

**SIMON FRASER UNIVERSITY**

**EDUCATION 497-4**

**SPECIAL TOPICS: COMPUTERS AND MATHEMATICS EDUCATION  
(D1.00)**

Summer Session, 1992  
(June 29 – August 7)  
Monday & Wednesday, 1:00 - 4:50 p.m.  
Location: MPX 9511

Instructor: R. Noss

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**PREREQUISITES: EDUC 401/402.**

**DESCRIPTION**

The course will centre on ways in which mathematics can be articulated using the computer both as a medium of expression and as a tool. The programs used will consist primarily of Logo and Excel, although others may be demonstrated.

The course will be suitable for any graduates and undergraduate students who has an interest in using computers for learning mathematics, particularly prospective or current teachers. The level of mathematics required will be very flexible, and will not assume a high degree of mathematical sophistication. On the other hand, any student wishing to explore advanced topics will be able (and encouraged) to do so. Mathematical topics will cover diverse areas determined largely by the interests of students.

The course will consist of 9 four-hour sessions and 1 whole-day (six hours plus two hour reading assignment), distributed as follows:

4-hour sessions: June 29, July 6, 8, 13, 15, 20, 22, 27, 29.

Whole-day: July 11th. Detailed scheduling subject to negotiation.

Students will be involved in a rich mixture of hands-on time, presentations, discussions and group-work. We will also spend some time looking at the interplay between research in computer-based mathematics education and practical implications for learning and teaching. This will be particularly true for students taking the course for graduate credit. An essential theme of the course will be for students to try out their ideas with kids, older learners, or each other.

**OBJECTIVES**

The objectives of the course will be for students to develop competence and confidence in the use of the computer as a mathematical problem-solving tool; to reflect on their own learning processes and relate these to learners within classrooms or other learning situations; to develop ways of structuring the computer environment within learning situations (such as classrooms) and evaluate its role in terms of pupil/student learning; and to confront the issues of the computer's influence on the role of the teacher, and to increase awareness of individual learning styles.

(PLEASE TURN OVER)

The ethos of the course is based around the belief (derived from many years experience and research) that a computer-based course focussed on the learning of mathematics needs to be substantial in terms of contact time; to concentrate on a small number of powerful computational environments; to offer students the chance to develop personal confidence and competence in using computers to express their own mathematical ideas; and to maintain a balance between clear course-structure and student-control over learning.

The course aims to provide tested computer-based materials for getting started in classrooms; to involve them in the process of microworld design and evaluation; to integrate classroom practice with the technical issues of mathematics and programming.

#### **REQUIRED TEXT**

Harvey, B. (1985). *Computer Science Logo Style*, Volume 1. Boston: MIT Press.

#### **RECOMMENDED READINGS**

To be identified at the first class.

#### **STUDENT ASSIGNMENTS**

- (1) A personal project: Criteria for grading will centre on a) the mathematical content for the topic/level chosen; b) evidence of student's self-reflection on the pedagogical aspects of the project and c) the appropriateness of the computer in the project.
- (2) The development of a mathematical microworld; note — this will be undertaken and assessed collaboratively, and presented by the group at the conclusion of the course. Criteria for evaluation will include a) evidence and nature of collaboration b) self-criticism, c) the extent of the 'links' made between mathematics and computing, d) the role of the computer and its appropriateness in the microworld and e) pedagogical issues.
- (3) One brief case study report of one or more learners exploring some mathematical topic within a Logo or an Excel setting. Grading will be based on evidence of reflection on some of the following a) the role of collaboration and discussion, b) the role of intervention, c) expectations of learners and teachers, d) sensitivity to learners' understandings, e) special needs of 'exceptional' learners.

**PLEASE NOTE:** This course is part of the Summer Institute in Teacher Education (SITE). This course is cross-listed with EDUC 712-5. Students registered in 712 will be expected to provide a theoretical framework within which to set each of the above assignments.