

SIMON FRASER UNIVERSITY

S.86-82

MEMORANDUM

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

From..Office of the Dean of Graduate Studies

Subject..Graduate Curriculum Changes - School
of Engineering Science

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.86-82, the proposed curriculum changes in the School of Engineering Science:

Delete: ENSC 835-3 Telphony and Digital Switching
ENSC 851-3 System Implementation Methodology

Add New Courses:

ENSC 851-3 Integrated Circuit Technology
ENSC 852-3 Analog Integrated Circuits
ENSC 853-3 Digital Semiconductor Circuits and Devices
ENSC 881-3 Modelling of Engineering Systems
ENSC 883-3 Optimization and Control
ENSC 891-3 Directed Studies I
ENSC 892-3 Directed Studies II
ENSC 894-3 Special Topics I
ENSC 895-3 Special Topics II
ENSC 897 M.Eng. Project
ENSC 898 M.A.Sc. Thesis

Regulation Change:

Explicit allowance for waiver of ENSC 800-3 Linear Systems Dynamics as a required course"

Rationale for these changes is attached.



B.P. Clayman
Dean of Graduate Studies.

mm/
attach.

SIMON FRASER UNIVERSITY

MEMORANDUM

To.....Marian McGinn.....

From.....M.V.. Savage, Chairman.....

.....Faculty of Applied Science Graduate
.....Committee.....

Subject.....CALENDAR REVISIONS.....

Date.....21st October 1986.....

Attached are the calendar revisions from the School of Engineering Science which were approved at the Faculty of Applied Science Graduate Studies Committee meeting, Tuesday, October 21st, 1986.


M. Savage

MS/ta

SCHOOL OF ENGINEERING SCIENCE
SIMON FRASER UNIVERSITY

M E M O

To: Marg Savage, Chair
Applied Sciences Graduate Studies Committee

From: Jim Cavers, Chair
Engineering Science Graduate Program

Date: 17 October 1986

Subject: Calendar Revisions.

Attached are the Engineering Science graduate studies calendar revisions for consideration at the Applied Sciences Graduate Studies Committee meeting to be held on Tuesday, October 21st at 2:00 pm.

The changes can be summarized as follows:

1. Course Deletions

ENSC 835-3 Telephony and Digital Switching
ENSC 851-3 System Implementation Methodology
Justification: These courses will be offered infrequently and we propose to do so under Special Topics.

2. New Courses

ENSC 851-3 Integrated Circuit Technology
ENSC 852-3 Analog Integrated Circuits
ENSC 853-3 Digital Semiconductor Circuits and Devices
Justification: These courses will support the M.A.Sc. students working in the microelectronics area, and should prove popular among the M.Eng. population.

ENSC 881-3 Modelling of Engineering Systems
ENSC 883-3 Optimization and Control
Justification: These courses will support M.A.Sc. students working in control and robotics.

ENSC 891-3 Directed Studies I
ENSC 892-3 Directed Studies II
ENSC 894-3 Special Topics I
ENSC 895-3 Special Topics II
ENSC 897 M.Eng. Project
ENSC 898 M.A.Sc. Thesis
Justification: These courses were left out of the original calendar entry.

3. Editorial Changes

ENSC 833-3 Network Protocols and Performance

Justification: Minor rewording for clarity of calendar description.

4. Regulation Change

Explicit allowance for waiver of ENSC 800-3 Linear Systems Dynamics as a required course.

Justification: We have had several excellent students entering the M.Eng. program whose background is such that this prerequisite course is unnecessary.

5. Other

Listing of courses offered by other departments which are of particular interest to Engineering Science students. These include:

CMPT 842-3	Distributed Computing
CMPT 850-3	Computer Architecture
CMPT 852-3	VLSI Systems Design
CMPT 863-3	Principles of Computer Aided Design
MATH 408-3	Discrete Optimization


James K. Cavers

Attachments

CALENDAR INFORMATION:

Department: Engineering Science Course Number: ENSC 851
 Title: Integrated Circuit Technology
 Description: This course gives an overall view of the technology involved in the fabrication of integrated circuits. The physics behind integrated circuit processing will also be discussed.
 Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: Permission of Instructor.

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 10 When will the course first be offered: 1987-3
 How often will the course be offered: Once per year.

JUSTIFICATION:

Competent designers of integrated circuits must have a good knowledge of the physics and technology behind integrated-circuit processing.

RESOURCES:

Which Faculty member will normally teach the course: Dr. M.J. Deen
 What are the budgetary implications of mounting the course: 30% of a technician's time or equivalent graduate student support required for the lab section of course.
 Are there sufficient Library resources (append details): Some additions required.
 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: 17/10/86
 Faculty Graduate Studies Committee: [Signature] Date: 24 Oct '86
 Faculty: D. A. George per T. Blanchet Date: 05/22/86
 Senate Graduate Studies Committee: [Signature] Date: 13 Nov/86
 Senate: _____ Date: _____

APPENDIX

a) Course outline

ENSC 851-3 Integrated-circuit Technology
 (M. Jamal Deen)
Review of semiconductor physics. Technology of semiconductor devices and integrated circuits: material evaluation, crystal growth, doping, epitaxy, oxidation, thermal diffusion, ion implantation, lithography and device patterning, and thin film formation. Design and fabrication of active and passive semiconductor devices, packaging techniques and reliability of integrated circuits.

b) Competence of the Faculty member to give the course

Dr. M Jamal Deen's background and research interest are in the area of solid-state devices. He also has practical experience in device processing and testing, and is well qualified to give this course.

c) Library resources

The following reference books and technical journals should be acquired:

Integrated Circuit Engineering, A.B. Glaser and G.E. Subak-Sharpe, Addison Wesley (1979).

VLSI Technology, Ed. S.M Sze, McGraw Hill (1983).

VLSI Fabrication Principles, S.K. Ghandi, Wiley Interscience (1983).

Physics and Technology of Semiconductor Devices, A.S. Grove, John Wiley & Sons (1967).

Physics of Semiconductor Devices, S.M. Sze, J. Wiley (1981).

Basic Integrated Circuit Engineering, Hamilton and Howard, McGraw Hill (1975).

Modern Semiconductor fabrication technology, P.E. Gise, Prentice Hall (1986).

Integrated circuit fabrication technology, D.J. Elliott, McGraw Hill (1982).

Integrated circuit mask technology, D.J. Elliott, McGraw Hill (1985).

Analysis and Design of Analog Integrated Circuits, P.R. Gray and R.G. Meyer, John Wiley and Sons (1983).

Integrated Circuits: Materials, Devices, and Fabrication, W.C. Till, Prentice Hall (1982).

Analysis and Design of Digital Integrated Circuits, D. Hodges and H. Jackson, McGraw Hill (1983).

Design and Analysis of VLSI Circuits, L. Glasser and D. Dobberpuhl, Addison Wesley (1985).

Introduction to NMOS and CMOS VLSI design, A. Mukherjee, Prentice Hall (1986).

Digital MOS Integrated Circuits, Ed. M.I. Elmasry, IEEE Press (1981).

Analog MOS Integrated Circuits, Ed. P.R. Gray....., IEEE Press (1981)

IEEE Trans. Electron Devices.

IEEE J. Solid State Circuits.

IEEE Trans. Circuits and Systems.

IEEE Circuits and Devices Magazine.

Solid-State Technology, Technical Publishing, New York, NY.

Semiconductor International,

Microelectronic Manufacturing and Testing, Lake Publishing Corp., Libertyville, Illinois.

Microcontamination, Canon Communications, Inc., Santa Monica, CA.

Lasers and Applications, High Tech Publications, Inc., Torrance, CA.

Electronic Products, Hearst Business Communications, Inc., Garden City, NY.

Microelectronic Engineering, Elsevier Science Publishers B.V. (North-Holland).

New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: Engineering Science Course Number: ENSC 852
Title: Analog Integrated Circuits
Description: This course provides an introduction to integrated circuit engineering and concentrates on special techniques for implementing analog electronic functions on an integrated circuit.
Credit Hours: 3 Vector: (2-0-2) Prerequisite(s) if any: _____

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 10 When will the course first be offered: Fall 87
How often will the course be offered: Once per year

JUSTIFICATION:

Background and training in integrated circuit design is becoming more and more important in the world of high technology. Local electronic industry has also expressed a special interest in this area. This course, because of its analog emphasis, is an ideal complement to the existing "VLSI System Design" course (CMPT 852).

RESOURCES:

Which Faculty member will normally teach the course: Dr. Albert M. Leung
What are the budgetary implications of mounting the course: 30% of a technician's time for the laboratory portion of this course.

Are there sufficient Library resources (append details): Some additions required.

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: H. Caves Date: 17/10/86
Faculty Graduate Studies Committee: M. Savage Date: 24 Oct '86
Faculty: D. A. George per T. Blanchet Date: Oct 22/86
Senate Graduate Studies Committee: B. P. Clay Date: 13 Nov/86
Senate: _____ Date: _____

APPENDIX

a) Course outline

ENSC 852-3 Analog Integrated Circuits
 (Albert M. Leung)
 Integrated-circuit (IC) technology, IC component
 models and analog circuit configurations. Computer
 aided design tools for circuit simulation and
 physical layout of ICs. Students are required to
 complete a project in which he/she will design,
 layout, fabricate and test a semicustom IC using
 the fast turnaround IC fabrication facility at the
 School of Engineering Science.

b) Competence of the Faculty member to give the course

Dr. Albert M. Leung is the instructor well qualified to give this course. He has ten years of hands-on experience in the design and fabrication of integrated circuits. His current research also concentrates on the development of integrated-circuit technology.

c) Library resources

The following reference books and technical journals should be acquired:

Integrated Circuit Engineering, A.B. Glaser and G.E.
Subak-Sharpe, Addison Wesley (1979).

VLSI Technology, Ed. S.M Sze, McGraw Hill (1983).

VLSI Fabrication Principles, S.K. Ghandi, Wiley Interscience
(1983).

Physics and Technology of Semiconductor Devices, A.S. Grove, John
Wiley & Sons (1967).

Physics of Semiconductor Devices, S.M. Sze, J. Wiley (1981).

Basic Integrated Circuit Engineering, Hamilton and Howard, McGraw
Hill (1975).

Modern Semiconductor fabrication technology, P.E. Gise, Prentice
Hall (1986).

Integrated circuit fabrication technology, D.J. Elliott, McGraw
Hill (1982).

Integrated circuit mask technology, D.J. Elliott, McGraw Hill
(1985).

Analysis and Design of Analog Integrated Circuits, P.R. Gray and

R.G. Meyer, John Wiley and Sons (1983).

Integrated Circuits: Materials, Devices, and Fabrication, W.C. Till, Prentice Hall (1982).

Analysis and Design of Digital Integrated Circuits, D. Hodges and H. Jackson, McGraw Hill (1983).

Design and Analysis of VLSI Circuits, L. Glasser and D. Dobberpuhl, Addison Wesley (1985).

Introduction to NMOS and CMOS VLSI design, A. Mukherjee, Prentice Hall (1986).

Digital MOS Integrated Circuits, Ed. M.I. Elmasry, IEEE Press (1981).

Analog MOS Integrated Circuits, Ed. P.R. Gray....., IEEE Press (1981)

IEEE Trans. Electron Devices.

IEEE J. Solid State Circuits.

IEEE Trans. Circuits and Systems.

IEEE Circuits and Devices Magazine.

Solid-State Technology, Technical Publishing, New York, NY.

Semiconductor International,

Microelectronic Manufacturing and Testing, Lake Publishing Corp., Libertyville, Illinois.

Microcontamination, Canon Communications, Inc., Santa Monica, CA.

Lasers and Applications, High Tech Publications, Inc., Torrance, CA.

Electronic Products, Hearst Business Communications, Inc., Garden City, NY.

Microelectronic Engineering, Elsevier Science Publishers B.V.(North-Holland).

New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: Engineering Science Course Number: ENSC 853
Title: Digital Semiconductor Circuits and Devices
Description: This course will provide an introduction to digital integrated circuit engineering and concentrates on various aspects of digital semiconductor circuits and devices.
Credit Hours: 3 Vector: 2-0-2 Prerequisite(s) if any: Permission of Instructor.

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 10 When will the course first be offered: 1987-3
How often will the course be offered: Once per year.

JUSTIFICATION:

Background and training in digital semiconductor circuits and devices are essential in the high technology field. This course, because of its digital emphasis will complement ENSC 852, Analog Integrated Circuits.

RESOURCES:

Which Faculty member will normally teach the course: Dr. M.J. Deen and Dr. R.H.S. Hardy
What are the budgetary implications of mounting the course: Possibly 30% of a technician's time or equivalent graduate student support required for lab section of the course.
Are there sufficient Library resources (append details): Some additions required.

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: 17/10/86
Faculty Graduate Studies Committee: [Signature] Date: 21 Oct '86
Faculty: [Signature] Date: Oct 22/86
Senate Graduate Studies Committee: [Signature] Date: 13 Nov/86
Senate: _____ Date: _____

APPENDIX

a) Course Outline

ENSC 853-3 DIGITAL SEMICONDUCTOR CIRCUITS & DEVICES
(M. Jamal Deen or R.H.S. Hardy)

MOS device electronics. Second Order Effects in MOS transistors. BJT device electronics. Static and transient analysis of inverters. Digital gates, circuits and circuit techniques. Speed and power dissipation. Memory systems. Gate arrays, semicustom and customized integrated circuits. CAD tools.

Students are required to complete a project.

b) Competence of the faculty members to give the course:

Dr. M. Jamal Deen is the instructor well qualified to give this course. He has six years of experience in the design and fabrication of integrated circuits and has taught a similar course previously. His current research interests are in the solid state electronics and microelectronics and device fabrication areas.

Dr. R.H.S. Hardy will teach a portion of this course. He has relevant industrial experience in the design of digital integrated circuits using modern computer-aided design tools. He has taught a similar course at the undergraduate level. His current research interests are in the areas of VLSI implementations of computer network components and in computer-aided design of integrated circuits.

c) Library Resources

The following reference books and technical journals should be acquired:

BOOKS:

Integrated Circuit Engineering, A.B. Glaser and G.E. Subak-Sharpe, Addison-Wesley (1979).

VLSI Technology, Ed. S.M. Sze, McGraw Hill (1983).

VLSI Fabrication Principles, S.K. Ghandi, Wiley Interscience (1983).

Physics and Technology of Semiconductor Devices, A.S. Grove, John Wiley & Sons (1967).

Physics of Semiconductor Devices, S.M. Sze, J.Wiley (1981).

Basic Integrated Circuit Engineering, Hamilton & Howard, McGraw Hill (1975).

Integrated Circuit Fabrication technology, D.J. Elliott, McGraw Hill (1982).

Integrated Circuit Mask Technology, D.J. Elliott, McGraw Hill (1985).

Analysis and Design of Analog Integrated Circuits, P.R. Gray and R.G. Meyer, John Wiley & Sons (1983).

Integrated Circuits: Materials, Devices, and Fabrication, W.C. Till, Prentice-Hall (1982).

Analysis and Design of Digital Integrated Circuits, D. Hodges and H. Jackson, McGraw-Hill (1983).

Design and Analysis of VLSI Circuits, L. Glasser and D. Dobberpuhl, Addison-Wesley (1985).

Introduction to NMOS and CMOS VLSI Design, A. Mukherjee, Prentice-Hall (1986).

Digital MOS Integrated Circuits, Ed. M.I. Elmasry, IEEE Press (1981).

Analog MOS Integrated Circuits, Ed. P.R. Gray, IEEE Press (1981).

Structured VLSI Design, Charles Seltz, Addison-Wesley (1986).

Digital Logic Testing and Simulation, AA. Miczo, Harper & Row (1986).

Design of VLSI Gate Array IC's, E.E. Hollis, Prentice-Hall (1987).

PERIODICALS:

IEEE Trans. Electron Devices, IEEE.

IEEE Design & Test of Computers, IEEE.

IEEE J. Solid State Circuits, IEEE.

IEEE Trnas. Circuits and Systems, IEEE.

IEEE Circuits and Devices Magazine.

Proceedings of the IEEE Custom IC Conference.

Solid-State Technology, Technical Publishing, New York, N.Y.

Semiconductor International.

VLSI Design Magazine.

Microelectronic Manufacturing and Testing, Lake Publishing Corp., Libertyville, Illinois.

Microcontamination, Canon Communications, Inc., Santa Monica, CA.

Lasers and Applications, High Tech Publications, Inc., Torrance, CA.

Electronic Products, Hearst Business Communications, Inc., Garden City, N.Y.

Microelectronic Engineering, Elsevier Science Publishers, B.V. (North-Holland).

New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: Engineering Science Course Number: ENSC 881
Title: Engineering Modelling of Dynamic Processes
Description: Introduction to systematic development of tractable models for engineering systems. Uses case studies and labs based on a variety of physical processes.
Credit Hours: 3 Vector: 2-0-2 Prerequisite(s) if any: ENSC 800

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 10 When will the course first be offered: 1987-3
How often will the course be offered: Every two years, more often if numbers warrant.

JUSTIFICATION:

The main intent is to support M.A.Sc. (full-time) students working in control and robotics. However, the material is of more general interest, and will be useful to many students in the M.Eng. (part-time) program as well.

RESOURCES:

Which Faculty member will normally teach the course: B.T. McGeer
What are the budgetary implications of mounting the course: One T.A. to assist in the laboratory.

Are there sufficient Library resources (append details): Yes, supported by ENSC Core B acquisitions..

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: J.K. Caves Date: 1986 10 20
Faculty Graduate Studies Committee: M.V. Savage Date: 21 Oct '86
Faculty: D.A. George for T. Blanchet Date: Oct 22/86
Senate Graduate Studies Committee: B.P. Clay Date: 13 Nov/86
Senate: _____ Date: _____

APPENDIX

a) Course Outline

ENSC 881-3 Engineering Modelling of Dynamic Processes
 (B.T. McGeer)

Effective design requires a good model of the system you work with. This course uses case studies and labs to introduce the student to systematic techniques of modelling: simplification and approximation of dynamical mechanisms, expression in appropriate mathematics, and comparison of mathematical results with observed phenomena. Topics include modelling philosophy and strategy; classification of mathematical models; dimensional analysis; approximate solutions of dynamical equations; perturbation methods; approximate physical models; experiment design; accuracy bounds on models and measurements. Examples are drawn from mechanical, electrical, thermal, fluid, and biological systems.

b) Competence of the faculty member to give the course:

Dr. B.T. McGeer (B.S.E., Mechanical Engineering, Princeton, 1979; M.S., Ph.D. Aeronautics and Astronautics, Stanford, 1980, 1983) has been working with modelling and control techniques since he started his doctoral work. His research since 1983, especially his work with two local companies, has required explicit development of models of difficult systems as a first step to development of control algorithms.

New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: Engineering Science Course Number: ENSC 883
Title: Optimization and Modern Control
Description: Numerical and variational techniques applied to linear and non-linear control of dynamic systems.
Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: ENSC 382 or equivalent.

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 15 When will the course first be offered: 1988-1
How often will the course be offered: Every two years, or more often if numbers warrant.

JUSTIFICATION:

This course will be useful to the control and automation community in the lower mainland, and will attract a significant number of M.Eng. students. In addition, it is an essential course for any M.A.Sc. student in the control and robotics area.

RESOURCES:

Which Faculty member will normally teach the course: B.T. McGeer
What are the budgetary implications of mounting the course: None.

Are there sufficient Library resources (append details): Yes, supported by ENSC Core B acquisitions.

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: J.K. Goss Date: 1986 10 20
Faculty Graduate Studies Committee: M.V. Savage Date: 21 Oct '86
Faculty: D. A. George per T. Blanchet Date: Oct 22/86
Senate Graduate Studies Committee: B.P. Clay Date: 13 Nov/86
Senate: _____ Date: _____

APPENDIX

a) Course Outline

ENSC 883-3 Optimization and Modern Control
 (B.T. McGeer)

This is a second control course for students with a background in classical control. The course begins with a discussion of the philosophy and process of optimization. This includes a review of objectives in optimization and figures of merit. Both variational and numerical methods are introduced, and applied to component design and trajectory planning problems. Appropriate and inappropriate applications are critically reviewed. The discussion then turns to control of dynamic systems. Alternative design techniques are developed and compared: classical linear design; 'modern' linear design; trajectory optimization; hybrid techniques.

b) Competence of the faculty member to give the course:

Dr. B.T. McGeer (B.S.E., Mechanical Engineering, Princeton, 1979; M.S., Ph.D., Aeronautics and Astronautics, Stanford, 1980, 1983) has been working with modelling and control techniques since he started his doctoral work. His research since 1983, especially his work with two local companies, has required explicit development of models of difficult systems as a first step to development of control algorithms.

SIMON FRASER UNIVERSITY

New Graduate Course Proposal FormCALENDAR INFORMATION:

Department: Engineering Science Course Number: ENSC 891-3
Title: Directed Studies I
Description: _____
Credit Hours: 3 Vector: _____ Prerequisite(s) if any: _____

ENROLLMENT AND SCHEDULING:

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

JUSTIFICATION:

To provide opportunity for further research and study in support
of M.A.Sc. thesis work.

RESOURCES:

Which Faculty member will normally teach the course: _____
What are the budgetary implications of mounting the course: _____

Are there sufficient Library resources (append details): _____

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: J.K. Coors Date: 17/10/86
Faculty Graduate Studies Committee: R.V. Savage Date: 21 Oct '86
Faculty: D.A. George per T. Blanchet Date: Oct 22/86
Senate Graduate Studies Committee: B.P. Clay Date: 13 Nov/86
Senate: _____ Date: _____

SIMON FRASER UNIVERSITY

New Graduate Course Proposal FormCALENDAR INFORMATION:Department: Engineering Science Course Number: ENSC 892-3Title: Directed Studies II

Description: _____

Credit Hours: 3 Vector: _____ Prerequisite(s) if any: _____ENROLLMENT AND SCHEDULING:

Estimated Enrollment: _____ When will the course first be offered: _____

How often will the course be offered: _____

JUSTIFICATION:

To provide opportunity for further research and study in support
of M.A.Sc. thesis work

RESOURCES:

Which Faculty member will normally teach the course: _____

What are the budgetary implications of mounting the course: _____

Are there sufficient Library resources (append details): _____

- 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: J.K. Caves Date: 17/10/86Faculty Graduate Studies Committee: M.V. Savage Date: 21 Oct '86Faculty: D. A. George per T. Blanchet Date: Oct 22/86Senate Graduate Studies Committee: B.P.C. Date: 13 Nov/86

Senate: _____ Date: _____

SIMON FRASER UNIVERSITY

New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: Engineering Science Course Number: ENSC 894-3

Title: Special Topics I

Description: _____

Credit Hours: 3 Vector: _____ Prerequisite(s) if any: _____

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: _____ When will the course first be offered: _____

How often will the course be offered: _____

JUSTIFICATION:

To offer courses which are required infrequently and in areas of rapidly changing technology.

RESOURCES:

Which Faculty member will normally teach the course: _____

What are the budgetary implications of mounting the course: _____

Are there sufficient Library resources (append details): _____

- 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: J.K. Owens Date: 17/10/86

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

Faculty: D.A. George per T. Blanchet Date: Oct 22/86

Senate Graduate Studies Committee: B.P. Clary Date: 13 Nov/86

Senate: _____ Date: _____

SIMON FRASER UNIVERSITY

New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: Engineering Science Course Number: ENSC 895-3
 Title: Special Topics II
 Description: _____

 Credit Hours: 3 Vector: _____ Prerequisite(s) if any: _____

ENROLLMENT AND SCHEDULING:

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

JUSTIFICATION:

To offer courses which are required infrequently and in areas
of rapidly changing technology

RESOURCES:

Which Faculty member will normally teach the course: _____
 What are the budgetary implications of mounting the course: _____

Are there sufficient Library resources (append details): _____

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: K. Cavers Date: 17/10/86
 Faculty Graduate Studies Committee: M. Savage Date: 21 Oct '86
 Faculty: D. A. George for T. Blunck Date: Oct 22/86
 Senate Graduate Studies Committee: B. P. O'Connell Date: 13 Nov/86
 Senate: _____ Date: _____

SIMON FRASER UNIVERSITY

New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: Engineering Science Course Number: ENSC 897
 Title: M.Eng. Project
 Description: _____

 Credit Hours: _____ Vector: _____ Prerequisite(s) if any: _____

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: _____ When will the course first be offered: _____
 How often will the course be offered: As required.

JUSTIFICATION:

RESOURCES:

Which Faculty member will normally teach the course: _____

What are the budgetary implications of mounting the course: _____

Are there sufficient Library resources (append details): _____

- 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: JK Quess Date: 17/10/86
 Faculty Graduate Studies Committee: MV Savage Date: 21 Oct '86
 Faculty: D. A. George per T. Blanchet Date: Oct 22/86
 Senate Graduate Studies Committee: BRC Clay Date: 13 Dec /86
 Senate: _____ Date: _____

New Graduate Course Proposal FormCALENDAR INFORMATION:Department: Engineering Science Course Number: ENSC 898Title: M.A.Sc. Thesis

Description: _____

Credit Hours: _____ Vector: _____ Prerequisite(s) if any: _____

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: _____ When will the course first be offered: _____

How often will the course be offered: _____

JUSTIFICATION:RESOURCES:

Which Faculty member will normally teach the course: _____

What are the budgetary implications of mounting the course: _____

Are there sufficient Library resources (append details): _____

- 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: JR Covert Date: 17/10/86Faculty Graduate Studies Committee: MV Savage Date: 21 Oct '86Faculty: D. A. George per T. Blanchet Date: Oct 22/86Senate Graduate Studies Committee: BR Clary Date: 13 Nov/86

Senate: _____ Date: _____

3. EDITORIAL CHANGE:

ENSC 833-3 Network Protocols and Performance

Practical techniques of design and performance analysis of data networks up to layer 3 of the Open System Interconnection protocol hierarchy. Point to point and polling data links. Networks of queues: stochastic and mean value analysis. Packet networks: loading, transit time, routing strategies.

Prerequisite: ENSC 800.

4. REGULATION CHANGE:

"Of the courses listed below, ENSC 805, 810, 815 and 820 are required. The prerequisite ENSC 800 will be waived if the student has equivalent preparation."

5. OTHER:

"COURSES OFFERED BY OTHER DEPARTMENTS

Of particular interest to graduate students in Engineering Science are the following courses, for which complete descriptions can be found elsewhere in this Calendar.

CMPT 842-3 Distributed Computing
CMPT 850-3 Computer Architecture
CMPT 852-3 VLSI Systems Design
CMPT 863-3 Principles of Computer Aided Design
MATH 408-3 Discrete Optimization"

SIMON FRASER UNIVERSITY

MEMORANDUM

To..... Jim Cavers, Director.....
Graduate Studies Program
..... School of Engineering Science.....
Subject..... Graduate Calendar Changes.....

From.... Binay Bhattacharya, Director.....
Graduate Studies Program
..... School of Computing Science.....
Date.... October 23, 1986.....

The School of Computing Science has no objection to the proposed calendar revisions proposed by the School of Engineering Science.

Binay K. Bhattacharya
Binay K. Bhattacharya

BKB:rcw

RECEIVED
OCT 24 1986
ENGINEERING SCIENCE

SIMON FRASER UNIVERSITY

MEMORANDUM

To..... J.K. Cavers,
School of Engineering
Science

From..... S. Thomas,
Head, Collections Management
Office

Subject... NEW GRADUATE COURSES

Date..... October 23, 1986

1. ENSC 851-3 INTEGRATED CIRCUIT TECHNOLOGY
- ENSC 852-3 ANALOG INTEGRATED CIRCUITS
- ENSC 852-3 DIGITAL SEMICONDUCTOR CIRCUITS AND DEVICES

These three appear to share a common body of literature and we already own a fair number of the cited titles. All but eleven of the books are already in the Library and the rest may be acquired at a cost of approximately \$750.00. Similarly, the Library already subscribes to five of the thirteen required journals and the rest are available at a surprisingly modest annual subscription and binding cost of about \$675.00.

In summary, these courses will require a first year outlay of \$1,425 for books and periodicals plus an additional \$675.00 for each following year.

2. ENSC 881-3 MODELLING OF ENGINEERING SYSTEMS
- ENSC 883-3 OPTIMIZATION AND CONTROL

These courses will depend on the materials acquired to support the implementation of ENSC CORE B. The Library and the School of Engineering Science are now in the process of jointly assessing the cost of these CORE B requirements, but there should then be no further expenditure required in order to support these two courses.

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ENGINEERING SCIENCE

Sharon Thomas

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