

MEMORANDUM

As amended at Senate - Jan. 10/83

To.....Senate.....

From..Office of the Dean of Graduate Studies

.....
Graduate Curriculum Changes -
Subject: Change in title for CMPT 820.....
Change in description for CMPT 821

Date.....December 22, 1982.....

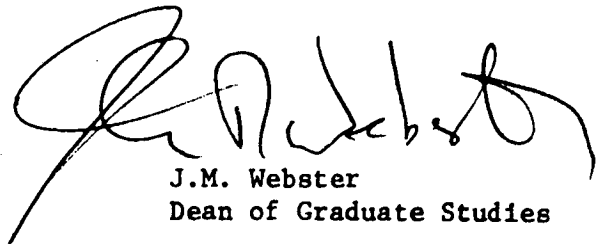
New Course Proposals - CMPT 822-3,
CMPT 842-3, CMPT 851-3 and CMPT 852-3

Action undertaken by the Executive Committee, Senate Graduate Studies Committee at its meeting on December 13, 1982, gives rise to the following motion:-

MOTION:

"That Senate approve and recommend approval to the Board of Governors, as set forth in S.83-23, the change in title for CMPT 820, the change in description for CMPT 821 and the following new course proposals:

CMPT 822-3
CMPT 842-3
CMPT 851-3
CMPT 852-3"


J.M. Webster
Dean of Graduate Studies

mm/

Following changes (from 3 to 7) in Special
Topics:

- Special Topics in Theoretical Computing Science
- Special Topics in Artificial Intelligence
- Special Topics in Programming Languages
- Special Topics in Database Systems
- Special Topics in Computer Architecture
- Special Topics in Operating Systems
- Special Topics in Hardware Design"

SIMON FRASER UNIVERSITY

MEMORANDUM

To.....Mr. H.M. Evans, Registrar and
Secretary to the Senate
.....Committee on Graduate Studies.

From.....Janet Blanchet.....
Administrative Assistant,
.....Faculty of I.D.S.....

Subject, NEW GRADUATE COURSE PROPOSALS
AND CURRICULUM CHANGES,

Date.....November 3, 1982.....

COMPUTING SCIENCE

At a meeting of the Faculty of Interdisciplinary Studies Graduate Studies Committee members of the committee reviewed and approved the following curriculum changes and new course proposals as set forth in the attached documentation:

Special Topics

Three existing Special Topics course titles have been modified to show greater specificity.
Four new Special Topics courses have been added to the curriculum.

Title Change

Existing title: CMPT 820-3, Heuristic Programming.
Proposed title: CMPT 820-3, Artificial Intelligence.

Course Description Change

Existing description:

CMPT 821-3, Pattern Recognition and Image Processing.
The representation of patterns and images; filtering and image enhancement; simple discrimination algorithms; statistical and structural approaches; applications in medicine, earth resources, etc.

Proposed description:

CMPT 821-3, Pattern Recognition and Image Processing.
The representation of patterns and images; basic image processing techniques; discrimination algorithms; statistical, structural and syntactical approaches; applications in medicine, earth sciences, etc.

New Course Proposals

CMPT 822-3, Computational Vision.
CMPT 842-3, Distributed Computing.
CMPT 851-3, Reliable and Fault-Tolerant Computing.
CMPT 852-3, VLSI System Design.

Mr. H.M. Evans, Registrar and
Secretary to the Senate Committee
on Graduate Studies

New Graduate Course Proposals and
Curriculum Changes,
Computing Science

November 3, 1982

Dr. S. Verdun-Jones, Acting Dean of Interdisciplinary Studies, has held discussions with Dr. J. Chase, Secretary to the Senate Committee on Academic Planning, and Mr. H.M. Evans, Secretary to the Senate Committee on Graduate Studies, and it has been ascertained that the changes incorporated in the foregoing do not constitute a major program proposal, and therefore there is no need to route them via the Senate Committee on Academic Planning.

Would you please place these items on the agenda of the Senate Committee on Graduate Studies.

JB/rj

A. T. Blanchet.

SIMON FRASER UNIVERSITY

MEMORANDUM

To..... Dr. John Chase, Secretary of SCAP....
.....
Subject..... Computing Science Graduate.....
Course Proposals

From..... Dr. S.N. Verdun-Jones,
Acting Dean,
Faculty of I.D.S.....
Date..... 1982-10-24.....

Our File No. 1G2(a)

I am forwarding copies of the proposed changes in the graduate course structure of the Computing Science Department. At the present time, I am requesting that you peruse these proposals in order to establish whether or not they constitute "major" changes and, therefore, require in-principle approval by SCAP.

The proposed graduate course changes include the following:

1. Expanding the number of special topics courses from three to seven and assigning special topics course no.'s to particular areas in Computing Science.
2. Changing one course title
3. Changing one course description
4. Introduction of four new courses

The Computing Science Department has emphasized that the mounting of four new courses will not require additional resources. In fact, the proposed new courses have been offered in the past as special topics courses. In my submission, the proposed changes represent "fine tuning" of an existing graduate program and, therefore, should not be categorized as "major" changes.


Simon N. Verdun-Jones

SVJ:mf

cc: Dr. N. Cerccone,
Computing Science

Dr. W.S. Luk,
Chairman,
Graduate Program Cmtee.
Computing Science

SIMON FRASER UNIVERSITY

MEMORANDUM

To Dr. S. Verdun-Jones, Acting Dean

From W.S. Luk, Chairman
Graduate Studies Committee
Computing Science

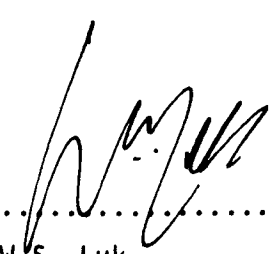
Interdisciplinary Studies

Subject New Graduate Course Proposals

Date 20 October 1982

Since our graduate program was first proposed four years ago, it has undergone only one minor revision. Meanwhile, there have been a great number of changes related to our graduate program. First of all, our graduate program has become more mature. We now have more experience in actually running our own graduate program. Our graduate enrollment at the Master's level is growing. Our Ph.D. program is just in place and already there are Ph.D. students in the Department. Perhaps more importantly, some of the faculty members have since left the Department and many more have since joined us. This year, half of the graduate courses in our Department are being or will be offered as special topics courses. Some other graduate courses are being taught quite differently from the calendar descriptions. Naturally there is a lot of confusion for the instructors and the students alike. To rationalize, we are proposing new courses that are currently taught as special courses and modifying course titles and descriptions of some existing graduate courses. From the viewpoint of attracting new graduate students, it is also important to bring our graduate curriculum up-to-date in a discipline as dynamic as computing science.

We would like to emphasize that the attached course proposals do not constitute a major shift in direction in our graduate program and no additional resources are required to mount these proposed courses.


.....
W.S. Luk

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Attachments

- list of course changes
- four course proposals

1) Renumbering special topics courses:

Existing: CMPT 881 Special Topics
CMPT 882 Special Topics
CMPT 883 Special Topics

Proposed: CMPT 881 Special Topics in Theoretical Computing Science
CMPT 882 Special Topics in Artificial Intelligence
CMPT 883 Special Topics in Programming Languages
CMPT 884 Special Topics in Database Systems
CMPT 885 Special Topics in Computer Architecture
CMPT 886 Special Topics in Operating Systems
CMPT 887 Special Topics in Hardware Design

2) Changing course title:

Existing: CMPT 820-3 Heuristic Programming
Heuristic problem solving; planning; concept formation; game playing and decision making; theorem proving and heuristic strategies; perception and vision; question-answering; comprehension of natural language.

Proposed: CMPT 820-3 Artificial Intelligence

3) Changing course description:

Existing: CMPT 821-3 Pattern Recognition and Image Processing
The representation of patterns and images; filtering and image enhancement; simple discrimination algorithms; statistical and structural approaches; applications in medicine, earth resources, etc.

Proposed: CMPT 821-3 Pattern Recognition and Image Processing
The representation of patterns and images; basic image processing techniques; discrimination algorithms; statistical, structural and syntactical approaches; applications in medicine, earth sciences, etc.

SIMON FRASER UNIVERSITY

MEMORANDUM

To.....	Dr. Wo-Shun Luk.....	From.....	Maurice Deutsch.....
	Computing Science.....		Library - Sciences.....
Subject.....		Date.....	82/10/27.....

With regard to the proposed changes in the 880 series of graduate level Special Topics courses and the four proposed new graduate courses (822, 842, 851, 852) the Library can provide adequate monograph and periodical resources. The two Blackwell computerized book profiles automatically retrieved practically all of the English language monographic material dealing with computers, computing science, hardware, software, and related fields. There is a growing body of indexing and abstracting publications and services available in the Library, both in printed and computer searchable forms. (Attached is a brief one page description of availability of computer searching services in the Library). Material not available at SFU can usually be borrowed or photocopied from UBC or elsewhere in Canada or the U.S.

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A handwritten signature in black ink, appearing to be 'Ma' followed by a long horizontal stroke.

New Graduate Course Proposal FormCALENDAR INFORMATION:Department: Computing Science Course Number: 822Title: Computational VisionDescription: A seminar based on the Artificial Intelligence approach to vision.(continued
Computational vision has the goal of discovering the algorithms (on attached....Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: _____ENROLLMENT AND SCHEDULING:Estimated Enrollment: 10 When will the course first be offered: 83-1How often will the course be offered: once every four or five semestersJUSTIFICATION:Computational vision is a major area of Artificial Intelligence and an active
research area in the Computing Science Department.RESOURCES:Which Faculty member will normally teach the course: Dr. Brian V. FuntWhat are the budgetary implications of mounting the course: NoneAre there sufficient Library resources (append details): Research papers will be provided
by the instructor.Appended: a) Outline of the Course
b) An indication of the competence of the Faculty member to give the course.
c) Library resourcesApproved: Departmental Graduate Studies Committee: [Signature] Date: Oct 22, '82Faculty Graduate Studies Committee: [Signature] Date: Nov 1 1982

Faculty: _____ Date: _____

Senate Graduate Studies Committee: _____ Date: _____

Senate: _____ Date: _____

Description continued:

and heuristics which allow a two-dimensional array of light intensities to be interpreted as a three-dimensional scene. By reading and discussing research papers -- starting with the original work on the analysis of line-drawings, and ending with the most recent work in the field -- participants begin to develop a general overview of computational vision, and an understanding of the current research problems.

APPENDIX A -- Outline of the Course

CMPT 822 proposal

Early Work

- L.G. Roberts, Machine perception of three-dimensional solids
- A. Guzman, Decomposition of a visual scene into three-dimensional bodies
- G. Falk, Interpretation of imperfect line data as a three-dimensional scene

Edge-detection and Region Growing

- C.R. Brice and C.L. Fennema, Scene analysis using regions
- Heuckel, A local visual operator which recognizes edges and lines

Gradient Space and Reflectance Map Techniques

- Mackworth, Interpreting pictures of polyhedral scenes
- Horn and Brachman, Using synthetic images to register real images with surface models
- T. Kanade, Recovery of the three-dimensional shape of an object from a single view
- B.K.P. Horn, Understanding image intensities

Scene Labelling

- Huffman, Impossible objects as nonsense sentences
- D. Waltz, Understanding line drawings of scenes with shadows

Representations: Primal Sketch, Intrinsic Images, 2½D sketch, Generalized Cones

- Marr, Representing visual information
- Barrow and Tenenbaum, Recovering Intrinsic Scene Characteristics from Images
- Nevatia and Binford, Description and recognition of curved objects

Parallel Processing

- Waltz, A parallel model for low-level vision
- B. Funt, Problem-solving with diagrammatic representations

Psychological Studies

- J. P. Frisby, Seeing: Illusion, Brain and Mind
- Land, The Retinex Theory of Color Vision
- Hudel and Wiesel, Brain Mechanisms of Vision
- D. Marr and T. Poggio, A computational theory of human stereo vision

Industrial Applications

- Perkins, Model-Based Vision System
- A.P. Ambler, H.G. Barrow, C.M. Brown, R.M. Burstall and R.J. Popplestone, A versatile system for computer-controlled assembly

New Graduate Course Proposal FormCALENDAR INFORMATION:

Department: Computing Science Course Number: 842
 Title: Distributed Computing
 Description: Parallel computation, network topology, communications protocols, ISO standards, data communication, local area networks, distributed operating systems and databases.
 Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: _____

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: _____ When will the course first be offered: 83-2
 How often will the course be offered: once per year

JUSTIFICATION:

With increased availability and quality, it is now practical to construct both local and long-haul networks reliably. There is an acute need for training students in this new emerging field to take advantage of the available new technology.

RESOURCES:

Which Faculty member will normally teach the course: T. Kameda, W.S. Luk
 What are the budgetary implications of mounting the course: none

Are there sufficient Library resources (append details): Research papers will be provided by the instructor.
 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: Oct. 22, '82
 Faculty Graduate Studies Committee: [Signature] Date: Nov 1 1982
 Faculty: _____ Date: _____
 Senate Graduate Studies Committee: _____ Date: _____
 Senate: _____ Date: _____

Syllabus for a proposed graduate course
in Distributed Computing -- CMPT 842

1. Introduction

Why distributed? Applications, design issues, protocol hierarchies

2. Network Topology

Different topologies, correctness, delay, capacities

3. Data Communication

Digital signal transmission, multiplexing, virtual circuit, packet switching, concentration

4. Protocols

Data link protocols, flow control engineering, host-to-host protocols, examples (ARPA, DECNET, SNA), ISO standards

5. The Communication Subset

Routing algorithms, congestion control, deadlock, broadcasting

6. Distributed Operating Systems and Databases

References

A.S. Tanenbaum "Computer Networks"

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: COMPUTING SCIENCE Course Number: 851
Title: Reliable and Fault-Tolerant Computing
Description: This course will cover fault-tolerance in hardware and software, viewing it as a powerful tool to assure the reliability and to provide continuous availability of computing systems. Existing fault-tolerant systems will also be studied.
Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: _____

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: _____ When will the course first be offered: _____
How often will the course be offered: Once a year

JUSTIFICATION: The objective of this course is to consider the issues related to diagnosing and locating failures in digital systems, and the related problem of design of ultra reliable systems: systems which do not fail despite the presence of physical defects, systems which diagnose their own failures, and systems which are easily tested. The often critical applications, and increased complexity of current systems makes this course well justified.

RESOURCES:

Which Faculty member will normally teach the course: H. Reghbati, T. Kameda, A. Liestman

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: Oct. 22, '82
Faculty Graduate Studies Committee: [Signature] Date: Nov 1 '82
Faculty: _____ Date: _____
Senate Graduate Studies Committee: _____ Date: _____
Senate: _____ Date: _____

RELIABLE AND FAULT-TOLERANT COMPUTING

Course Outline:

1. Approaches to Reliable Computing
 - Fault-Avoidance: Perfectionism in Hardware and Software
 - Fault-Tolerance: Reliability and Availability without Perfection
2. Specification of Fault-Tolerance
 - Fault Pathology: The Nature of Undesired Events
 - Basic Models and Quantitative Measures
 - Acceptance Criteria and Procedures
3. Principles of Protective Redundancy
 - Levels of Redundancy: Internal, Block, Network
 - Forms of Redundancy: Hardware, Software, Time
 - Functions of Redundancy: Masking, Detection, Recovery
4. Implementation: Fault-Tolerant System Case Studies
 - Long-Life Systems: JPL-Star and USAF FTSC
 - Spacecraft Computers
 - Real-Time Control: Space Shuttle; SIFT and FTMP Multiprocessors
 - High Availability: ESS Processors with On-Line Repair
 - Recent Advances: IBM, UNIVAC, INTEL, TANDEM, AUGUST, ETC.
 - Local Networks: Distributed System Issues
5. Evaluation and Design Tools
 - Advanced Modeling: Transient Faults
 - Degradability, Repair
 - Interactive Evaluation: The Aries 81 Design Tool
6. Fault-Tolerance in Software
 - The N-Version Programming and Recovery Block Approaches
 - Formal Specification: The "Hard Core" of Software
7. Conclusions and Prognosis: How Far Can We Go?

CMPT 851
Library Resources

TEXTS

1. D. Siewiorek et al., "The Theory and Practice of Reliable System Design", Digital Press, 1982.
2. J. Wakerly, "Error Detecting Codes, Self Checking Circuits and Applications", North Holland, 1978.
3. M. Breuer et al., "Diagnosis and Reliable Design of Digital Systems", Computer Science Press, 1976.
4. D. Pradhan, "Fault-Tolerant Computing: Theory and Techniques", Prentice-Hall, 1983.
5. A. Arizienis, "Principles of Fault-Tolerant Computing", to be published, 1983.

Some of the above texts which are not currently available in the library will be ordered. There are many journals and conference proceedings relevant to this area, most of which are available in the library. Students can get access to the other publications through "Interlibrary Loans". The personal holdings of Reghbati, Kameda, and Liestman is also of value.

New Graduate Course Proposal FormCALENDAR INFORMATION:

Department: Computing Science Course Number: 852
 Title: VLSI System Design
 Description: This course links two fields that traditionally have been considered two
separate entities: computer architecture and integrated circuit design. (continued on
 Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: attached

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: _____ When will the course first be offered: _____
 How often will the course be offered: once per year

JUSTIFICATION:

The objective of this course is to overcome the traditional separation between the
 computer architect and integrated circuit designer. In current technology, computer
 designers must be well versed in both fields -- computer architecture and design of
 .. (continued on attached)

RESOURCES:

Which Faculty member will normally teach the course: H. Reghbati, L. Hafer, R. Hobson
 What are the budgetary implications of mounting the course: none

Are there sufficient Library resources (append details): please see attached

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: Oct. 22, '82
 Faculty Graduate Studies Committee: [Signature] Date: Nov 1 1982
 Faculty: _____ Date: _____
 Senate Graduate Studies Committee: _____ Date: _____
 Senate: _____ Date: _____

New Graduate Course Proposal for CMPT 852

VLSI System Design

DESCRIPTION continued:

The vehicle used to demonstrate the interaction of layout issues and architectural concepts is metal oxide semiconductor technology.

JUSTIFICATION continued:

of integrated circuits -- in order to fully exploit the possibilities in VLSI chips.

VLSI SYSTEM DESIGN

Course Outline:

1. Introduction
2. Integrated Circuit Layout
 - Stick diagrams
 - Function mapping
 - Structured layouts
 - Modular cells
3. IC Processing and Relative Dimensions
 - MOS technology
 - Parametrized design rules
4. Physics of MOS transistors and Time Scale
 - MOS transistor operation
 - MOS circuit simulation
 - System timing
5. Hierarchical Circuit Modules
 - Logic cell family
 - Designing with module libraries
6. Existing Layout Tools
 - Hand layout and digitization
 - Interactive systems
7. Software Developments
 - Intermediate descriptive form
 - Human-oriented input language
 - Joint data base
 - High-level design tools
8. Constraints on Chip Design
 - I/O pins
 - Chip size and materials limitations
9. Reliability and Testing
 - Design for testability
 - Debugging integrated circuits
 - Test generation
10. Highly Concurrent Systems
 - Algorithms for VLSI processor arrays
 - Hierarchically organized machines
 - Highly concurrent structures

CMPT-852
Library Resources

TEXTS

1. C. Mead and L. Conway, "Introduction to VLSI Systems", Addison-Wesley, 1980.
2. S. Muroga, "VLSI System Design", Wiley-Interscience, 1982.

A copy of "Introduction to VLSI Systems" is available in the Library. A copy of "VLSI System Design" is being ordered for the library. The journals and conference proceedings in this area are available through the following sources:

1. Current holdings of the Library.
2. Interlibrary Loans
3. Personal holdings of: H. Reghbaty, L. Hafer, and R. Hobson.