

SIMON FRASER UNIVERSITY

S.76-91

MEMORANDUM

To SENATE

From Senate Committee on Undergraduate Studies

Subject New Course Proposal:CMPT 218-3,  
Special Topics, Computing Science.

Date 20th July, 1976

Action taken by the Senate Committee on Undergraduate Studies at its meeting of July 13th 1976 gives rise to the following Motion:

MOTION:

That Senate approve, and recommend approval by the Board of Governors, CMPT 218-3, Special Topics in Computing Science as contained in paper S.76-91



Daniel R. Birch

:ams

att.

SIMON FRASER UNIVERSITY

SCUS 76-24

MEMORANDUM

Mr. H. M. Evans, Registrar &  
Secretary of the Senate Committee  
on Undergraduate Studies.

Subject I. S. C. 76-5. CMPT 218, Special  
Topics in Computing Science.

From J. Blanchet, Secretary of the  
Faculty of Interdisciplinary Studies  
Undergraduate Curriculum Committee.

Date June 30/76.

The Faculty of Interdisciplinary Studies Undergraduate Curriculum Committee has reviewed and approved the attached new course proposal, and I am forwarding it to you for inclusion on the agenda of the Senate Committee on Undergraduate Studies.

Attachment.

SENATE COMMITTEE ON UNDERGRADUATE STUDIESNEW COURSE PROPOSAL FORM1. Calendar InformationDepartment: Computing ScienceAbbreviation Code: CMPT Course Number: 218 Credit Hours: 3 Vector: 2-1-0Title of Course: Special Topics in Computing Science

## Calendar Description of Course:

*Special topics in Computing Science which are of current interest or are not covered in the regular curriculum will be offered from time to time depending on availability of faculty and on student interest.*

Nature of Course Lecture/TutorialPrerequisites (or special instructions): CMPT 105 and CMPT 118What course (courses), if any, is being dropped from the calendar if this course is approved: None2. SchedulingHow frequently will the course be offered? Intermittently

Semester in which the course will first be offered?

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

3. Objectives of the Course *The objective of the course is to enable special topics of current or specialized interest to be presented at a level accessible to second year students. This course is not intended to provide a lower division alternative to upper division material; rather, its purpose is to enable special topics to be offered at this level if appropriate. The content will be different each time the course is offered. A detailed course description will be published at least one semester prior to each offering. Course descriptions typical of what might be used are attached.*
4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty NoneStaff NoneLibrary NoneAudio Visual NoneSpace NoneEquipment None5. Approval

Date: \_\_\_\_\_

June 30/76July 13/76\_\_\_\_\_  
Department ChairmanRC Brown  
\_\_\_\_\_  
DeanDR Bruch  
\_\_\_\_\_  
Chairman, SCUS

## INTRODUCTION TO FORMAL TOPICS IN COMPUTING SCIENCE

This course provides an introduction to the formal treatment of basic concepts introduced at the 100 level. In particular machines, languages, algorithms, data and information are all considered. Basic discrete mathematical structures are introduced and applied in the context of well motivated computational problems.

### Outline

#### I Discrete Mathematical Structure

- sets, relations, functions, graphs, trees
  - properties and applications
  - computer representation and manipulation

#### II Machine Models

- circuits, automata, random access machines, decision trees, flowchart schemes, parallel machines.
- models for machine components.

#### III Languages

- formal definitions, grammars, parsing, translation
- syntax and semantics
- logical expressions

#### IV Algorithms

- design methodologies
  - repetition, recursion, divide and conquer, dynamic programming, heuristics and approximations
- analysis techniques
  - concern for efficiency, optimization combinatoral techniques
- program testing and correctness
- effectiveness and efficiency of algorithms

#### V Data and Information

- representation and communication
- applications for the efficiency of algorithms

#### Reading List

Suitably supplemented the following could serve as primary sources:

1. F.P. Preparata and R.T. Yeh, Introduction to Discrete Structure for Computer Science and Engineering, Addison-Wesley.
2. J.P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill.
3. R.R. Korfhage, Discrete Computational Structures, Academic Press.

Supplementary material could be drawn from:

1. D.E. Knuth, The Art of Computer Programming, Vol. 1, (Fundamental Algorithms), Addison-Wesley.
2. A.V. Aho, J.E. Hopcroft and J.D. Ullman, The Design and Analysis of Computer Algorithms, Addison-Wesley.
3. Nevergelt, Farrar and Reingold, Computer Approaches to Mathematical Problems, Prentice-Hall.

## INTRODUCTION TO ANALOG AND HYBRID COMPUTATION

This course introduces the student to the basic principles of analog computation as well as to the combined use of analog and digital techniques or hybrid computation. The course emphasizes models and their realization via analog devices, not the circuitry of these devices. A major goal of the course is to help students develop experience in interpreting results.

### Outline

- review of digital-sequential machine operation.
- introduction of continuous feedback vs pulsed feedback for the dynamic state of a machine.
- operational amplifiers.
- components of an analog computer.
- analog output.
- the clock, time scaling, and variable scaling.
- clock programming and hybrid computation.
- simple process control.
- dynamic system modeling.
- analog simulation on a digital machine.

### Experiments

- some practical experiments will be provided with graphic display output.

### Reading Material

Hausner A., "Analog and Analog/Hybrid Computer Programming", Prentice Hall, 1971.

Korn, G.A., and Korn, T.M., "Electronic Analog and Hybrid Computers", McGraw-Hill, 1964.

Shinskey, F.G., "Process Control Systems", McGraw-Hill, 1967.

# SIMON FRASER UNIVERSITY

## MEMORANDUM

To	See distribution below.	From	J. Weinkam, Chairman
			Faculty of Interdisciplinary Studies Undergraduate Curriculum Committee
Subject	I.S.C. 76-5 (Title of Course: CMPT. 218, SPECIAL TOPICS IN	Date	April 9, 1976

COMPUTING SCIENCE

In accordance with the ruling of the Senate Committee on Undergraduate Studies, the attached paper is forwarded to faculty curriculum committees for review in terms of course overlap.

*Distribution:*

L. Boland, Chairman, Faculty of Arts  
Curriculum Committee  
M. Wideen, Chairman, Faculty of Education  
Curriculum Committee  
D. Ryeburn, Chairman, Faculty of Science  
Curriculum Committee

*Attachment.*

*cc: H.M. Evans, Registrar & Secretary of  
Senate Committee on Undergraduate Studies*

*JW/jk*