University of Alberta

Math 372 – Mathematical Modelling I
Section A1
Fall 2012

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Office Hours: MW 1-1:50pm and R 3-3:50pm or by appointment.
Lecture Room & Time: NRE 2 020, MWF 12-12:50pm

Course Description: This course is designed to develop the students' problem-solving abilities along heuristic lines and to illustrate the processes of Applied Mathematics. Students will be encouraged to recognize and formulate problems in mathematical terms, solve the resulting mathematical problems and interpret the solution in real world terms. Typical problems considered include nonlinear programming, optimization problems, diffusion models.

Course Prerequisites: MATH 120 or 125 or equivalent; MATH 215.

Course Objectives: The main goal of this course is to develop the following skills:
1) The ability to model real-world problems, by translating them into mathematical equations.
2) The ability to solve the model (in conjunction with appropriate computational methods).
3) The ability to interpret the mathematical solution in terms of the real-world application.
4) The ability to assess the strengths and weaknesses of the model and the information obtained from it.

Recommended Textbook: "A first course in mathematical modeling," 4th edition, by Frank R. Diordano, William P. Fox, Steven B. Horton, and Maurice D. Weir

Representative Evaluative Material: Sample midterm problems will be made available on the class website.

Grade Evaluation: Your grade will be determined using the following weighting:

Homework-Assignments (approximately 1 every 2 weeks)	**40%**
Midterm exam (In class, October 26th, 2012)	**20%**
Final Project and Presentation (Report due December 3rd, 2012. Presentations during the last 2-3 weeks of class):	**40%**

After the numerical grades are calculated, letter grades will be determined using the following mapping:

Course mark	Letter grade
95-100	A+
90-94	A
85-89	A-
80-84	B+
75-79	B
70-74	B-
65-69	C+
60-64	C
55-59	C-
52-54	D+
50-51	D
0-49	F

Grades may be adjusted to account for exceptional grade distributions.

Grades are unofficial until approved by the Department of Mathematical and Statistical Sciences and the Faculty of Science.

Missed Term Exams and Assignments:
A student who cannot write a term project or complete a term assignment due to incapacitating illness, severe domestic affliction or other compelling reasons can apply for an extension.

An extension is a privilege and not a right; there is no guarantee that it will be granted. Misrepresentation of Facts to gain an extension is a serious breach of the *Code of Student Behaviour*.

Topics to be Covered: The course will focus on two main types of models:

1) *optimization models* (topics include single-variable optimization, constrained and unconstrained multi-variable optimization, sensitivity analysis, linear programming, symbolic computation).
2) *dynamical models* (topics include discrete and continuous models, steady states, stability analysis, phase plane analysis, periodic behaviour, numerical simulation).

Student Responsibilities:
ACADEMIC INTEGRITY: "The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with

these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at http://www.governance.ualberta.ca/en/CodesofConductandResidenceCommunityStandards/CodeofStudentBehaviour.aspx) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University."

All forms of dishonesty are unacceptable at the University. Any offence will be reported to the Senior Associate Dean of Science who will determine the disciplinary action to be taken. Cheating, plagiarism and misrepresentation of facts are serious offences. Anyone who engages in these practices will receive at minimum a grade of zero for the exam or paper in question and no opportunity will be given to replace the grade or redistribute the weights. As well, in the Faculty of Science the sanction for **cheating** on any examination will include **a disciplinary failing grade** (no exceptions) and senior students should expect a period of suspension or expulsion from the University of Alberta.

CELL PHONES: Cell phones are to be turned off during lectures, labs and seminars. Cell phones are not to be brought to exams.

STUDENTS WITH DISABILITIES: Students who require accommodation in this course due to a disability are advised to discuss their needs with Specialized Support & Disability Services (2-800 Students' Union Building).

ACADEMIC SUPPORT CENTRE: Students who require additional help in developing strategies for better time management, study skills or examination skills should contact the Student Success Centre (2-300 Students' Union Building).

Policy about course outlines can be found in section 23.4(2) of the University Calendar.

Disclaimer: Any typographical errors in this Course Outline are subject to change and will be announced in class.

Note: Recording is permitted only with the prior written consent of the professor or if recording is part of an approved accommodation plan.