

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Senate

From: Senate Committee on
Undergraduate Studies

Subject: Applied Physics Program

Date: October 22, 1986

Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of October 21, 1986 gives rise to the following motion:

MOTION:

"That Senate approve and recommend approval to the Board of Governors, as set forth in S.86-76, the proposed

Majors Program in Applied Physics"

SIMON FRASER UNIVERSITY**MEMORANDUM**

To: W. R. Heath, Secretary
Senate Committee on Undergraduate
Studies

From: W. Wattamaniuk, Secretary,
Senate Committee on Academic
Planning

Subject: Applied Physics Program

Date: October 14, 1986

I attach a proposal for a Majors Program in Applied Physics at SFU. The Senate Committee on Academic Planning at its meeting of October 8, 1986 unanimously approved the program and is so recommending to Senate, subject of course, to SCUS approval of the fine structure details.

SCUS should note that the proposal requires students in the program (estimated by the Department to be 10-15 per year) to take two upper level Computing courses; CMPT 390-3 and CMPT 391-3. Both courses currently have enrolment restrictions.

W.

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Members of Senate Committee
on Academic Planning

From: W. Wattamaniuk
Secretary, SCAP

Subject: Applied Physics Program

Date: October 2, 1986

I attach a proposal from the Faculty of Science for a Majors Program in Applied Physics at SFU. It is before SCAP for in-principle approval prior to consideration by SCUS.

SIMON FRASER UNIVERSITY

MEMORANDUM

To..... Dr. ROSS SAUNDERS, Chairman

SCUS

PROPOSAL FOR AN APPLIED PHYSICS

Subject..... DEGREE PROGRAM

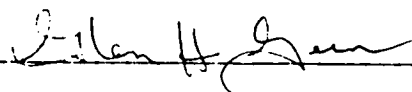
GLEN H. GEEN, Dean

From..... Faculty of Science

July 9, 1986

Date.....

The following course and the proposal for an Applied Physics degree program has been approved by the Faculty of Science Undergraduate Curriculum Committee and by myself as Dean. I am forwarding this to you for your consideration prior to it going to UCBC as it must in the case of a new program.


Glen H. Geen

/wy

Encls.

CL

[Faint handwritten notes and signatures follow]

SIMON FRASER UNIVERSITY

MEMORANDUM

To..... Dr. G. Geen

..... Dean of Science

Subject.....

From..... J. C. Irwin, Chairman

..... Department of Physics

Date..... 1986 04 24

Dear Glen:

Attached are the following: a proposal for an Applied Physics degree program; Proposal Forms for a new 4th Year course in Electronics - ~~P430-5, a new introductory lab. course - P130-2; and some minor calendar description changes for P326, P331 and P131.~~

Chuck

J. C. IRWIN

JCI/ml

Enclosures

c.c. Dr. P. Dobud
Administrative Assistant
to the Dean of Science

Rationale

APPLIED PHYSICS PROGRAM

The Physics Department wishes to develop a Majors degree program in Applied Physics. Our department, like many other departments in the University, has traditionally offered the same courses to both its majors and honours students. In the upper division these courses are selected and taught with the implicit understanding that the students will be going on to graduate school. They are thus designed primarily for the honours students. As a result, our prospective majors students, who in general are interested in gaining employment upon graduation rather than entering graduate school, find some of the courses irrelevant for their purpose.

The introduction of the Applied Physics Program thus represents an attempt to provide an attractive and relevant degree path for majors students who are interested in the direct practical applications of physics. An attempt has been made to introduce new courses, and select other existing courses, that will be relevant and valuable to them in their careers after graduation. The range of material presented in the proposed program should also greatly enhance and broaden their prospects for employment. To this end, an attempt has been made to develop a course structure that will emphasize material and provide training that is important in the high technology world of to-day. The graduates of the program should thus be of great interest to the ever-increasing number of local and national technologically-oriented companies.

- PHYS 120-3 Physics I
 121-3 Physics II
 131-2 General Physics Laboratory
 211-3 Intermediate Mechanics
 221-3 Intermediate Electricity and Magnetism
 233-2 Introductory Physics Laboratory A
 234-2 Introductory Physics Laboratory B

Upper Division Courses in Science:

- MATH 310-3 Introduction to Ordinary Differential Equations
 plus one other MATH course numbered 316 or greater

- PHYS Minimum 30 semester hours upper division credit (courses numbered 300 and above), including a minimum 6 semester hours of upper division laboratory credit.

Non-science Electives — A minimum of 6 semester hours from the Faculty of Arts.

In addition to the courses listed above, the student must elect sufficient unspecified upper division courses to complete a minimum of 44 semester hours in courses numbered 300 and above, and further unspecified courses in any division to bring the total credit for the degree to a minimum of 120 semester hours. (See Faculty of Science Requirements).

Physics Major - Applied Physics Option

The Applied Physics Option offers a solid background in physics combined with an orientation toward the applied aspects of physics necessary for students planning careers in high technology industries after completing their B.Sc. degrees. It is recommended that students also enrol in the Co-Op program in order to acquire valuable industrial experience.

Program leading to a B.Sc. degree in Applied Physics

REQUIRED

RECOMMENDED COURSES FOR APPLIED PHYSICS

LOWER DIVISION COURSES: (40 semester hours) ----- 51

- CHEM 104-3 General Chemistry I
 105-3 General Chemistry II
 115-3 General Chemistry Laboratory I
 CMPT 102-3 Introduction to Programming for Science Students
 290-3 Introduction to Digital Systems *
 291-3 Introduction to Digital Circuit Design
 MATH 151-3 Calculus I
 152-3 Calculus II
 232-3 Elementary Linear Algebra
 251-3 Calculus III
 252-3 Vector Calculus
 PHYS 120-3 Physics
 121-3 Physics II
 131-2 General Physics Laboratory B
 211-3 Intermediate Mechanic
 221-3 Intermediate Electricity and Magnetism
 233-2 Introductory Physics Laboratory A
 234-2 Introductory Physics Laboratory B

UPPER DIVISION COURSES: (45 to 47 semester hours)

Core

- CMPT 390-3 Digital Circuits and Systems *
 391-3 Microcomputer Hardware Workshop
 MATH 310-3 Introduction to Ordinary Differential Equations
 MACM 316-3 Numerical Analysis I
 PHYS 324-3 Electromagnetics
 326-3 Electronics and Instrumentation
 331-3 Electronics Laboratory
 332-3 Intermediate Laboratory
 344-3 Thermal Physics
 355-3 Optics
 385-3 Quantum Physics

~~421-4 Advanced Physics Laboratory I~~

430-5 Digital Electronics and Interfacing

and either

- NUSC 341-3 Introduction to Radiochemistry
 342-3 Introduction to Nuclear Science
 346-3 Radiochemistry Laboratory

or three of

- PHYS 365-3 Semiconductor Device Physics
 455-3 Laser Physics
 465-3 Solid State Physics
 431-4 ~~432-4~~ Advanced Physics Laboratory# I

Non-Science electives — A minimum of 6 semester hours of electives from the Faculty of Arts.

In addition to the courses listed above, the students must elect sufficient unspecified courses in any division to complete a minimum of 120 semester hours total credit.

NEW COURSE PROPOSAL FORM1. Calendar InformationDepartment: PhysicsAbbreviation Code: PHYS Course Number: 430 Credit Hours: 5 Vector: 2-0-4Title of Course: DIGITAL ELECTRONICS AND INTERFACING

Calendar Description of Course:

Digital logic design with particular application to interfacing computers to physical apparatus. Construction and use of interface devices for various laboratory experiments. Computer data reduction.

Nature of Course:

Lecture/Laboratory

Prerequisites (or special instructions):

PHYS 326 and PHYS 331; or permission of instructor.

What course (courses), if any, is being dropped from the calendar if this course is approved: PHYS 432-4

2. SchedulingHow frequently will the course be offered? once per yearSemester in which the course will first be offered: 87-3

Which of your present faculty would be available to make the proposed offering possible?

M. Thewalt & others3. Objectives of the Course

To provide students with the skills required to design and perform computer-controlled experiments.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty	None
Staff	Part-time Laboratory Instructor (desired but not essential)
Library	None
Audio Visual	None
Space	None
Equipment	\$70,000 (microcomputers, components & diagnostic equipment)

5. Approval

Date:

April 22/86July 9/86

[Signature]
Department Chairman

[Signature]
Dean

[Signature]
Chairman, SCUS

PROPOSAL - PHYS 430-5 (2-0-4)

Digital Electronics and Interfacing

Proposed course outline for a new fourth year course comprising one lab period and two hours of lectures per week.

Course Description

The course will provide a working knowledge of digital logic design with particular application to interfacing digital computers to external apparatus. While all logic families will be briefly discussed and compared, the emphasis will be on TTL logic. The course will concentrate on the construction of custom-made interfaces connected directly to the computer bus, although standardized interface protocols such as RS232 and IEEE488 will also be discussed. While interfacing concepts will be introduced at a general level, the specific examples and lab experiments will be solely concerned with the IBM PC bus. The detailed internal working of the computer will not be covered, nor will machine-language programming. By the end of the course several interface devices suitable for performing physical experiments in the lab will have been constructed and used. These experiments will also require data reduction on the computer.

Outline: (lab experiments will be coupled to these topics)

- logic families
- logic design and minimization, Boolean algebra, Karnaugh maps
- more complicated devices: counters, shift registers, decoders, etc.
- synchronous vs. asynchronous design
- standard interface protocols: RS 232, IEEE488
- interfacing to the computer bus, special LSI circuits useful in interfacing
- the IBM PC bus
- advanced interfacing: interrupts and direct memory access
- construction and use of complete hardware devices for performing physical experiments

SIMON FRASER UNIVERSITY

MEMORANDUM

W. Wattamaniuk
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Director, Analytical Studies
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Subject... APPLIED PHYSICS DEGREE PROGRAM

R. Frindt, Acting Chairman
From.....
Department of Physics
.....
September 4, 1986
Date.....

This is in response to your memo of August 5, 1986 to the Dean of Science regarding the Applied Physics Degree Program Proposal to be placed on the SCAP agenda on September 10, 1986 where you asked for an indication of need and enrolment projections for the Applied Physics Program.

Ever since the Applied Physics program was under discussion many of our Major physics students have expressed interest in the program, and we expect that in steady-state we will have about 10 to 15 Applied Physics students graduating per year. We expect that the majority of these will be in the Co-op program.

We feel that our Applied Physics Major program is a timely response to what we perceive to be a growing need in B.C. industry for graduates who have a solid background in physical science with significant exposure to computing science, electronics and laboratory skills.

I expect to be attending the SCAP meeting on September 10, 1986.

R. Frindt

R. Frindt

RF/mrb

cc: Dean of Science
Dr. J.C. Irwin

dk.02-05