Teaching Outline / Semester 1, 2005-2006

1. **Subject Code:** 240-304 (was 240-311)
   Subject Name: Mathematics for Computer Engineering
2. **Credits**: 3(3-0-0)
3. **Teaching Period**: June 2005 -- October, 2005
4. **Responsible Department**: Dept. of Computer Eng., Fac. of Eng., PSU

5. Course Objectives

5.1. To teach discrete mathematics useful for a deeper understanding of computer engineering;

5.2. Show that mathematical ideas are the building blocks of all of computer engineering/science.

6. Course Description

We teach discrete maths useful for a deeper understanding of computer engineering. For example, how do algorithms like recursion really work, how can programs be proved correct, what data structures are the most suitable for a task?

A solid mathematical background is essential for understanding more advanced computing tools and techniques, such as regular expressions, grammars, and theorem provers.

Mathematics is at the heart of any advanced study of computer engineering, such as Masters or Ph.D. research.

7. Prerequisites

A basic knowledge of maths, including an understanding of mathematical functions, sets, and basic propositional logic.

240-204 *Computer Programming Techniques* (or equivalent)

8. Teaching Method: lectures

9. Course Outline

Week	Subject
1	Preliminaries; Induction
2	Induction
3-4	Invariants and Proofs
5	Recursion
6-7	Big-Oh Analysis

8	Graph Theory Part 1
9	*Midterm Exam*
10	Graph Theory Part 2
11	*PSU Open Week* (no teaching)
12	Trees
13	Automata
14	Regular Expressions
15	Context Free Grammars
16	Propositional and Predicate Logic
17	Predicate Logic
18-19	*Final Exam*

10. Assessment

- Two Exercises: 20% (10% each)
  - Exercise 1 in weeks 6-7, July 11-22
  - Exercise 2 in weeks 15-16, September 12-23
- Mid-term Exam: 35% (2 hours)
- Final Exam: 45% (3 hours)

Grading Scheme

Grade	Mark Range
A	80 and above
B+	75-79
B	70-74
C+	65-69
C	60-64
D+	55-59
D	50-54
E	below 50

11. Lecturer

Name: Dr. Andrew Davison

Affiliation: Dept. of Computer Engineering
Prince of Songkla University

Hat Yai, Songkhla 90112
Tel/Fax: +66 74 212 895
E-mail: ad@fivedots.coe.psu.ac.th
URL: http://fivedots.coe.psu.ac.th/~ad

Teaching Equipment

- white board, black board, chalk, marker pens, a computer with network connection, a projector connected to the computer, a projector screen, overhead projector, chair

References

One copy of my PowerPoint slides will be given to the students.

I will supply URLs for information on the Web.

Textbooks

- *Discrete Mathematics and its Applications*
  Kenneth H. Rosen
  McGraw Hill, 1999, 4th ed.
- *Discrete Mathematics for Computer Scientists*
  John K. Truss
  Addison-Wesley, 1999, 2nd ed.
- *Foundations of Computer Science* (C Edition)
  A. V. Aho & J.D. Ullman
  W.H. Freeman & Co., 1995
- *Discrete Mathematics*
  Richard Johnsonbaugh
  Macmillian Pub. Co., 1997, 4th ed.

The *Rosen* and Truss texts are the CoE library, the *Johnsonbaugh* text is in the PSU library. The Pascal edition of *Aho and Ullman* in the CoE library; the C edition is available from me on request.

12. Subject Type: compulsory

13. Teaching Schedule and Timetable

3 hours/week for 15 weeks
(not including 3 weeks for exams, 1 week for PSU Open Week)