
Senate Graduate Studies Committee: Robert Blaine Date: 14 July 80
Senate: _____ Date: _____

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 871-3
Title: Introduction to Elementary Particle Physics
Description: Elementary Particle Phenomenology; classification of particles, forces, conservation laws; relativistic scattering theory, electromagnetic interactions of leptons and hadrons, weak interactions, gauge theories, strong interactions.
Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: -

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: _____
How often will the course be offered: On demand; perhaps every second year

JUSTIFICATION:

To provide a survey of elementary particle physics.

RESOURCES:

Which Faculty member will normally teach the course: Dr. K. S. Viswanathan
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: Michael P. Hinchey Date: 1980-05-09

Faculty Graduate Studies Committee: James G. Parniske Date: 13 May 80

Faculty: [Signature] Date: 10 June 1980

Senate Graduate Studies Committee: Byron Beune Date: 14 July 80

Senate: _____ Date: _____

New Graduate Course Proposal Form

Department: PHYSICS Course Number: PHYS 880-3

Title: Applications of Group Theory to Physics

Description: Elements of group theory, matrix representations, the Clebsch-Gordon series; applications of finite and continuous groups to problems in atomic, solid state and elementary particle physics.

Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: -

Estimated Enrollment: 6 When will the course first be offered: _____
How often will the course be offered: On demand

Survey course on group theory and applications.

Which Faculty member will normally teach the course: Dr. L. E. Ballentine, Dr. K. S. Viswanathan, Dr. J. C. Irwin

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: Mikhael Chahine Date: 1980-05-09
Faculty Graduate Studies Committee: Debra G. Brouke Date: 13 May/80
Faculty: A. N. Webster Date: 10 June 1980
Senate Graduate Studies Committee: Barry Beane Date: 14 July 80
Senate: _____ Date: _____

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 881-3
Title: Special Topics I
Description: _____

Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: _____

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: _____
How often will the course be offered: On demand

JUSTIFICATION:

This will be an advanced course in a specialised
area of physics.

RESOURCES:

Which Faculty member will normally teach the course: All members of the department
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: Michael Phillips Date: 1980-05-09

Faculty Graduate Studies Committee: D. R. C. Proulx Date: 15 May 80

Faculty: [Signature] Date: 10 June 1980

Senate Graduate Studies Committee: Peter Blume Date: 14 July 80

Senate: _____ Date: _____

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 882-3
Title: Special Topics II
Description: _____
Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: -

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: _____
How often will the course be offered: On demand

JUSTIFICATION:

This will be an advanced course in a specialised
area of physics.

RESOURCES:

Which Faculty member will normally teach the course: All members of the department
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: [Signature] Date: 1980-05-09
Faculty Graduate Studies Committee: [Signature] Date: 13 May 80
Faculty: [Signature] Date: 10 June 1980
Senate Graduate Studies Committee: [Signature] Date: 17 July 80
Senate: _____ Date: _____

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 883-3
Title: Special Topics III
Description: _____
Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: -

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: _____
How often will the course be offered: On demand

JUSTIFICATION:

This will be an advanced course in a specialised
area of physics.

RESOURCES:

Which Faculty member will normally teach the course: All members of the department
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: Michael Phillips Date: 1980-05-09
Faculty Graduate Studies Committee: Don & G. Brooks Date: 13 May 80
Faculty: [Signature] Date: 10 June 1980
Senate Graduate Studies Committee: Royce Blaine Date: 14 July 80
Senate: _____ Date: _____

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 884-2
Title: Special Topics IV
Description: _____

Credit Hours: 2 Vector: 2-0-0 Prerequisite(s) if any: _____

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: _____
How often will the course be offered: On demand

JUSTIFICATION:

RESOURCES:

Which Faculty member will normally teach the course: All members of the department
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: Michael Plutcher Date: 1980-05-09
Faculty Graduate Studies Committee: James C. Bracken Date: 13 May 1980
Faculty: John H. Webster Date: 10 June 1980
Senate Graduate Studies Committee: Robert Beune Date: 14 July 80
Senate: _____ Date: _____

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 885-2
Title: Special Topics V
Description: _____

Credit Hours: 2 Vector: 2-0-0 Prerequisite(s) if any: -

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: _____
How often will the course be offered: On demand

JUSTIFICATION:

This is an advanced course in a specialised
area of physics.

RESOURCES:

Which Faculty member will normally teach the course: All members of the department
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: Michael Phidias Date: 1980-05-09
Faculty Graduate Studies Committee: Dennis C. Branka Date: 13 May 80
Faculty: [Signature] Date: 10 June 1980
Senate Graduate Studies Committee: Bruce Beane Date: 14 July 80
Senate: _____ Date: _____

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: PHYSICS Course Number: PHYS 886-2
Title: Special Topics VI
Description: _____

Credit Hours: 2 Vector: 2-0-0 Prerequisite(s) if any: -

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 6 When will the course first be offered: _____
How often will the course be offered: On demand

JUSTIFICATION:

This will be an advanced course in a specialised
area of physics.

RESOURCES:

Which Faculty member will normally teach the course: All members of the department
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: Michael P. Burke Date: 1980-05-09
Faculty Graduate Studies Committee: James G. Bowker Date: 13 May 80
Faculty: [Signature] Date: 10 June 1980
Senate Graduate Studies Committee: Royce Blum Date: 14 July 80
Senate: _____ Date: _____