**MATH 250A Intermediate Calculus 1 for Engineers Class Outline**

**Calendar Description**

*This course is restricted to students in the Engineering Bridge (UVic) program.* Topics: techniques of integration, indeterminate forms, infinite series, parametric and polar coordinates, vectors and geometry of 3-space, vector functions and partial derivatives.

**Course Information**

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|---|---|
| **Instructor:** | Dr. Peter J. Trushel |
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| **web site:** | http://ccins.camosun.bc.ca/~trushel/math250a |
| **web tools:** | http://ccins.camosun.bc.ca/~trushel/etc/ |
| **Office:** | CBA 151 Interurban Campus |
| **Phone:** | (250) 370-4490 |
| **Office hours:** | by appointment or posted |

**Organization**

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|---|---|
| OFFERED: | 4th Quarter |
| CREDIT: | 3 |
| IN-CLASS WORKLOAD: | 5 hours lecture/week |
| OUT-OF-CLASS WORKLOAD: | 6 hours/week |
| PREREQUISITES: | Admission to the Engineering Bridging Program |
| COREQUISITES: | Math 251 (formerly 130) |

**Objectives**

To reinforce the Engineering Bridging Program students' understanding of intermediate calculus concepts, techniques and applications.

**Text**

Roland E. Larson, Robert P. Hostetler and Bruce H. Edwards, *Calculus*, 7th ed. Houghton Mifflin Company, 2002.

**Recommended Calculator**

Texas Instruments    TI-89.

**Evaluation**

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| Four 2 hour term tests: | 50% |
| Comprehensive final exam: | 50% |

**Midterm Dates**

Mid-Terms will be held in CC 124A/B for both sections on the following Mondays.

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|---|---|
| 12 July, 2004 | Test 1 |
| 26 July, 2004 | Test 2 |
| 9 August, 2004 | Test 3 |
| 23 August, 2004 | Test 4 |

**OUTLINE**

**Background**

| Text (week) | Hours | Topic |
|---|---|---|
| 1.1 (1) | Read | A Preview of Calculus |
| 1.2 (1) | 1 | Finding Limits Graphically and Numerically |
| 1.3 (1) | 1 | Evaluating Limits Analytically |
| 1.4 (1) | 1 | Continuity and One-Sided Limits |
| **1 July, 2004** | | **Canada Day** |
| 2.4 (1) | 1 | The Chain Rule |
| 2.5 (2) | 1 | Implicit Differentiation |
| 4.5 (2) | 1 | Integration by Substitution |
| **Total hours** | **6** | |

**Integration Techniques, L'Hôpital's Rule, and Improper Integrals**

| Text (week) | Hours | Topic |
|---|---|---|
| 7.1 (2) | 2 | Basic Integration Rules |
| 7.2 (2, 3) | 2 | Integration by Parts |
| 7.3 (3) | 2 | Trigonometric Integrals |
| **12 July, 2004** | | **Test 1** |
| 7.4 (3) | 2 | Trigonometric Substitution |
| 7.5 (4) | 2 | Partial Fractions |
| 7.6 (4) | read | Integration by Table and Other Integration Techniques |
| 7.7 (4) | 2 | Indeterminate Forms and L'Hopital's Rule |
| 7.8 (4, 5) | 2 | Improper Integrals |
| **Total hours** | **14** | |

**Infinite Series**

| Text (week) | Hours | Topic |
|---|---|---|
| 8.1 (5) | 1 | Sequences |
| **26 July, 2004** | | **Test 2** |
| 8.2 (5) | 1 | Series and Convergence |
| 8.3 (5) | 1 | The Integral Test and $p$-Series |
| 8.4 (5) | 1 | Comparisons of Series |
| **2 August, 2004** | | **BC Day** |
| 8.5 (6) | 1 | Alternating Series |
| 8.6 (6) | 1 | The Ratio and Root Tests |
| 8.7 (6) | 1 | Taylor Polynomials and Approximations |
| 8.8 (6) | 1 | Power Series |
| 8.9 (6, 7) | 2 | Representation of Functions by Power Series |
| 8.10 (7) | 2 | Taylor and Maclaurin Series |
| **9 August, 2004** | | **Test 3** |
| **Total hours** | **12** | |

**Conics, Parametric Equations, and Polar Coordinates**

| Text (week) | Hours | Topic |
|---|---|---|
| 9.1 (7) | Read | Conics and Calculus |
| 9.2 (7) | 2 | Plane Curves and Parametric Equations |
| 9.3 (8) | 2 | Parametric Equations and Calculus |
| 9.4 (8) | 2 | Polar Coordinates and Polar Graphs |
| 9.5 (8, 9) | 2 | Area and Arc Length in Polar Coordinates |
| 9.6 (9) | 2 | Polar Equations of Conics and Kepler's Law |
| **Total hours** | **10** | |

**OUTLINE (continued)**

### Vectors and Geometry of Space

| Text (week) | Hours | Topic |
|---|---|---|
| **23 August, 2004** | | **Test 4** |
| 10.1 (9) | Read | Vectors in the Plane |
| 10.2 (9) | Read | Space Coordinates and Vectors in Space |
| 10.3 (9) | 1 | The Dot Product of Two Vectors |
| 10.4 (9) | 1 | The Cross Product of Two Vectors in Space |
| 10.5 (10) | 1 | Lines and Planes in Space |
| 10.6 (10) | 2 | Surfaces in Space |
| 10.7 (10) | 2 | Cylindrical and Spherical Coordinates |
| **Total hours** | **7** | |

### Vector-Valued Functions

| Text (week) | Hours | Topic |
|---|---|---|
| 11.1 (11) | 1 | Vector-Valued Functions |
| 11.2 (11) | 2 | Differentiation and Integration of Vector-Valued Functions |
| 11.3 (11) | 1 | Velocity and Acceleration |
| 11.4 (11) | 1 | Tangent Vectors and Normal Vectors |
| **Total hours** | **5** | |

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|---|---|
| **Lecture** | 54 hours |
| **Holiday** | 1 hour |
| **Total** | 55 hours |

### Percentage to Letter Grade Conversion

| Percentage | Letter Grade |
|---|---|
| 95 to 100 | A+ |
| 90 to 94 | A |
| 85 to 89 | A- |
| 80 to 84 | B+ |
| 75 to 79 | B |
| 70 to 74 | B- |
| 65 to 69 | C+ |
| 60 to 65 | C |
| 50 to 59 | D |
| below 50 | F |