

MEMORANDUM

To..... SENATE

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Subject..... CURRICULUM CHANGES - COMPUTING
SCIENCE

From..... SENATE COMMITTEE ON UNDERGRADUATE STUDIES

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Date..... DECEMBER 21, 1982

Action undertaken by the Senate Committee on Undergraduate Studies at its meeting of December 14, 1982 gives rise to the following motion:-

MOTION:

"That Senate approve and recommend approval to the Board of Governors, as set forth in S.83 - 8 , changes including

- 1) New courses - CMPT 384-3 - Symbolic Computing
CMPT 406-3 - Computational Geometry
CMPT 411-3 - Artificial Intelligence
- 2) Change in lower division course requirements - delete PHYS 150, substitute PHYS 120/121
- 3) Change in upper division course requirements (tables)
- 4) Change in name to Software Systems and Programming
- 5) Change in key courses - Table II"

FOR INFORMATION:

Acting under delegated authority at its meeting of December 14, 1982, the Senate Committee on Undergraduate Studies approved changes as follows:-

- 1) CMPT 401-3 - Change in title, description and nature of course
- 2) CMPT 410-4 - Change in title, description, prerequisite, nature of course, and change in credits from 4 to 3.
- 3) CMPT 301-3 - Change in title, description, nature of course.

MEMORANDUM

Dr. G. Bhakthan, Chairman
Undergraduate Curriculum Committee

From..... Ronald Harrop, Chairman.....
Undergraduate Curriculum Committee

UNDERGRADUATE CALENDAR CHANGES

Subject 1982-83

Date..... November 15, 1982.....

I list below the principal changes proposed for the Computing Science Undergraduate Calendar and attach course proposal and course revision documents as appropriate. Additional documentation is not provided for editorial changes.

CMPT 101/103 whenever mentioned a note has been added to the effect that they are inter-changeable.

MATH 101/272 wherever mentioned a note has been added to the effect that they are inter-changeable. If the MATH 102 change is approved our calendar entry will be changed accordingly.

LOWER DIVISION COURSE REQUIREMENTS

PHYS 150 has been deleted by PHYSICS - the change to "PHYS 120/121 ..." is replacement.

UPPER DIVISION COURSE REQUIREMENTS

- all duplicate courses are being dropped from the tables:

CMPT 401 from Computer Design

MACM 401 " " "

CMPT 305 " Software Systems

- CMPT 392 has been moved to INTENSIVE APPLICATIONS at the request of the instructor (Don George).

- CMPT 301 has been moved to INFORMATION SYSTEMS as this is a more appropriate group for the course in view of its overall content. Its title, description and prerequisites have been changed.

SOFTWARE SYSTEMS

The group name has been changed to SOFTWARE SYSTEMS AND PROGRAMMING.

new course * CMPT 384 (SYMBOLIC COMPUTING) has been added to provide students
* with an earlier exposure to Artificial Intelligence, and to
* another approach to programming (i.e. with symbols rather than
* numbers). (Proposal form attached.)

CMPT 401 title has been changed (OPERATING SYSTEMS). This is also a change in description. (Details Attached)

-INTENSIVE APPLICATIONS:

CMPT 410 has had credits reduced from 4 to 3 and title has been changed to reflect the deletion of the project.

(Details Attached)

new course * CMPT 411 (ARTIFICIAL INTELLIGENCE TOPICS) has been added.
* Artificial Intelligence is one of the important fields in
* Computing Science and there is too much material to be
* handled in one course.

THEORETICAL COMPUTING

- * CMPT 406-3 (COMPUTATIONAL GEOMETRY) has been added (Details attached).
- new * This area is required of all HONORS students and students planning
- course * on graduate work are encouraged to select this area also. The
- * addition of the course will give the students more flexibility in
- * course selection.

KEY COURSES (TABLE II)

CMPT 405 has been made the key course in THEORETICAL COMPUTING (replacing MACM 306). This makes the required courses also key courses in their area. In the SOFTWARE SYSTEMS area the key course is either CMPT 401 or 383 (CMPT 301 was moved to another area and is no longer a key course).

COMMENTS REGARDING NEW COURSES

Although we have added 3 new courses (CMPT 384, 411, 406) you will note that we have indicated that no additional faculty will be required as a result of this. At the moment we offer many of our upper level courses two or three times per year but with the addition of these courses we will be able to reduce the number of yearly offerings of some of the other courses. All of the proposed new courses have been taught under CMPT 418 (SPECIAL TOPICS) and reflect the area of expertise and interest of our newer faculty members.

MATHEMATICS/COMPUTING SCIENCE HONOURS PROGRAM

Entries have been made in the Computing Science and in the Mathematics section of the calendar drawing the attention of students to the existence of this program.

Ronald Hanson

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

Calendar Information

Department: COMPUTING SCIENCE

Abbreviation Code: CMPT Course Number: 384

Credit Hours: 3 Vector: 3-1-0

Title of Course: Symbolic Computing

Calendar Description of Course:

Automated and semi-automated processing of information in symbolic form. Programming language support for symbolic computing. Symbolic algebraic manipulation. Application of symbolic computing to the processing of programming languages.

Nature of Course Lecture/Tutorial

Prerequisites (or special instructions):

CMPT 201, 205

What course (courses), if any, is being dropped from the calendar if this course is approved: None. (Note: This course has previously been offered as a "Special Topics" course.)

2. Scheduling

How frequently will the course be offered? Once per year

Semester in which the course will first be offered? Spring, 1983

Which of your present faculty would be available to make the proposed offering possible? R. Cameron, B. Funt, N. Cercone

3. Objectives of the Course

The objectives of this course are to familiarize students with the symbolic computing paradigm and acquaint them with a programming language for symbolic computing.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty

Staff

Library None.

Audio Visual

Space

Equipment Computer usage as appropriate for an upper division Computing Science course.

5. Approval

Date: 16 Nov 82 Dec 2 1982

W. Cercone
Department Chairman

S. J. Van Dyke
Dean

Chairman, SCUS

Outline of Topics to be Covered (not necessarily in order)

1. The Paradigm of Symbolic Computing
 - Symbolic Data, Notation Systems, Languages
 - Syntax and Semantics
 - Interpretation and Manipulation
2. Abstraction of Symbolic Data
3. Symbolic Computing with Lisp
 - S-expressions and operations thereon
 - Lisp programming
 - Dictionaries and property lists
 - Interactive Computing with Lisp
4. Symbolic Algebraic Manipulation
 - Algebra Packages - REDUCE2, MACSYMA
5. Symbolic Computing Applied to Programming Language Processing
 - Lisp EVAL
 - Lisp Compilers, Editors, Debuggers
6. Pattern Matching

Optional text:

Allen, John, The Anatomy of Lisp, McGraw Hill, 1978.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

Calendar Information

Department: Computing Science

Abbreviation Code: CMPT Course Number: 406

Credit Hours: 3 Vector: 3-0-0

Title of Course: Computational geometry

Calendar Description of Course:

Mathematical preliminaries; convex hull algorithms; intersection problems; closest-point problems and their applications.

Nature of Course Lecture

Prerequisites (or special instructions):

CMPT 405. MATH 194-3 strongly recommended.

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

None. (Note that this course has previously been offered as a "Special Topics" course.)

2. Scheduling

How frequently will the course be offered? Once a year.

Semester in which the course will first be offered? Probably 83-3 (if new text available)

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

A. Liestman and B. Bhattacharya

3. Objectives of the Course

This course considers the computational aspects of geometry within the framework of analysis of algorithms. It develops the mathematical techniques that are necessary for the design of efficient algorithms and applies them to a variety of theoretical and practical problems.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty

Staff

Library

Audio Visual

Space

Equipment

} None

A small amount of computer usage (MTS), less than for most upper division courses.

5. Approval

Date:

14 Nov 82

Dec. 2nd 1982

A. Curcane
Department Chairman

S. M. Vandenberg
Dean

Chairman, SCUS

CMPT 406 - Computational Geometry

COURSE OUTLINE

1. Mathematical preliminaries

model of computation; introductory metric topology and euclidean n-space; structure of euclidean n-space;

2. Convex hull algorithms

general geometry of convex bodies; convex hull algorithms of Graham, Shamos, Chand et al and their analyses;

3. Intersection problem

Intersection of convex polygons, star-shaped polygons, line segments, rectangles, half-planes, half-spaces; linear time solution of linear programming problem of two and three variables;

4. Closest-point problem

problems; closest pair, nearest-neighbor search, k-nearest neighbors, smallest enclosing circle, largest enclosing circle; construction of Voronoi diagram and its applications;

TEXTS

1. Preparata, F.P. and Shamos, M.I., "Computational Geometry", In Press (to be published in Fall, 1983).
2. Grunbaum, B., "Convex polytopes", Interscience publishers, 1967.
3. Shamos, M.I., "Computational Geometry", Ph.D. Thesis, Yale University, 1977.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES
NEW COURSE PROPOSAL FORM

Calendar Information

Department: Computing Science

Abbreviation Code: CMPT Course Number: 411

Credit Hours: 3 Vector: 3-0-0

Title of Course: Artificial Intelligence Topics

Calendar Description of Course:

This course investigates two central topics of Artificial Intelligence (i) the application of logic to problem-solving and computer programming; and (ii) computational approaches to image understanding.

Nature of Course Lecture

Prerequisites (or special instructions):

CMPT 201-4 and CMPT 205-3. CMPT 410-3 recommended.

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

None. (Note that this course has previously been offered as a "Special Topics" course.)

2. Scheduling

How frequently will the course be offered? Annually

Semester in which the course will first be offered? 83-3

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

Dr. V. Dahl and Dr. B.V. Funt

3. Objectives of the Course

Artificial Intelligence is one of the important fields in Computing Science and there is too much material to be handled in one course.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty
Staff
Library
Audio Visual
Space

} None

Equipment MTS computer time. Student access to a raster graphics terminal would be desirable.

5. Approval

Date: 16 Nov 82 Dec. 2nd 1982

N. Carcone
Department Chairman

S. V. Dahl
Dean

[Signature]
Chairman, SCUS

Course Outline

I. Logic Programming

- a) Introduction. The clausal form of logic. Universe of discourse, interpretations, inconsistency. Horn clauses.
- b) Representation in clausal form. Representing thought through logic clauses. Clausal form vs. semantic networks and databases. High-level data queries, natural language.
- c) Top-down and bottom-up proof procedures. Top-down and bottom-up inference, substitution and matching. Resolution. Correctness and completeness of inference systems.
- d) Prolog: a language for logic programming. Procedural interpretation of Horn clauses. Non-determinism. Algorithm: logic plus control.
- e) Applications. Problem-solving. Plan-formation and the frame problem. High level querying and defining data base features. Natural language processing. Default reasoning.

II. Computer Vision

a) Introduction

The nature of the machine perception problems. Relation to human perception. Digitized images. Constraint based approaches.

b) Line-Drawing Interpretation

Robert's early work.
Huffman-Clowes line labels.
Weltz's shadow constraints.

c) Representations

2 1/2 D sketch;
intrinsic images; primal sketch;
generalized cones.

d) Low-level vision

Extraction of surface shape from image intensity data.
Shape from shading, optical flow, stereoscopic matching,
occluding contours and texture.

SIMON FRASER UNIVERSITY

MEMORANDUM

Dr. G. Bhakthan, Chairman

From..... Dr. R. Harrop, Chairman

Undergraduate Curriculum Committee

..... Undergraduate Curriculum Committee

Subject..... Proposal for Course Title,
Description, & Prerequisite Change

Date..... November 16, 1982

Computing Science Department

Present Calendar Entry:

CMPT 301-3 System Development Methodology

Gives the student detailed knowledge concerning the accepted methods used to develop computer application systems. Topics covered include system definition study, preliminary design, human engineering, database logical and physical design, data communications, security subsystems, coding, debugging, testing, system conversion, implementation and operation.

(Lecture/Tutorial)

Prerequisite: CMPT 201-4.

Students with credit for CMPT 301 under its former title may not take this course for further credit.

Proposed Entry:

CMPT 301-3 INFORMATION SYSTEMS MANAGEMENT

The student is oriented to the role, application and structure of Data Processing within an organization. Each component of a typical Data Processing Department is analyzed with respect to general purpose, specific tasks, and personnel requirements.

Prerequisite: CMPT 201-4

(lecture)

Students with credit for CMPT 301 under its

former title may not take this course for further credit.

Rationale:

The change takes into account a change on emphasis which has occurred in the course since the original description was approved.

RS

SIMON FRASER UNIVERSITY

MEMORANDUM

To..... Dr. G. Bhakthan, Chairman
..... Undergraduate Curriculum Committee
Subject..... Proposal for Course Title,
..... Description & Prerequisites Change

From..... Dr. R. Harrop, Chairman
..... Undergraduate Curriculum Committee
Date..... November 16, 1982

Computing Science Department

Present Calendar Entry:

CMPT 401-3 Software Architecture

The second semester of the hardware-software architecture sequence. Topics include evolution of operating systems, multiprogramming and time-sharing, concurrent processes, process co-operation, deadlocks and scheduling algorithms. (Lecture)

Prerequisite: CMPT 201-4, 205-3.

Proposed Entry:

CMPT. 401-3 OPERATING SYSTEMS

Discusses important concepts in modern operating systems. Topics include multiprogramming and multiprocessing, processes, semaphores and other synchronization primitives, memory management, process management, resource management, deadlocks, file systems.

Prerequisite: CMPT 201-4, 205-3, 400-3. (Lecture)

CMPT 393-4 is recommended.

Students with credit for CMPT 401 under its former title may not take this course for further credit.

Rationale:

The change takes into account a change on emphasis which has occurred in the course since the original description was approved.

RAH

SIMON FRASER UNIVERSITY

MEMORANDUM

Dr. G. Bhakthan, Chairman	From..... Dr. R. Harrop, Chairman
Undergraduate Curriculum Committee	Undergraduate Curriculum Committee
Subject..... Proposal for Course Title, Credit & Prerequisite Change	Date..... November 16, 1982

Computing Science Department

Present Calendar Entry:

CMPT 410-4 Artificial Intelligence

Provides a unified discussion of the fundamental approaches to the problems in artificial intelligence. The topics considered are: representational typology and search methods; game playing; heuristic programming; pattern recognition and classification; theorem-proving; question-answering systems; natural language understanding; computer vision. (Lecture/Tutorial)

Prerequisites: CMPT 201-4 and 205-3.

Proposed Entry:

CMPT. 410-3 ARTIFICIAL INTELLIGENCE SURVEY

Prerequisites: CMPT 201-4 and 205-3. (Lecture)

Students with credit for CMPT 410 under its former title may not take this course for further credit.

Rationale:

The change in credit hours is due to the deletion of the project from the course, a change which is connected with, and contingent on the introduction of the new course CMPT 411 which has this course (CMPT 410) as prerequisite.