OBJECTIVES: To introduce fundamental energy analysis of various systems involved in the built environment, learn modelling aspects of these building systems, and perform simulations and analysis using common energy modelling software. To learn modelling aspects for compliance.

PREREQUISITES: Graduate student standing or permission from the instructor

ANTIREQUISITES: None

TOPICS:
1. Energy resources and consumption
2. Review of heat transfer fundamentals
3. Fundamental energy analysis of building systems
4. Introduction to modelling aspects in building systems
5. Introduction to energy modelling software
6. Energy modelling case studies: Simulation and analysis
7. Life cycle cost analysis

CONTACT HOURS: 2 lecture hours per week, half course

TEXTBOOK(S): None

REFERENCES:
5. ASHRAE Handbook of Fundamentals (2009 or 2011). American Society of Heating Ventilating and Air Conditioning Engineers, Atlanta, Georgia, US.

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

Assignment 20% [One assignment (Tentative): Due date, Mar. 6]

Project 50% [Due date: April 10]

Final Examination 30% [April 3] (Closed book)

INSTRUCTOR: Professor K. Siddiqui
Office: SEB 3078, Tel. 519-661-2111, ext. 88234
Email: ksiddiq@uwo.ca
Office Hours: Tuesdays (1:00 pm-2:00 pm), or by appointment

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.

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.

ACCESSIBILITY: 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.
<table>
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<th>Degree Level Expectation</th>
<th>Weight</th>
<th>Assessment Tools</th>
<th>Outcomes</th>
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| Depth and breadth of knowledge     | 30%    | • 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%    | • 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           | 35%    | • Assignments • 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               | 15%    | • Project report • Project presentation | • Communicates (oral and/or written) ideas, issues, results and conclusions clearly and effectively |
| Awareness of limits of knowledge   | 10%    | • 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 |