

## MATHEMATICS 137: MATHEMATICS FOR ELECTRONIC ENGINEERING TECHNOLOGY I

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**Lectures:** M 1230-1320, C176,  
WF 0830-0920, C130,  
R 1330-1420, C130  
**Office Hours:** T 1030-1330, other times by appointment only  
**Text:** Washington, *Basic Technical Mathematics with Calculus*, 9<sup>th</sup>  
Edition, Addison-Wesley

**COURSE DESCRIPTION:** Topics include a review of intermediate algebra, functions, graphs, matrices, determinants, trigonometry, complex numbers, logarithms and exponentials. Emphasis is on applications in electronics. (4,0,0)

**PREREQUISITE:** Admission to the Electronic Engineering Technology program.

**CALCULATORS:** All students are required to have a basic scientific calculator. In keeping with the policy of the Electronic Engineering Technology Department, **calculators with graphical, alphanumeric or symbolic capabilities may not be used on examinations.**

**HELP DURING OFFICE HOURS:** If you are having trouble with the course work at any point, then I need to know. Either see me during office hours or email me. **This should not occur the day before either a test or the final exam. Do not hesitate; take action right away to clear up your difficulties.** Consult my schedule for office hours. I will always be available to help you during these hours. I will also be available at other times by appointment. When an immediate concern arises or a problem has you frustrated, please email me so that I may assist you.

**ADDITIONAL HELP:** The **Kelowna Campus Learning Centre** is located in the Student Services Building, Room S111H. There is a mathematics tutor on duty at the Centre who may be able to help you with problems that you are having in Mathematics 137. If you cannot find me, the Learning Centre should be a reasonable alternative.

### EVALUATION:

Assignments & WebCT Quizzes	20%
Term Tests (2)	15%, 25%
Final Exam	40%

**TERM TESTS:** Each term test shall be about sixty minutes in length. You shall receive at least one week's notice of an impending test. **The final exam, written in the December examination period, shall be three hours in length. You must obtain at least 35% in the final exam in order to pass the course.** Mathematics 257 uses the OC standardized grading scheme described on page 155 in 2007-2008 OC calendar.

Please read the discussion on cheating and plagiarism found on the website:

<http://www.okanagan.bc.ca/calendar/general-academic-regulations-policies/general-academic-regulations-policies/academic-offenses.html>

or on page 163 in the 2007-2008 OC Calendar. These are academic regulations, which shall be enforced in the classroom.

**POLICY ON EXAMINATIONS:** Normally, term tests and the final examination must be written at the scheduled time and out-of-time exams are not permitted. However, you may be prevented from writing an examination at the scheduled time because of medical reasons, family difficulties, legal obligations, religious beliefs, etc. In such cases, arrangements may be made for an out-of-time examination. Students should be prepared to provide written evidence that they are unable to write the exam at the scheduled time.

**WebCT:** WebCT is a set of web-based tools, which we shall use to help organize the course. Through WebCT, you will have access to any on-line course material from off campus, as long as you have an Internet connection. I will use WebCT to post a variety of supplementary course materials, so you should check occasionally to see what new stuff has been posted. You will also be able to access your course grades through WebCT.

**HOMEWORK & ASSIGNMENTS:** You will be assigned problems from the textbook as homework. **You should seriously attempt all of the assigned problems.** When there is no corresponding text section, supplemental problems will be given in class. Questions on tests and examinations will closely resemble the assigned problems. Consequently, seriously working on these problems is vital to obtain higher grades.

You will also be given regular assignments to complete. These assignments are worth 15% of your final grade.

**MATLAB:** We will introduce the computer software Matlab and see how this software can be used to perform various algebraic, computational and graphical tasks.

**COURSE SYLLABUS:** The following represents an approximate course outline. It is possible that not all of the topics will be covered. Moreover, the order in which topics are covered may vary from what is given below.

## MAIN TOPICS

### 1. Basic Numerical Computations

- a) Number systems, order of operations, significant digits & evaluation of formulae, exponents, scientific notation, radicals: § 1.1 – 1.6
- b) Units of measurement : Appendix B (*self-study*)

### 2. Basic Algebra

- a) Fundamental algebraic operations: § 1.7 – 1.9
- b) Factoring, simplify rational expressions: § 6.1 – 6.7 (6.4 optional)
- c) Simplifying expressions with integer and rational exponents: § 11.1 – 11.5
- d) Simplifying algebraic expressions in Matlab

### 3. Equation Solving

- a) Basic equation solving, word problems: § 1.10 – 1.12
- b) Linear systems of equations: § 5.1, 5.4, 5.6
- c) Equations involving rational functions: § 6.8
- d) Quadratic equations: § 7.1 – 7.3
- e) Nonlinear systems of equations, equations in quadratic form, equations involving radicals: § 14.2 – 14.4
- f) Solving equations in Matlab

### 4. Functions & Graphs

- a) Functions, domain, range, rectangular coordinates, graphs of functions, tables of data and linear interpolation: § 3.1 – 3.6
- b) Graphs of linear functions: § 5.2
- c) Graphs of quadratic functions: § 7.4
- d) Function and graphing in Matlab

### 5. Basic Trigonometry

Angles, definitions of trigonometric functions, values at special angles, right triangles and applications: § 4.1 – 4.5

### 6. Trigonometric Functions

- a) Reference angles, radians and applications: § 8.1 – 8.4
- b) Graphs of trigonometric functions: § 10.1 – 10.6
- c) Trigonometric functions and parametric curves (Lissajou figures) in Matlab

**7. Exponential & Logarithmic Functions**

Properties of exponential and logarithmic functions, base 10 logarithms, natural logarithms, logarithmic and exponential equations, graphs with logarithmic scales:  
§ 13.1 – 13.7

**8. Vectors**

Vector algebra & applications: § 9.1 – 9.4

**9. Complex Numbers**

Algebra of complex numbers, polar and exponential forms, applications to AC circuits: § 12.1 – 12.7

**ADDITIONAL TOPICS (time permitting)**

**10. Ratios, Proportions & Variation**

§ 18.1 – 18.2

**11. Additional Topics in Trigonometry**

- a) Trigonometric identities, trigonometric equations, inverse trigonometric functions: § 20.1 – 20.6
- b) Oblique triangles, law of sines and law of cosines: § 9.5 – 9.6

**12. Analytic Geometry**

Euclidean distance and conic sections (straight lines, circles, parabolas, ellipses and hyperbolas): § 21.1 – 21.6