

Concordia University
Faulty of Engineering and Computer Science
Department of Mechanical & Industrial Engineering

Course Outline
MECH 370 – Modelling, Simulation and Analysis of Physical Systems

Summer 2007

Instructor:

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Office Hours: Tuesdays and Thursdays, 14:00 - 15:00; EV 4-109

TAs:

Tutorials:

Mohammad Aljanaideh (CE, WF)	Email: mohammad9237@yahoo.ca	EV 11.215, ext 7090
Mohammad Qasaimeh (CF, WF)	Email: m_qasai@encs.concordia.ca	EV 12.154, ext 7215

Labs:

Mohammad Aljanaideh (CP, J; CQ,J)	Email: mohammad9237@yahoo.ca	EV 11.215, ext 7090
Mohammad Qasaimeh (CK, J; CL,F)	Email: m_qasai@encs.concordia.ca	EV 12.154, ext 7215
Xiaoxi Huang (CI, M; CJ, M ; CN,M)	Email: xiaoxihuang@hotmail.com	EV S3.335, ext 7078

Assignments:

Alfin Amalorpavasamy	Email: alfinleo@rediffmail.com	EV 14.119, ext 7238
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Textbook:

C. M. Close, D. K. Frederick and J. C. Mewell, *Modeling and Analysis of Dynamic Systems*, 3rd edition, John Wiley and Sons Inc., 2002, ISBN: 0-471-39442-4.

Lectures:

Wednesdays and Fridays, 15:45 - 18:15; Location: SGW H-507

Tutorials:

Wednesdays and Fridays, 14:00 - 14:50 (CE: H-431; CF: H-427)

Laboratory:

The laboratory will start from the July 9, 2007 (Monday) at H-822. A passing mark in laboratory is mandatory. You are required to perform all the experiments. If you miss more than one experiment, you will receive a grade *R*. For further details, please contact Mr. N. Suresh (Office: H-851-02, Tel: x3157).

Course Descriptions:

Definition and classification of dynamic systems and components. State-variable and input-output models. Modelling of system components: electrical, mechanical, fluid, and thermal. Modelling of multi-domain systems. Nonlinear systems and linear representations of nonlinear components. Simulation techniques. Analysis and solution techniques for linear systems. Transfer functions and block diagrams. Frequency response.

Design Soft Skill:

The following design soft skill will be included in this course:

Engineering Tool Usage: An ability to create, select and apply appropriate techniques, resources, and modern engineering tools, including prediction and modelling, to a range of engineering activities, from simple to complex, with an understanding of the associated limitations.

TEACHING – This course focuses on introduction to the methodologies and tools for modelling, simulation and analysis of different types of physical systems, from simple to complex, covering components from mechanical, electrical, electromechanical, thermal, and fluid systems, with an understanding of the dynamics of systems for the purposes of modelling, simulation and analysis.

PRACTICE – Problems given in the assignments will involve significantly the activities and tools as mentioned in the above.

EVALUATION – This aspect will be covered by assignments and examination problems.

Lecture Topics:

1. Definition and classification of dynamic systems (chapter 1)
2. Translational mechanical systems (chapter 2)
3. Standard forms for system models (chapter 3)
4. Block diagrams and computer simulation using Matlab/Simulink (chapter 4)
5. Rotational mechanical systems (chapter 5)
6. Electrical systems (chapter 6)
7. Analysis and solution techniques for linear systems (chapter 7)
8. Transfer functions analysis (chapter 8)
9. Nonlinear systems and linear representation of nonlinear components (chapter 9)
10. Electromechanical systems (chapter 10)
11. Thermal and fluid systems (chapter 11, 12)

Grading Scheme:

Assignments	10 %
Midterm exam	20 % (Tentative date: July 18, 2007)
Final exam	60 %
Laboratory	10 % (Need 70 out of 100 to pass)
Total	100 %

If the grade of the final exam is better than the combined mark of the mid-term examination then it will carry 80% of the final grade. If the student misses the mid-term test for any reason, including illness, then the weight will be counted in final examination. No backup midterm test. If a student does not write the final and midterm exams, and with very poor performance in assignments and labs, then the grade will be *R*.

Course Webpage:

Assignment solutions, lecture notes, review material, and other types of important information will be regularly posted on the Moodle and some information is also available at following webpage:

http://users.encs.concordia.ca/~ymzhang/courses/Modeling/MECH370_S07.html