

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Senate

From: J.W.G. Ivany
Chair, SCAP

Subject: School of Computing Science -
Curriculum changes

Date: November 17, 1988

Action undertaken by the Senate Committee on Academic Planning/Senate Committee on Undergraduate Studies gives rise to the following motion:

Motion:

that Senate approve and recommend approval to the Board of Governors curriculum changes in the School of Computing Science as set forth in S.88-46 including:

New courses -	CMPT 300-3	Operating Systems I
	CMPT 414-3	Model-Based Computer Vision

Deletion -	CMPT 404-3	Computer System Measurement and Evaluation
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SIMON FRASER UNIVERSITY

MEMORANDUM

SCUS 88-24

Faculty of Applied Science
Undergraduate Curriculum Committee

James J. Weinkam
From..... Undergraduate Director.....
School of Computing Science.

Subject.....

May 18, 1988
Date.....

The attached curriculum changes have been approved by the School of Computing Science Undergraduate Curriculum Committee and are forwarded to the Faculty of Applied Sciences Undergraduate Committee for approval.

The purpose of these changes is to reorganize the courses dealing with operating systems in order to introduce the material at an earlier stage and eliminate a bottleneck in the Computing Systems area of our Undergraduate Program.

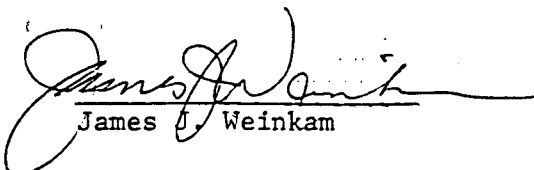
Summary of Changes

The present CMPT 401 has been reorganized as two courses CMPT 300 and CMPT 401. CMPT 300 introduces the major principle underlying modern operating systems, especially topics such as process synchronization, multiprogramming, and memory management that are needed for other courses both in Computing Science and in other disciplines. It also includes a more thorough treatment of command languages, file systems, and the history of operating systems than is possible in the current course.

The revised CMPT 401 builds on this foundation to cover more advanced topics including advanced methods of process synchronization, distributed systems, and computer security. In addition, a section queuing models of computers system and their analysis and application to performance measurement and evaluation is included, and CMPT 404 is being dropped from the calendar.

Finally the prerequisite for CMPT 402 is being changed from CMPT 401 to CMPT 300.

JJW/dc


James J. Weinkam

MAY 20 1988
FACULTY OF
APPLIED SCIENCES

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: COMPUTING SCIENCE

Credit Hours: 3 Vector: 3-0-0

Abbreviation Code: CMPT Course Number: 300

Title of Course: ~~INTRODUCTION TO~~ OPERATING SYSTEMS I

Calendar Description of Course:

This course aims to give the student an understanding of what a modern operating system is and the services it provides. It also discusses some basic issues in operating systems and provides solutions. Topics include multiprogramming, process management, memory management, and file systems.

Nature of Course LECTURE

Prerequisites (or special instructions):

CMPT 201, 205

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

2. Scheduling

How frequently will the course be offered? Every semester

Semester in which the course will first be offered? 89-3

Which of your present faculty would be available to make the proposed offering possible? Atkins, Kameda, Delgrande

3. Objectives of the Course

To give the student an understanding of what a modern operating system is, what it does and how it provides its services.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty	<u>None</u>
Staff	<u>None</u>
Library	<u>None</u>
Audio Visual	<u>None</u>
Space	<u>None</u>
Equipment	<u>None</u>

5. Approval

Date: 8/5/13

James White
Department Chairman

[Signature]
Dean

11/15/88
[Signature]
Chairman, SCUS

CMPT300-3 Introduction to Operating Systems

This course aims to give the student an understanding of what a modern operating system is and the services it provides. It also discusses some basic issues in operating systems and provides solutions. Topics include multiprogramming, process management, memory management, and file systems.

Prerequisites: CMPT201, CMPT205

- (1) **Introduction (1 wk)**
History of operating systems, Batch, interactive and real time processing, multiprogramming and multiprocessing, review of hardware architectures
- (2) **Operating System Services (1.5 wks.)**
Command language user's view, System call user's view, relocation, loading, linking, input/output processing
- (3) **Process Synchronization (2 wks.)**
Processes, critical section, deadlock and starvation, semaphores, producer-consumer problem, monitors.
- (4) **Multiprogramming (2 wks.)**
Process control block, process status, state transitions, OS nucleus, process management, resource descriptor, resource management, job and process scheduling, priorities.
- (5) **Memory Management (2 wks.)**
Contiguous allocation, first-fit and best-fit algorithms, paging, FIFO and LRU replacement policies,
- (6) **File Systems (1.5 wks.)**
Disk systems, file operations, access methods, allocation methods, directory system
- (7) **Case Studies (2 wks.)**
Unix, MS DOS, VMS

Possible Textbooks:

- (1) M. Milenkovic, "Operating Systems Concepts and Design," McGraw-Hill, 1987.
- (2) J. Peterson and A. Silberschatz, "Operating System Concepts", Alternate Edition, Addison-Wesley, 1988.
- (3) L. Bic and A.C. Shaw, "The Logical Design of Operating Systems," 2nd Edition, Prentice-Hall, 1988.

Work involved:

One or more projects which provide hands-on experience on a real operating system. Projects will be marked and count towards the final mark.

NEW COURSE PROPOSAL FORM

1. Calendar InformationDepartment: COMPUTING SCIENCEAbbreviation Code: CMPT Course Number: 414Credit Hours: 3 Vector: Title of Course: MODEL-BASED COMPUTER VISION

Calendar Description of Course:

This course covers various topics in computer vision with the emphasis on the model-based approach. Main subjects include 2-D and 3-D representations, matching, constraint relaxation, model-based vision systems. State-of-the-art robot vision systems will be used extensively as study cases. The solid modelling and CAD aspects of this course should also interest students of computer graphics.

Nature of Course LECTURE

Prerequisites (or special instructions):

MATH 152 and nine credits in CMPT upper division courses, or permission of the instructor.

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

Frequency of offering of CMPT 412 may be reduced.

2. Scheduling

How frequently will the course be offered? Once per year

Semester in which the course will first be offered? SPRING 1990

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

Dr. Z.N. Li, Dr. B.V. Funt

3. Objectives of the Course

The objective of this course is to give students good exposures to the state-of-the-art model-based computer vision technology. It will provide students with unique experience in understanding the problems and approaches for robot vision systems.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty Adequate

Staff Adequate

Library Library has all the reference materials

Audio Visual Adequate

Space Computer Science's instructional lab is adequate.

Equipment

5. Approval

Date: October 5, 1988

11/15/88

[Signature]
Department Chairman

[Signature]
Dean

[Signature]
Chairman, SCUS

CMPT 414 Model-based Computer Vision

Course Outline

This course covers various topics in computer vision with the emphasis on the model-based approach. Main subjects include 2-D and 3-D representations, matching, constraint relaxation, model-based vision systems. Since most state-of-the-art robot vision systems are model-based, they will be used extensively as study cases.

Prerequisite: MATH-152 and nine credits in CMPT upper division courses, or permission of the instructor.

Grading: Several programming and written assignments, a midterm, and a Final.

TOPICS

1. Introduction

- History • Levels of representation — both model-based and image-based

2. Representations — Modeling

2.1. 2-D Object Representations

- Chain Codes, B-splines, Medial Axis Transform (MAT), Quad trees, etc.

2.2. 3-D Object Representations

- 2½ D sketch, Extended Gaussian Images (EGI), Generalized cylinders, Constructive Solid Geometry (CSG), etc.

3. Matching

- Decision trees [Winston] • Graph-theoretic Algorithms • Dynamic Programming

4. Constraint Relaxation

- Understanding line-drawings (Waltz's Algorithm, etc.) • Rosenfeld-Hummel-Zucker method • Hierarchical (pyramidal) relaxation

5. Model-based Vision Systems

- Model-based recognition [Chin & Dyer86] • Acronym [Brooks] • Robot navigation and obstacle avoidance • CAD-based robot vision

Textbook: D.H. Ballard and C.M. Brown, "Computer Vision", Prentice-Hall, 1982.

Reference Books:

- R.A. Brooks, "Model-based Computer Vision", UMI Research Press, 1984.
- M.A. Fischler and O. Firschein, "Readings in Computer Vision", Morgan Kaufmann, 1987.
- B.K.P. Horn, "Robot Vision", McGraw-Hill, 1986.
- M. Levine, "Vision in Man and Machine", McGraw-Hill, 1985.
- D. Marr, "Vision", W.H. Freeman, 1982.
- T. Pavlidis, "Algorithms for Graphics and Image Processing", Computer Science Press, 1982.
- A. Rosenfeld and A.C. Kak, "Digital Picture Processing" (2nd ed.), Academic Press, 1982.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

REVISION ~~to~~ COURSE PROPOSAL FORM

Department: COMPUTING SCIENCE

Credit Hours: 3 Vector: 3-0-0

1. Calendar Information

Abbreviation Code: CMPT Course Number: 401

Title of Course: OPERATING SYSTEMS Change to: Operating Systems II

Calendar Description of Course:

This second course on operating systems studies in depth some of the issues introduced in CMPT 300, as well as new, more advanced topics in modern operating systems. Topics include language constructs for concurrency, deadlocks, virtual machines, distributed systems, distributed concurrency control, security and protection, performance evaluation.

Nature of Course LECTURE

Prerequisites (or special instructions):

CMPT 300, CMPT 390

What course (courses), if any, is being dropped from the calendar if this course is approved: CMPT 404

2. Scheduling

How frequently will the course be offered? Twice per year

Semester in which the course will first be offered? 90-1

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

3. Objectives of the Course

To build on the introduction from CMPT 300 and introduce the student to more advanced concepts in operating systems including distributed systems and the problems of concurrency control, security, and protection that arise in such systems.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty None

Staff None

Library None

Audio Visual None

Space None

Equipment None

5. Approval

Date: 88/05/13

James J. Weir
Department Chairman

John Kameda
Dean

11/15/88
R. S. Smith
Chairman, SCUS

CMPT401-3 Operating Systems II

This second course on operating systems studies in depth some of the issues introduced in CMPT300, as well as new, more advanced topics in modern operating systems. Topics include language constructs for concurrency, deadlocks, virtual machines, distributed systems, distributed concurrency control, security and protection, performance evaluation.

Prerequisites: CMPT300, CMPT390.

- (1) **Introduction**
Review of processes.
- (2) **Process synchronization**
Event count and sequencers, Interprocess communication, message passing.
- (3) **Language constructs for concurrency**
Object model, monitors, path expressions, communicating sequential processes, Ada programming constructs.
- (4) **Distributed Systems**
Layered structures, distributed process management, distributed database system, concurrency control.
- (5) **Virtual Memory**
Stack algorithms, Working sets, Clock algorithms, paging performance.
- (6) **Computer Security**
Mechanisms and policies, access matrix, implementation, security.
- (7) **Queuing Model of Computer Systems**
Single queue, networks of queues, job flow analysis, system response time, bottleneck analysis.
- (8) **Case Studies**
SUN-NFS system, UNIX.

Possible Textbook

Maekawa, Oldehoeft and Oldehoeft, "Operating Systems - Advanced Concepts," Benjamin/Cummings, 1987.

References

Ferrari, G.Serazzi and A.Zeigner, "Measurement and Tuning of Computer Systems" Prentice-Hall, 1983.

PREREQUISITE CHANGE ONLY
SENATE COMMITTEE ON UNDERGRADUATE STUDIES
CHANGE
COURSE PROPOSAL FORM

Calendar Information

Abbreviation Code: CMPT Course Number: 402

Department: COMPUTING SCIENCE

Credit Hours: 3 Vector:

Title of Course: OPERATING SYSTEM SOFTWARE LABORATORY

Calendar Description of Course:

Nature of Course

Prerequisites (or special instructions):
CMPT 300

Students with credit for CMPT 393 may not take CMPT 402 for further credit.

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

2. Scheduling

How frequently will the course be offered?

Semester in which the course will first be offered?

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

3. Objectives of the 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

Equipment

5. Approval

Date: 88/05/18

James F. ...
Department Chairman

Dean
Dean

4/15/88
R. Smith
Chairman, SCUS

School of Computing Science

Summary of changes to Lower Level Courses

Current

CMPT 100-3 Structured BASIC Programming and Software packages for Business Administration Students

Introduction to the fundamentals of computer operation and computer programming. Basic steps in entering, saving, retrieving, editing and running programs using WATERLOO BASIC on MTS. The class will explore the techniques used in designing and implementing simple computer programs and will have an opportunity to run user-oriented business software packages.

CMPT 101-4 Introduction to a High Level Programming Language A

An intensive introduction to high level programming in a modern programming language. Review of fundamental programming concepts, including integer and real numbers as data objects, variables, assignment, conditional statements and loops. The concept of an algorithm. Structured programming using subprograms, modules, and recursion. Structured data objects including arrays, strings, and records. Program and user documentation.

For Computing Science majors/honors students

Prerequisites: B.C. High School Algebra 12 (or equivalent) or MATH 100-3, and B.C. High School Computer Science 11 (or 12) with a grade of B or higher, or CMPT 001, or equivalent computing experience (with permission of the department). Students with credit for CMPT 100, 102, or 103 may not take CMPT 101 for further credit.

CMPT 102-3 Introduction to Programming for Science Students

Students with credit for CMPT 100, 101, or 103 may not take CMPT 102 for further credit.

CMPT 103-4 Introduction to High Level Programming Language B

Students with credit for CMPT 100, 101, or 102 may not take CMPT 103 for further credit.

Proposed

CMPT 100-3 Structured BASIC Programming and Software Packages

Introduction to the fundamentals of computer operation and computer programming. Basic steps in entering, saving, retrieving, editing and running programs using BASIC will be introduced. The class will explore the techniques used in designing and implementing simple computer programs and will have an opportunity to run user-oriented software packages.

CMPT 101-4 Modula 2

An intensive introduction to Modula 2 for the student with considerable previous computing experience. Review of fundamental programming concepts, including integer and real numbers as data objects, variables, assignment, conditional statements and loops. The concept of an algorithm. Structured programming using subprograms, recursion, modules, and libraries. Structured data objects including arrays, strings, and records. Program and user documentation.

Prerequisites: A minimum grade of B in B.C. High School Algebra 12 or MATH 100 (or equivalent) and B.C. High School Computer Science 12 (or equivalent) or equivalent programming experience with Pascal.

Students with credit for CMPT 102, 103, or 104 may not take CMPT 101 for further credit.

CMPT 102-3 Introduction to FORTRAN for Science Students

Students with credit for CMPT 101, 103, or 114 may not take CMPT 102 for further credit.

CMPT 103-3 Introduction to Pascal Programming

Students with credit for CMPT 101, 102, or 115 may not take CMPT 103 for further credit.

Rationale

Although examples and assignments are business oriented, the actual course content is of general applicability. Since the Faculty of Business Administration is dropping the requirement that all business students take this course, references to business in the title and course description are being deleted.

Which version of BASIC is used is irrelevant; Present plans call for teaching this course using a micro computer laboratory.

Modula 2 has been the only language taught in this course for the past two years. The other wording changes are intended to express more clearly the fact that this course is intended for the well prepared student and that other students should take CMPT 102 or 103.

The prerequisite changes are designed to ensure that only students with adequate preparation are eligible to enter the course.

Students with CMPT 100 may now take this course.

Title is being changed to reflect the fact that FORTRAN is the language taught.

Students with CMPT 100 may now take this course.

Title is being changed to reflect the fact that Pascal is the only language taught in this course. Credit (and workload) reduction makes this course consistent with CMPT 102. Credit for CMPT 104 is being increased to compensate.

Students with CMPT 100 may now take this course.

Current**CMPT 104-1 Introduction to High Level Programming Language I**

*Prerequisites: CMPT 102 or 103 with a grade of B or higher.
Students may not receive credit for more than one of CMPT 104, 111, 112, 113, 114, or 115. The student must select a different language from that studied previously.*

CMPT 111-1 Introduction to a Second Programming Language - COBOL

*Prerequisites: CMPT 101
Students may not receive credit for more than one of CMPT 104, 111, 112, 113, 114, or 115. This course may not be taken for credit if the student has studied COBOL in a previous course.*

CMPT 112-1 Introduction to a Second Programming Language - C

*Prerequisites: CMPT 101
Students may not receive credit for more than one of CMPT 104, 111, 112, 113, 114, or 115. This course may not be taken for credit if the student has studied C in a previous course.*

CMPT 113-1 Introduction to a Second Programming Language - PL/I

*Prerequisites: CMPT 101
Students may not receive credit for more than one of CMPT 104, 111, 112, 113, 114, or 115. This course may not be taken for credit if the student has studied PL/I in a previous course.*

CMPT 114-1 Introduction to a Second Programming Language - FORTRAN

*Prerequisites: CMPT 101
Students may not receive credit for more than one of CMPT 104, 111, 112, 113, 114, or 115. This course may not be taken for credit if the student has studied FORTRAN in a previous course.*

CMPT 115-1 Introduction to a Second Programming Language - PASCAL

*Prerequisites: CMPT 101
Students may not receive credit for more than one of CMPT 104, 111, 112, 113, 114, or 115. This course may not be taken for credit if the student has studied PASCAL in a previous course.*

Proposed**CMPT 104-2 Introduction to Modula 2 as a Second High Level Programming Language**

*Prerequisites: CMPT 102 or 103.
Students with credit for CMPT 101 may not take CMPT 104 for further credit.*

CMPT 111-1 Introduction to an Additional Programming Language - COBOL

*Prerequisites: CMPT 101, 102 or 103.
Students may not receive credit for more than two of CMPT 111, 112, 113, 114, or 115. This course may not be taken for credit if the student has studied COBOL in a previous course.*

CMPT 112-1 Introduction to an Additional Programming Language - C

*Prerequisites: CMPT 101, 102 or 103.
Students may not receive credit for more than two of CMPT 111, 112, 113, 114, or 115. This course may not be taken for credit if the student has studied C in a previous course.*

CMPT 113-1 Introduction to an Additional Programming Language - PL/I

*Prerequisites: CMPT 101, 102 or 103.
Students may not receive credit for more than two of CMPT 111, 112, 113, 114, or 115. This course may not be taken for credit if the student has studied PL/I in a previous course.*

CMPT 114-1 Introduction to an Additional Programming Language - FORTRAN

*Prerequisites: CMPT 101, 102 or 103.
Students may not receive credit for more than two of CMPT 111, 112, 113, 114, or 115. This course may not be taken for credit if the student has studied FORTRAN in a previous course.*

CMPT 115-1 Introduction to an Additional Programming Language - Pascal

*Prerequisites: CMPT 101, 102 or 103.
Students may not receive credit for more than two of CMPT 111, 112, 113, 114, or 115. This course may not be taken for credit if the student has studied Pascal in a previous course.*

Rationale

Title change reflects the fact that Modula 2 is the only language taught. Credit increase reflects the fact that the additional concepts relating to modular program development and abstract data types covered in this course deserve more than one credit. Credit for CMPT 103 has been reduced to compensate. This change also treats CMPT 102 and 103 students in a uniform manner.

For CMPT 111-115, changes reflect the fact that more than one of these courses may be taken