SIMON FRASER UNIVERSITY

S.86-81

MEMORANDUM

To: Senate

From: Office of the Dean of Graduate Studies

Subject: New Graduate Courses - Cmpt 811-3, 812-3 and 813-3

Date: November 12, 1986

Action undertaken by the Senate Graduate Studies Committee, at its Meeting on November 10, 1986, gives rise to the following motion:

MOTION:

"That Senate approve and recommend approval to the Board of Governors, as set forth in S.86-81 , the proposed new graduate courses:

CMPT 811-3 Distributed Algorithms
CMPT 812-3 Parallel Computation
CMPT 813-3 Computational Geometry"

Bruce P. Clayman

B.P. Clayman
Dean of Graduate Studies.

mm/
attach.

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Marion McGinn, Graduate Studies Registrar's Office	From: Binay K. Bhattacharya Director, Graduate Program School of Computing Science
Subject: Graduate Course Proposals	Date: October 24, 1986

Please find enclosed 3 graduate course proposals (CMPT 811, CMPT 812, and CMPT 813) from the School of Computing Science to be incorporated in the 1987-88 Calendar.

Binay K. Bhattacharya

BKB:rcw

New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: Computing Science Course Number: 811

Title: Distributed Algorithms

Description: The course is primarily concerned with distributed algorithms that have been proposed in recent years. Several models of distributed computing will be discussed.

Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any:

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 10 When will the course first be offered: 87-3

How often will the course be offered: Annually or on demand.

JUSTIFICATION:

Distributed computing is an important recent development in Computing Science. This course deals with the design and analysis of algorithms in several models of distributed computation.

RESOURCES:

Which Faculty member will normally teach the course: Dr. A.L. Liestman, Dr. J.G. Peters

What are the budgetary implications of mounting the course: None

Are there sufficient Library resources (append details): 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: Brian K. Bhattacharya Date: 21/10/86

Faculty Graduate Studies Committee: M V Savage Date: 21 Oct '86

Faculty: D. A. George for T. Blanchet Date: Oct 24/86

Senate Graduate Studies Committee: B P Clay Date: 13 Nov 86

Senate: Date:

CMPT 811 DISTRIBUTED ALGORITHMS

Course Outline

Week

1. Introduction to the models of distributed computing.
2. Election in unidirectional rings.
3. Election in bidirectional rings.
4. Election in complete networks.
5. Election - lower bounds.
6. Echo algorithms.
7. Minimum spanning tree algorithms.
8. Median finding/selection.
9. Ranking/sorting.
10. Adaptive algorithms.
11. Eventually connected networks.
12. Fail-safe protocols.

CMPT 811 - Library Requirements

There is, as yet, no text for this course. A survey has been prepared by Dr. A. Liestman and Dr. J. Peters and is available as a technical report (TR86-10) from The School of Computing Science (SFU). Copies will be supplied for the students.

Most of the papers discussed in class are current technical reports or papers in conference proceedings. Dr. Liestman and Dr. Peters have accumulated an extensive collection of these papers.

Relevant journal articles appear in recent issues of the following journals (all of which are available currently in the SFU library):

Networks
J. Comput. Sys. Sci.
Communications of the ACM
IEEE Trans. Soft. Eng.
IEEE Trans. Comp.
IEEE Trans. Comm.
IEEE Trans. Inf. Theory
J. Algorithms
ACM TOPLAS
SIAM J. Comp.
Journal of the ACM
Th. Comp. Sci.
Inf. Proc. Let.

CMPT 811

This course has been co-taught by Dr. A. L. Liestman and Dr. J. G. Peters as CMPT 881 (a special topics number) in 85-3 and 86-3. As a result of the 85-3 offering a survey of 73 relevant papers was issued as a technical report. In 86-3, the survey is being used as a text for the course with an additional 50 - 75 papers to be discussed. It is expected that an enlarged survey will be issued during 87-1.

Dr. Liestman's research interests include distributed algorithms, network communication processes, and graph algorithms. He recently supervised an M.Sc. thesis in the area of distributed algorithms.

Dr. Peters' research interests include distributed algorithms and parallel computation. He is currently supervising an M.Sc. thesis in the area of distributed algorithms.

New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: Computing Science Course Number: 812

Title: Parallel Computation

Description: The course is a theoretical treatment of parallel complexity theory concentrating on algorithms and models.

Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any:

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 10 When will the course first be offered: 88-1

How often will the course be offered: Annually or on demand.

JUSTIFICATION:

Parallel computation is a well-established and important area of Computing Science that is currently covered in an ad-hoc way in our graduate programme. The course will concentrate on the design and analysis of parallel algorithms (as opposed to parallel hardware).

RESOURCES:

Which Faculty member will normally teach the course: Dr. J. G. Peters

What are the budgetary implications of mounting the course: none

Are there sufficient Library resources (append details): Yes (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: Binay K. Bhattacharya Date: 20/10/86
Faculty Graduate Studies Committee: M V Savage Date: 21 Oct '86
Faculty: D. A. George per T. Blanchet Date: Oct 24/86
Senate Graduate Studies Committee: B R Clay Date: 13 Nov/86
Senate: Date:

CMPT 812 PARALLEL COMPUTATION

Course Outline

Week

1. Overview of parallel computer architectures.
2. Models of parallel computation.
3. Relationships among parallel models.
4. Parallel complexity hierarchies - NC and SC.
5. Parallel prefix computation and applications.
6. Tree traversals.
7. Connected components and minimum spanning trees.
8. Other parallel graph algorithms.
9. Sorting.
10. Parallel approximation alogrithms.
11. Parallel matroid algorithms.
12. Convex hulls and triangulations.

CMPT 812 Library Requirements

There is no suitable textbook for this course. Material will be taken from journal papers, conference papers, and technical reports. Dr. Peters will put copies of relevant conference papers and technical reports from his own collection into the reserve section of the library. Journal articles appear in recent issues of the following journals. All of these journals are currently available in the SFU library.

SIAM J. Comp.
Journal of the ACM
ACM TOPLAS
Communications of the ACM
J. Algorithms
J. Comput. Sys. Sci.
IEEE Trans. Computers
IEEE Computer
Theoretical Comp. Sci.
Inf. Proc. Letters

CMPT 812

Some of the material in this course has been taught by Dr. J. G. Peters in 85-1 as CMPT 881 (a special topics number). The remainder of the material was taught by Dr. Peters in 86-1 as part of CMPT 881 which was taught jointly by Dr. Peters and Dr. A. L. Liestman.

Dr. Peters' research interests include parallel computation and distributed algorithms. He has supervised one M.Sc. thesis and is currently supervising a second M.Sc. thesis in the area of parallel computation.

New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: Computing Science Course Number: 813

Title: Computational Geometry

Description: This course is concerned with geometric algorithms that have been proposed in recent years. Applications of these algorithms to various disciplines will also be discussed.

Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: CMPT 405

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 10 When will the course first be offered: 87-3

How often will the course be offered: Anually or on demand

JUSTIFICATION:

In spite of the maturity that it has achieved, computational geometry continues to be a fertile source of problems with relevance to several fields such as CAD, VLSI Testing, Computer Graphics, Pattern Recognition, and Robotics.

RESOURCES:

Which Faculty member will normally teach the course: Dr. B.K. Bhattacharya

What are the budgetary implications of mounting the course: None

Are there sufficient Library resources (append details): 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: Binay K. Bhattacharya Date: 21/10/86.
Faculty Graduate Studies Committee: M V Sabaya Date: 21 Oct '86.
Faculty: D. A. George per J. I. Sanchez Date: Oct 24/86
Senate Graduate Studies Committee: B R Clay Date: 13 Nov/86
Senate: Date:

CMPT 813 COMPUTATIONAL GEOMETRY

Course Outline

1. Geometric searching.
2. Convex Hulls : Basic Algorithms.
3. Convex Hulls : Extensions and applications.
4. Proximity : Fundamental algorithms.
5. Proximity : Variants and generalizations.
6. Intersections.
7. The geometry of rectangles.

CMPT 813 - Library Requirements

There is no suitable textbook for this course. However, there are a few books on computational geometry which will be used as reference books. These books are:

1. Computational Geometry - An Introduction
   by F. P. Preparata and M. I. Shamos.

2. Computational Geometry and Multi-Dimensional Searching
   by K. Melhorn.

Materials will be taken from journal papers, conference papers and technical reports. Dr. Bhattacharya has an extensive collection of papers. Copies of the relevant papers will be put in the reserve section of the library.

Relevant journal articles generally appear in the following journals (all of which are presently available in the SFU library):

Information Processing Letters
BIT
Communications of the ACM
Journal of the ACM
IEEE Trans. Computers
IEEE Pattern Analysis & Machine Intelligence
Journal of Algorithms
Journal of Computer System Science
SIAM Journal of Computing
Computer Journal
Computer Vision, Graphics and Image Processing
Theoretical Computer Science

CMPT 813

Dr. Bhattacharya presently teaches the undergraduate version of Computational Geometry (CMPT 406). This is offered once a year. Graduate students of the School of Computing Science are allowed to take this course under special arrangements.

Dr. Bhattacharya obtained his doctorate degree in the area of Computational Geometry. His other research interests are in the area of Pattern Recognition, Robotics and Computer Graphics.

SIMON FRASER UNIVERSITY

MEMORANDUM

To: Binay Bhattacharya
Computing Science

From: Sharon Thomas,
Head, Collections Management

Subject: NEW COURSE PROPOSALS:
CMPT 811, 812, 813

Date: October 17, 1986

Noneof these courses should prove troublesome since, aside from the cited journals which are already in the collection, they will apparently make only minimal use of the Library's resources.

Sharon Thomas

ST:is

S I M O N F R A S E R U N I V E R S I T Y

MEMORANDUM

DEPARTMENT OF MATHEMATICS AND STATISTICS

To:	Dr. B.K. Bhattacharya Chairman, Grad. Studies Computing Science	From:	Dr. G. Bojadziev Chairman Graduate Studies Math & Stats Dept.
Re:	Course Proposals	Date:	October 24, 1986

I appreciate your memo of October 22, 1986 regarding the proposal of three graduate courses in computing Science: 811, 812 and 813. The courses are relevant and certainly Mathematics and Statistics Department approves the proposal.

G. Bojadziev

GB/sh