RYERSON UNIVERSITY

Faculty of Engineering and Architectural Science (FEAS)
Department of Electrical and Computer Engineering

COE618: Object Oriented Engineering Analysis and Design Course Outline

Prerequisites	COE318
Website	my.ryerson.ca (Blackboard)
Compulsory Text	*Program Development in Java: Abstraction, Specification, and Object-Oriented Design*, by Barbara Liskov and John Guttag, 2000, Addison-Wesley, ISBN: 0201657686.
Reference Texts	- *Design Patterns Explained: A New Perspective on Object-Oriented Design*, by Alan Shalloway and James R. Trott, 2004, Addison-Wesley Professional, Second Edition, ISBN 0321247140. - *Design Patterns: Elements of Reusable Object-Oriented Software*, by Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, 1995, Addison-Wesley Professional, First Edition, ISBN 0201633612. - *Object-Oriented Software Engineering: Using UML, Patterns, and Java*, by Bernd Bruegge and Allen H. Dutoit, 2003, Prentice Hall, Second edition, ISBN 0130471100. - *Head First Design Patterns*, by Eric Freeman, Elisabeth Freeman, Kathy Sierra, Bert Bates, 2004, O'Reilly, First Edition, ISBN 0596007124.
Calendar Description	This course deals with the analysis and design of complex engineering systems. In particular, students will be asked to create requirement specifications prior to the design and implementation of such engineering systems. Case studies from software development projects will be used to illustrate the design process. Development of expertise in analyzing, designing, implementing, and testing industrial-quality, reusable software systems.
Course Organization	3 hours of lecture per week for 13 weeks 2 hours of lab per week for 12 weeks
Course Evaluation	Midterm exam 10% Labs 20% Quiz 5% Final exam 40% Project: Demonstration: 5% Report: 20% Total 100%

	• **IMPORTANT:** Students must achieve passing grades in both the theoretical and the laboratory components of the course in order to pass the course. • All the Labs have to be done individually. • Lab assignments should be submitted 24 hours before the beginning of next lab. Late lab assignments will not be accepted and will receive a mark of 0. • The project should be done in a group of 2-3 students.
Examinations	Quiz in Week 4, multiple-choice and questions, closed book (covers weeks 1-3). The marks will be returned approximately within two weeks after the quiz. Midterm exam in Week 7, multiple-choice and questions, closed book (covers weeks 1-6). The marks will be returned approximately within two weeks after the midterm. Final exam, during exam period, 3 hours, closed-book (covers weeks 1-13).

Learning Objectives

At the end of this course, the successful student will be able to:

1. Apply Object-Oriented Software Engineering principles and concepts to solve technical problems (1c).
    - Assessment Method: Quiz, Midterm, Final exam, and Labs

2. Use the knowledge of object oriented design methodology, design patterns, and UML design tools (4a); Integrate the existing design patterns into the software design where applicable (4d); Select the most appropriate design pattern to address a software design problem (4g).
    - Assessment Method: Midterm, Final exam, Labs, and Project Report

3. Produce course project report using appropriate format (7a); Demonstrate the project to the Teaching Assistant through oral communication (7b).
    - Assessment Method: Project Report and Project demonstration

Note: Numbers in parentheses refer to the graduate attributes required by the Canadian Engineering Accreditation Board. For more information, see: http://www.feas.ryerson.ca/quality_assurance/accreditation.pdf

Lecture Schedule

NOTE: This is a preliminary schedule and is subject to change and modifications.
In the table below, chapter numbers are from the "*Program Development in Java"* book.

Chapter	Section	hours	Topic
2	2.1-2.8	3	Understanding Objects in Java
1	1.1- 1.3	3	Abstraction and Decomposition Decoupling and Specifications
3	3.1-3.6	3	Procedural Abstraction
5	5.1-5.10	3	Data Abstraction
		3	Modeling with UML
10	10.1, 10.2, 10.4, 10.7	3	Testing and Debugging
15		12	Design Patterns
11	11.1-11.3	3	Requirements Analysis
12	12.1-12.4	3	Requirements Specification
13	13.1-13.7	3	Object-Oriented Software Design

Lab Schedule

Week	Title
2, 3 (4 marks)	Review Java programming and JUnit (for testing) using NetBeans IDE.
4 (3 marks)	Procedural Abstraction - Implement and specify procedures with requires, modifies and effects clauses.
5 (3 marks)	Implement an application using Interfaces and Abstract Classes.
6 (4 marks)	Data Abstraction – Provide and implement the rep invariant and abstract function for each given class.
7, 8 (6 marks)	UML Modeling - Analyze system requirements of a software system, design with UML diagrams, implement and test the system.
9, 10, 11, 12	Project

Missed Classes and/or Evaluations

Students are required to inform their instructors of any situation which arises during the semester which may have an adverse effect upon their academic performance, and must request any considerations and accommodations according to the relevant policies and well in advance. Failure to do so will jeopardize any academic appeals.

- *Medical certificates* – If a student misses the deadline for submitting an assignment, or the date of an exam or other evaluation component because of illness, he or she must submit a Ryerson Student Medical Certificate AND an Academic Consideration form within 3 working days of the missed date. Both documents are available at www.ryerson.ca/senate/forms/medical.pdf. **If you are a full-time or part-time degree student, then you submit your forms to your own program department or school. If you are a full-time or part-time degree student, then you submit your forms to your own program department or school. If you are a certificate or non-certificate student, then you submit your forms to the staff at the front desk of the Chang School.**
- *Religious observance* – If a student needs accommodation because of religious observance, he or she must submit a Request for Accommodation of Student Religious, Aboriginal and Spiritual Observance AND an Academic Consideration form within the first 2 weeks of the class or, for a final examination, within 2 weeks of the posting of the examination schedule. If the required absence occurs within the first 2 weeks of classes, or the dates are not known well in advance as they are linked to other conditions, these forms should be submitted with as much lead time as possible in advance of the required absence. Both documents are available at http://www.ryerson.ca/senate/forms/relobservforminstr.pdf. **If you are a full-time or part-time degree student, then you submit the forms to your own program department or school. If you are a certificate or non-certificate student, then you submit the forms to the staff at the front desk of the Chang School**.
- *Students with disabilities* – In order to facilitate the academic success and access of students with disabilities, they should register with the Access Centre http://www.ryerson.ca/studentservices/accesscentre/index.html. Before the first graded work is due, students should also inform their instructor through an "Accommodation Form for Professors" that they are registered with the Access Centre and what accommodations are required.

Academic Integrity and Plagiarism

Ryerson's Policy 60 (the *Student Code of Academic Conduct)* applies to all students at the University. The policy and its procedures are triggered in the event that the there is a suspicion that a student has engaged in a form of academic misconduct.

Forms of academic misconduct include plagiarism, cheating, supplying false information to the University, and other acts. The most common form of academic misconduct is plagiarism. Plagiarism is a serious academic offence and penalties can be severe. In any academic exercise, plagiarism occurs when one offers as one's own work the words, data, ideas, arguments, calculations, designs or productions of another without appropriate attribution or when one allows one's work to be copied.

All academic work must be submitted using the citation style approved by the instructor. The most common citation style is APA. Students may refer to the Ryerson Library for APA style guide references: http://library.ryerson.ca/guides/toolbox/style/

It is assumed that all examinations and work submitted for evaluation and course credit will be the product of individual effort, except in the case of group projects arranged for and approved by the course instructor. Submitting the same work to more than one course, without instructor approval, is also considered a form of plagiarism.

Students are advised that suspicions of academic misconduct may be referred to the Academic Integrity Office (AIO). Students who are charged with academic misconduct will have a Disciplinary Notation (DN) placed on their academic record (not on their transcript) and will be assigned one or more of the following penalties:

- A grade reduction for the plagiarized work
- A zero for the plagiarized work
- An F in the course
- More serious penalties up to and including expulsion from the University

For more detailed information on these issues, please refer to the full online text for the *Student Code of Academic Conduct* at http://www.ryerson.ca/senate/policies/pol60-F2014.pdf and the Academic Integrity Website at www.ryerson.ca/ai.

Important Resources Available at Ryerson

Use the services of the University when you are having problems writing, editing or researching papers, or when you need help with course material:

- **The Library** (LIB 2nd floor) provides research workshops and individual assistance. Inquire at the Reference Desk or at www.ryerson.ca/library/info/workshops.html
- **The Writing Centre** (LIB 272- B) offers one-on-one tutorial help with writing and workshops www.ryerson.ca/writingcentre/workshops.htm
- **Learning Success** (VIC B-15) offers individual sessions and workshops covering various aspects of researching, writing, and studying. You must book these directly through their website http://www.ryerson.ca/studentservices/learningsuccess/
- **English Language Support** (VIC B-17) offers workshops to improve overall communication skills www.ryerson.ca/studentservices/els/

There is one general site where you may see and register for all of the workshops offered by all of these areas: http://www.ryerson.ca/academicintegrity/workshops.html