

SIMON FRASER UNIVERSITY
OFFICE OF THE VICE-PRESIDENT, ACADEMIC

MEMORANDUM

To: Senate

From: D. Gagan, Chair 
Senate Committee on Academic Planning

Subject: School of Computing Science
Curriculum Revisions

Date: December 11, 1995

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

Motion:

"That Senate approve and recommend approval to the Board of Governors, as set forth in S.96-8 , the following

New courses:

- CMPT 770-3 Computer Graphics
- CMPT 873-3 User Interface Design
- CMPT 878-3 Scientific Visualization
- CMPT 880-3 Special Topics in Computing Science
- CMPT 887-3 Special Topics in Computer Graphics."

For Information:

Acting under delegated authority of Senate, SGSC has approved the following revision

CMPT 827-3 Change of title From: Expert Systems
To: Intelligent Systems

Agreement has been reached between the Faculty and Library in the assessment of library costs associated with the new courses.

Simon Fraser University

MEMORANDUM

To: Dr. Parveen Bawa, Associate Dean
and Chair, FAS Grad Committee

From: Tiko Kameda, Director, CMPT
Grad Program *T. Kameda*

Subject: Calendar Changes 1996/97

Date: Nov. 10, 1995

1. New course proposals

- CMPT770 Computer Graphics
- CMPT873 User Interface Design
- CMPT878 Scientific Visualization
- CMPT887 Special Topics in Computer Graphics
- CMPT880 Special Topics in Computing Science

2. Course name change, CMPT827

From 'Expert Systems' to 'Intelligent Systems'
Rationale: to reflect the recent trend in this field.

3. Library assessment

No additional resources are required (see the attached memo from the Library).

CMPT - GRADUATE CURRICULUM REVISIONS
Revision 5 - Oct. 13, 1995**RATIONALE:**

- reflect current trends in the field AND demand of the students in computer graphics AND the strengths of the faculty.
- provide an introductory computer graphics course(s) to bring those without a graphics background (or limited one) up to speed, as well as present research topics.
- should allow a computer graphics course for other emerging topics.
- need a general computer science course for accommodating other areas which are not currently covered by existing courses (such as software engineering) to allow flexibility in meeting new demands, supporting visiting faculty, and developing new courses.

NOTES:

Courses equivalent to CMPT770 and CMPT878 have been taught recently as Special Topics courses, and a course equivalent CMPT873 is scheduled for 96-1 under CMPT882 (Special topics in Artificial Intelligence).

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

Department: School of Computing Science

Course Number: CMPT 770

Course Title: Computer Graphics

Course Description for Calendar (*append a course outline*):

This course covers advanced topics and techniques in computer graphics such as solid modelling, curves and surfaces, fractals, particle systems, advanced rendering techniques, animation, and post-production techniques. Research topics in virtual reality, human figure animation, CAD, scientific visualization, and other areas will also be discussed.

Credit Hours: 3 **Vector:** 3/0/0 **Prerequisites (if any):** Students with credit for CMPT 461 or equivalent may not take CMPT 770 for further credit.

Estimated Enrolment: 10-15

When the course will first be offered: 1996 (has already as 882)

Frequency of course offering: Once a year

Justification:

The course provides an introduction to advanced topics in computer graphics to graduate students who do not have an extensive graphics background. Thus it forms the backbone of future graduate graphics courses.

Resources:

Faculty member(s) who will normally teach this course;
append information about their competence to teach the course: Fracchia, Calvert, Dill, Shermer

Number of additional faculty members required in order to offer this course: 0

Additional space required in order to offer this course (*append details*): 0

Additional specialized equipment required in order to offer this course (*append details*): 0

Additional Library resources required (*append details*): annually: \$ 0 One-time: \$ 0

Any other resources implications of offering this course (*append details*): _____

If additional resources are required to offer this course, the department proposing the course should be prepared to provide information on the source(s) of those additional resources.

Approvals:

Departmental Graduate Program Committee: B. Hancock Date: Oct. 16/95

Faculty Graduate Studies Committee: Parveen Bamei Date: Nov. 10, 1995

Faculty: Parveen Bamei Date: Nov. 10, 1995

Following approval by the Faculty, this form and all relevant documentation should be forwarded to the Assistant Director - Graduate Studies in the Office of the Registrar for consideration by the Senate Graduate Studies Committee, the Senate Committee and Academic Planning and Senate.

CMPT 770-3 Computer Graphics

Instructor: D. Fracchia, T. Calvert, J. Dill, T. Shermer
Possibly B. Funt and Z. Li

OBJECTIVE/DESCRIPTION:

This course aims to provide an introduction to advanced topics in computer graphics to graduate students who do not have an extensive graphics background (one half to two thirds of the course) as well as present research topics (one third to one half of the course).

CALENDAR DESCRIPTION:

This course covers advanced topics and techniques in computer graphics such as solid modelling, curves and surfaces, fractals, particle systems, advanced rendering techniques, animation, and post-production techniques. Research topics in virtual reality, human figure animation, CAD, scientific visualization, and other areas will also be discussed.

Exclusion: CMPT461 or equivalent.

TOPICS:

Topics include: solid modelling, curves and surfaces, fractals, particle systems, advanced rendering techniques (colour spaces, shading, raytracing, radiosity, texture mapping, stereoscopy), animation, and post-production techniques. Applications in virtual reality, human figure animation, CAD, scientific visualization, and other research areas will be discussed.

An instructor may use his/her own discretion as to the amount of time spent on each topic, as well as to the choice of research topics covered. Several areas warrant the use of other materials (articles, books, etc.) to supplement the textbook, such as: CIE colour space, fractals, animation, and research topics. Approximately 1/2 to 2/3 of the course time will be spent on background material with the remainder of the time focused on research topics. The course should also include an extensive project.

TEXTBOOK:

Foley, J. D., Van Dam, A., Feiner, S. K., and Hughes, J. F.; *Computer Graphics Principles and Practice* (2nd Ed.); Addison-Wesley Publishing Company, Reading, MA, 1990.

REFERENCES:

Rogers, D. F.; *Procedural Elements for Computer Graphics* (2nd Ed.); McGraw-Hill, New York, 1985.

Rogers, D. F. and Adams, J. A.; *Mathematical Elements for Computer Graphics* (2nd Ed.); McGraw-Hill, New York, 1990.

IEEE Computer Graphics and Applications (Journal).

ACM Transactions on Graphics (Journal).

ACM SIGGRAPH Computer Graphics (Conference Proceedings).

ADMINISTRATIVE CONCERNS:

Frequency of Offering: once a year.

Anticipated Enrollment: 10-15 students/offering.

Faculty: F. D. Fracchia, T. Calvert, J. Dill (Engineering), T. Shermer. Possibly B. Funt and Z. Li.

COMPUTER FACILITIES:

Machines: SGI, Sun (Instructor discretion).

Languages: C, C++, Modula-2, Modula-3, Pascal (Instructor discretion).

Special Software: GL/OpenGL/NPGL and Inventor/OpenInventor and MOTIF or FORMS on SGI and Sun (Instructor discretion).

EXCLUSION:

CMPT461 or equivalent.

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

Department: School of Computing Science
Course Title: User Interface Design

Course Number: CMPT 873

Course Description for Calendar (append a course outline):

This course provides an overview of a number of research areas in human-computer interaction. Topics may include: overview of HCI (historical/intellectual, GUI, case studies), interactive systems (design, evaluation, software development), interaction methods (vision, graphic design, touch, speech, etc.), human factors (information processing, capabilities), research frontiers (computer supported cooperative-work, intelligent systems, hypertext, multimedia, virtual reality, cyberspace).

Credit Hours: 3 **Vector:** 3/0/0 **Prerequisites (if any):** CMPT 363 or equivalent is recommended (instructor discretion).

Estimated Enrolment: 10-15

When the course will first be offered: 1996 (as 882)

Frequency of course offering: Once a year (or every second)

Justification:

User interface design is an important (and necessary) aspect of computer graphics. Many of our graduate students in computer graphics are involved in UI research (such as IGI, VIEW, and 3DPS projects).

Resources:

Faculty member(s) who will normally teach this course;
append information about their competence to teach the course: Fracchia, Calvert, Dill, Shermer

Number of additional faculty members required in order to offer this course: 0

Additional space required in order to offer this course (append details): 0

Additional specialized equipment required in order to offer this course (append details): 0

Additional Library resources required (append details): annually: \$ 0 One-time: \$ 0

Any other resources implications of offering this course (append details): _____

If additional resources are required to offer this course, the department proposing the course should be prepared to provide information on the source(s) of those additional resources.

Approvals:

Departmental Graduate Program Committee: B. Hancock Date: Oct. 16, 1995
Faculty Graduate Studies Committee: Parveen Bawa Date: Nov 10, 1995
Faculty: Parveen Bawa Date: Nov 10, 1995

Following approval by the Faculty, this form and all relevant documentation should be forwarded to the Assistant Director - Graduate Studies in the Office of the Registrar for consideration by the Senate Graduate Studies Committee, the Senate Committee and Academic Planning and Senate.

CMPT 873-3 User Interface Design

Instructor: T. Calvert, J. Dill, D. Fracchia, T. Shermer

OBJECTIVE/DESCRIPTION:

This course provides an overview of a number of research areas in human-computer interaction.

CALENDAR DESCRIPTION:

This course provides an overview of a number of research areas in human-computer interaction. Topics may include: overview of HCI (historical/intellectual, GUI, case studies), interactive systems (design, evaluation, software development), interaction methods (vision, graphic design, touch, speech, etc.), human factors (information processing, capabilities), research frontiers (computer-supported cooperative-work, intelligent systems, hypertext, multimedia, virtual reality, cyberspace).

Prerequisites: CMPT363 or equivalent is recommended (instructor discretion).

TOPICS:

This course provides an overview of a number of research areas in human-computer interaction. Topics may include:

- Overview of Human Computer Interaction - historical and intellectual perspective; emergence of graphical user interfaces; case studies.
- The Process of Developing Interactive Systems - design and evaluation; considering work contexts in design; software development environments; development tools.
- Interacting with Computers - vision, graphic design, and visual display; touch, gesture, and marking; speech, language, and audition.
- Psychology and Human Factors - human information processing; designing to human capabilities.
- Research Frontiers in Human-Computer Interaction - groupware and computer-supported cooperative-work; customizable systems and intelligent agents; hypertext and multimedia; virtual reality and cyberspace.

TEXTBOOK:

None.

REFERENCES:

Shneiderman, B.: *Designing the User Interface* (2nd Edition),; Addison-Wesley Publishing Company, Reading, MA, 1992. Badre, A. and Shneiderman, B. (eds); *Directions in Human-Computer Interaction*,; Ablex Pub. Corp., Norwood, N.J., 1982.

Barratt, K.; *Logic and Design : In Art, Science and Mathematics*,; Herbert Press, London, 1989.

Bodker, S.; *Through the Interface*,; L. Erlbaum, Hillsdale, N.J., 1991.

Foley, J. D., Van Dam, A., Feiner, S. K., and Hughes, J. F.; *Computer Graphics Principles and Practice* (2nd Edition),; Addison-Wesley Publishing Company, Reading, MA, 1990.

ACM SIGGRAPH (Conference Proceedings).

ACM CHI (Conference Proceedings).

International Journal of Human-Computer Interaction (Journal).

Journal of Visual Languages and Computing (Journal).

ADMINISTRATIVE CONCERNS:

Frequency of Offering: once a year.

Anticipated Enrollment: 10-15 students/offering.

Faculty: T. Calvert, J. Dill (Engineering), F. D. Fracchia, T. Shermer.

COMPUTER FACILITIES:

Machines: SGI, Sun, NeXT (Instructor discretion).

Languages: C, C++, Modula-2, Modula-3, Pascal (Instructor discretion).

6.

Special Software: GL/OpenGL/NPGL and Inventor/OpenInventor and MOTIF or FORMS on SGI and Sun, Interface builders (NeXTstep, etc.) or prototyping tools (if available). Instructor discretion is advised.

PREREQUISITES:

CMPT363 or equivalent is recommended (instructor discretion).

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

Department: School of Computing Science

Course Number: CMPT 878

Course Title: Scientific Visualization

Course Description for Calendar (append a course outline):

This course presents advanced topics in the field of scientific visualization. Topics may include: an introduction to visualization (importance, basic approaches and existing tools), abstract visualization concepts, human perception, visualization methodology, 2D and 3D display and interaction, advanced techniques (polygon reduction, volume rendering, multivariate representations, parallel algorithms, etc.) and virtual reality.

Credit Hours: 3 **Vector:** 3/0/0 **Prerequisites (if any):** CMPT 461, CMPT 770 or equivalent (by permission of instructor).

Estimated Enrolment: 10-15

When the course will first be offered: 1997 (already as 882)

Frequency of course offering: Once a year (or second) depending of CMPT 763.

Justification:

Scientific visualization is emerging as an important area of interest in computer graphics. It is also the primary research interest of several faculty and students.

Resources:

Faculty member(s) who will normally teach this course;

append information about their competence to teach the course: Fracchia, Calvert, Dill, Shermer

Number of additional faculty members required in order to offer this course: 0

Additional space required in order to offer this course (append details): 0

Additional specialized equipment required in order to offer this course (append details): 0

Additional Library resources required (append details): annually: \$ 0 One-time: \$ 0

Any other resources implications of offering this course (append details):

If additional resources are required to offer this course, the department proposing the course should be prepared to provide information on the source(s) of those additional resources.

Approvals:

Departmental Graduate Program Committee E. Hamada Date: Oct. 25/95

Faculty Graduate Studies Committee: Parveen Bawa Date: Nov. 9, 1995

Faculty: Parveen Bawa Date: Nov. 9, 1995

Following approval by the Faculty, this form and all relevant documentation should be forwarded to the Assistant Director - Graduate Studies in the Office of the Registrar for consideration by the Senate Graduate Studies Committee, the Senate Committee and Academic Planning and Senate.

CMPT 878-3 Scientific Visualization

Instructor: D. Fracchia, J. Dill, T. Calvert, T. Shermer

OBJECTIVE/DESCRIPTION:

This course presents advanced topics in the field of scientific visualization.

CALENDAR DESCRIPTION:

This course presents advanced topics in the field of scientific visualization. Topics may include: an introduction to visualization (importance, basic approaches and existing tools), abstract visualization concepts, human perception, visualization methodology, 2D and 3D display and interaction, advanced techniques (polygon reduction, volume rendering, multivariate representations, parallel algorithms, etc.) and virtual reality.

Prerequisites: CMPT461, CMPT770 or equivalent (by permission of instructor).

TOPICS:

Topics include: an introduction to visualization (importance, basic approaches and existing tools), abstract visualization concepts, human perception, visualization methodology, 2D and 3D display and interaction, advanced techniques (polygon reduction, volume rendering, multivariate representations, parallel algorithms, etc.) and virtual reality.

The course will contain an extensive project of an interdisciplinary nature (in collaboration with other researchers working on actual research projects where possible).

TEXTBOOK:

None.

REFERENCES:

Brodie, K. W. (ed); *Scientific visualization : techniques and applications*; Springer-Verlag, Berlin, 1992. Foley, J. D., Van Dam, A., Feiner, S. K., and Hughes, J. F.; *Computer Graphics Principles and Practice* (2nd Edition); Addison-Wesley Publishing Company, Reading, MA, 1990.

Friedhoff, R. M. and Benzon, W.; *Visualization : the second computer revolution*; Abrams, New York, 1989.

Hagen, H., Muller, H., and Nielson, G. M. (eds); *Focus on scientific visualization*; Springer-Verlag, Berlin, 1993.

Tufte, E. R.; *The Visual Display of Quantitative Information*; Graphics Press, Cheshire, Conn., 1983.

IEEE Visualization (Conference Proceedings).

IEEE Computer Graphics and Applications (Journal).

IEEE Transactions on Visualization and Computer Graphics (Journal).

ACM Transactions on Graphics (Journal).

ACM SIGGRAPH Computer Graphics (Conference Proceedings).

ADMINISTRATIVE CONCERNS:

Frequency of Offering: once a year.

Anticipated Enrollment: 10-15 students/offering.

Faculty: F. D. Fracchia, J. Dill (Engineering), T. Calvert, T. Shermer.

COMPUTER FACILITIES:

Machines: IBM, MacIntosh, SGI, Sun, NeXT (Instructor discretion).

Languages: C, C++, Modula-2, Modula-3, Pascal (Instructor discretion).

Special Software: GL/OpenGL/NPGL and Inventor/OpenInventor and MOTIF or FORMS on SGI and Sun (Instructor discretion). Depends on project and availability of visualization package.

PREREQUISITES:

CMPT461, CMPT770 or equivalent (by permission of instructor).

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

Department: School of Computing Science

Course Number: CMPT 880

Course Title: Special Topics in Computing Science.

Course Description for Calendar (append a course outline):

This course aims to give students experience to emerging important areas of Computing Science.

Credit Hours: 3 **Vector:** 3/0/0 **Prerequisites (if any):** Instructor discretion.

Estimated Enrolment: 10

When the course will first be offered: 96-3

Frequency of course offering: irregular (no more than once every 2 years)

Justification:

Need a general course not currently covered by existing courses to allow flexibility in meeting new demands, supporting visiting faculty, and developing new courses.

Resources:

Faculty member(s) who will normally teach this course;

append information about their competence to teach the course: Faculty, visitors

Number of additional faculty members required in order to offer this course: 0

Additional space required in order to offer this course (append details): One classroom

Additional specialized equipment required in order to offer this course (append details): 0

Additional Library resources required (append details): annually: \$ 0 One-time: \$ 0

Any other resources implications of offering this course (append details): None

If additional resources are required to offer this course, the department proposing the course should be prepared to provide information on the source(s) of those additional resources.

Approvals:

Departmental Graduate Program Committee: B. Hanks Date: Oct. 16/95

Faculty Graduate Studies Committee: Parvinder Bawa Date: Nov. 10, 1995

Faculty: Parvinder Bawa Date: Nov. 10, 1995

Following approval by the Faculty, this form and all relevant documentation should be forwarded to the Assistant Director - Graduate Studies in the Office of the Registrar for consideration by the Senate Graduate Studies Committee, the Senate Committee and Academic Planning and Senate.

OBJECTIVE/DESCRIPTION:

This course introduces graduate students to specialized topics in computing science. The intention is to accommodate areas within computing science for which there are no current course offerings (such as software engineering).

CALENDAR DESCRIPTION:

Current topics in Computing Science depending on faculty and student interest.

Prerequisites: instructor discretion.

TOPICS:

Instructor discretion.

TEXTBOOK:

Instructor discretion.

REFERENCES:

Instructor discretion.

ADMINISTRATIVE CONCERNS:

Frequency of Offering: instructor discretion.

Anticipated Enrollment: tba.

Faculty: tba.

COMPUTER FACILITIES:

Machines: instructor discretion.

Languages: instructor discretion.

Special Software: instructor discretion.

PREREQUISITES:

Instructor discretion.

SIMON FRASER UNIVERSITY
New Graduate Course Proposal Form

Department: School of Computing Science **Course Number:** CMPT 883

Course Title: Special Topics in Computer Graphics

Course Description for Calendar (append a course outline):

This course introduces graduate students to specialized topics in computer graphics. In most cases, such topics will build upon those discussed in previous graphics classes, or of prime interest to faculty (such as current research topics).

Credit Hours: 3 **Vector:** 3/0/0 **Prerequisites (if any):** Instructor discretion.

Estimated Enrolment: 5-10

When the course will first be offered: Instructor discretion

Frequency of course offering: Instructor discretion (once every 2/3 years)

Justification:

To allow for courses on research (advanced) topics not covered by the other proposed graphics courses (770, 873, 878).

Resources:

Faculty member(s) who will normally teach this course;
append information about their competence to teach the course: Fracchia, Calvert, Dill, Shermer

Number of additional faculty members required in order to offer this course: 0

Additional space required in order to offer this course (append details): 0

Additional specialized equipment required in order to offer this course (append details): 0

Additional Library resources required (append details): annually: \$ 0 One-time: \$ 0

Any other resources implications of offering this course (append details): instructor discretion.

If additional resources are required to offer this course, the department proposing the course should be prepared to provide information on the source(s) of those additional resources.

Approvals:

Departmental Graduate Program Committee: E. Handberg Date: Oct. 16/95

Faculty Graduate Studies Committee: Parvinder Bawa Date: Nov. 10, 1995

Faculty: Parvinder Bawa Date: Nov. 10, 1995

Following approval by the Faculty, this form and all relevant documentation should be forwarded to the Assistant Director - Graduate Studies in the Office of the Registrar for consideration by the Senate Graduate Studies Committee, the Senate Committee and Academic Planning and Senate.

CMPT 888-3 Special Topics in Computer Graphics

Instructor: D. Fracchia, T. Calvert, J. Dill, T. Shermer

Possibly B. Funt, Z. Li, M. Drew.

OBJECTIVE/DESCRIPTION:

This course introduces graduate students to specialized topics in computer graphics. In most cases, such topics will build upon those discussed in previous graphics classes, or of prime interest to faculty (such as current research topics).

CALENDAR DESCRIPTION:

Current topics in Computer Graphics depending on faculty and student interest.

Prerequisites: instructor discretion.

TOPICS:

Instructor discretion.

TEXTBOOK:

Instructor discretion.

REFERENCES:

Instructor discretion.

ADMINISTRATIVE CONCERNS:

Frequency of Offering: instructor discretion.

Anticipated Enrollment: 5-10 students/offering.

Faculty: F. D. Fracchia, T. Calvert, J. Dill (Eng.), T. Shermer. Possibly B. Funt, Z. Li, M. Drew.

COMPUTER FACILITIES:

Machines: instructor discretion.

Languages: instructor discretion.

Special Software: instructor discretion.

PREREQUISITES:

Instructor discretion.