Western University
Faculty of Engineering
Department of Mechanical & Materials Engineering

MME 9527b – Advanced CAE: Reverse Engineering

COURSE OUTLINE 2015-2016

DESCRIPTION: This course is an introduction to the use of modern computer-aided design (CAD) techniques in generation of 3D digital models from physical objects. Topics include contact and non-contact data acquisition techniques, data type and exchange formats, and advanced visualization and surfacing techniques.

PREREQUISITES: Graduate standing in MME or permission from the instructor

ANTIREQUISITES: None

TOPICS:
1. Introduction to reverse engineering of physical objects
2. Data acquisition techniques
3. Data types and data exchange formats
4. Parametric data reconstruction

CONTACT HOURS: 3 lecture hours and 2 laboratory hours per week, half course

TEXTBOOK(S): None

REFERENCES:
1. Raja V., Fernandes, K.J., *Reverse Engineering, an Industrial Perspective*, Springer-Verlag, 2008.
2. Zeid I., *Mastering CAD/CAM*, McGraw-Hill, 2005.
3. Tickoo S., *NX 9 for Designers*. CADCIM Technologies, 2014.
4. Zeid I., *Mastering SolidWorks, the Design Approach*, Peachpit Press, 2014.

EVALUATION: The final course grade will be determined as listed below:
Deadline dates for assignments, projects, and examinations are determined according to the **tentative** schedule as follows:

Evaluation Format	Weight	Assigned	Due
Workshop 1	2%	Jan. 18	Jan. 22
Workshop 2	2%	Jan. 25	Jan. 29
Workshop 3	2%	Feb. 1	Feb. 5
Workshop 4	2%	Feb. 8	Feb. 12
Assignment 1	5%	Feb. 8	Mar. 4
Workshop 5	2%	Feb. 22	Feb. 26
Project	30%	Mar. 1	Apr. 6
Assignment 2	5%	Mar. 16	Apr. 6
Final Exam	50%	Written at the same time with final exam in MME 4480b	

Please note that:

- Laboratory session attendance (2 hours/week) is mandatory.
- Final examination is closed book.
- Only non-programmable calculators will be allowed during the final examination.

INSTRUCTOR: Professor R. Tutunea-Fatan
Office: SEB 2063A; Tel. 519-661-2111, ext. 88289
Email: rtutunea@eng.uwo.ca
Office hours: by appointment via email or drop in

ATTENDANCE: Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course, will be reported to the Associate Dean (Graduate) (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Associate Dean (Graduate), the student will be debarred from taking the regular examination in the course

CONDUCT: Students are expected to arrive at lectures on time, and to conduct themselves during class in a professional and respectful manner that is not disruptive to others.

HEALTH/WELLNESS: As part of a successful graduate student experience at Western, we encourage students to make their health and wellness a priority. Western provides several on campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your graduate degree. For example, to support physical activity, all students, as part of their registration, receive membership in Western's Campus Recreation Centre. Numerous cultural events are offered throughout the year. Please check out the Faculty of Music web page http://www.music.uwo.ca/, and our own McIntosh Gallery http://www.mcintoshgallery.ca/. Information regarding health- and wellness-related services available to students may be found at http://www.health.uwo.ca/

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or other relevant administrators in their unit. Campus mental health resources may be found at http://www.health.uwo.ca/mental_health/resources.html

To help you learn more about mental health, Western has developed an interactive mental health learning module, found here: http://www.health.uwo.ca/mental_health/module.html. This module is 30 minutes in length and provides participants with a basic understanding of mental health issues and of available campus and community resources. Topics include stress, anxiety, depression, suicide and eating disorders. After successful completion of the module, participants receive a certificate confirming their participation.

SICKNESS: Students should immediately consult with the instructor or Associate Chair (Graduate) if they have problems that could affect their performance in the course. The student should seek advice from the Instructor or Associate Chair (Graduate) regarding how best to deal with the problem. Failure to notify the Instructor or the Associate Chair (Graduate) immediately (or as soon as possible thereafter) will have a negative effect on any appeal.

ACCESSIBLITY: Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

PLAGIARISM/ ACADEMIC OFFENCES: Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence. Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_grad.pdf

NOTICES: Students are responsible for regularly checking their Western email and notices posted on Instructors' doors.

NOTE: The above topics and outline are subject to adjustments and changes as needed.

Learning Outcomes (Graduate Coursework)

Degree Level Expectation	Weight	Assessment Tools	Outcomes
Depth and breadth of knowledge	45%	• Assignments • Project • Final exam	• Understands advanced concepts and theories • Aware of important current problems in the field of study • Understands computational and/or empirical methodologies to solve related problems
Research & scholarship	10%	• Assignments • Project	• Able to conduct critical evaluation of current advancements in the field of specialization • Able to conduct coherent and thorough analyses of complex problems using established techniques/principles and judgment
Application of knowledge	30%	• Assignments • Workshops • Project • Final exam	• Able to apply knowledge in a rational way to analyze a particular problem • Able to use coherent approach to design a particular engineering system using existing design tools
Professional capacity / autonomy			• Aware of academic integrity • Implements established procedures and practices in the coursework • Defends own ideas and conclusions • Integrates reflection into his/her learning process
Communication skills	10%	• Assignments • Final exam	• Communicates (oral and/or written) ideas, issues, results and conclusions clearly and effectively
Awareness of limits of knowledge	5%	• Assignments • Project	• Aware of the need of assumptions in complex scientific analyses and their consequences • Understands the difference between theoretical and empirical approaches • Acknowledges analytical limitation due to complexity of practical problems

Common assessment tools: Assignments, term exams, lab work, case studies, projects, oral exam, final exam.