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

COE 528: Object Oriented Engineering Analysis and Design
Course Outline (Fall 2015)
DSQ15,  Tue 12:00PM - 1:00PM
KHE321C, Fri 12:00PM - 2:00PM

Instructor
Prof. Olivia Das
Office: ENG464
Phone: (416) 979-5000 ext 6114
Email: odas@ee.ryerson.ca
(in accordance with Policy 157, only Ryerson e-mail accounts are to be used for communication.)

Office hours: (if known)

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>COE 318 and COE 428 and CEN 199</th>
</tr>
</thead>
<tbody>
<tr>
<td>Website</td>
<td>my.ryerson.ca for courses using Brightspace</td>
</tr>
<tr>
<td>Calendar Description</td>
<td>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. Project work includes practice with an object-oriented programming language (Formerly COE 618).</td>
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| 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:  
Lecture Schedule
NOTE: This is a preliminary schedule and is subject to change and modifications.
In the table below, chapter numbers (where provided) are from the following books:

Book-1: *Program Development in Java: Abstraction, Specification, and Object-Oriented Design*
Book-2: *Object-Oriented Software Engineering Using UML, Patterns, and Java*
Book-3: *Design Patterns Explained: A New Perspective on Object-Oriented Design*
Book-4: *Design Patterns: Elements of Reusable Object-Oriented Software*
Book-5: *Head First Design Patterns*

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Section</th>
<th>hours</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 (Book-1)</td>
<td>2.1-2.8</td>
<td>3</td>
<td>Understanding Objects in Java</td>
</tr>
<tr>
<td>1 (Book-1)</td>
<td>1.1-1.3</td>
<td>3</td>
<td>Abstraction and Decomposition</td>
</tr>
<tr>
<td>Slides</td>
<td></td>
<td></td>
<td>Decoupling and Specifications</td>
</tr>
<tr>
<td>3 (Book-1)</td>
<td>3.1-3.6</td>
<td>3</td>
<td>Procedural Abstraction</td>
</tr>
<tr>
<td>5 (Book-1)</td>
<td>5.1-5.10</td>
<td>3</td>
<td>Data Abstraction</td>
</tr>
<tr>
<td>2 (Book-2)</td>
<td></td>
<td>3</td>
<td>Modeling with UML</td>
</tr>
<tr>
<td>10 (Book-2)</td>
<td>10.1, 10.2, 10.4, 10.7</td>
<td>3</td>
<td>Testing and Debugging</td>
</tr>
<tr>
<td>Information from Book-3, Book-4, and Book-5</td>
<td></td>
<td>12</td>
<td>Design Patterns</td>
</tr>
<tr>
<td>4 and 5 (Book-2)</td>
<td></td>
<td>4</td>
<td>Requirements Elicitation and Analysis</td>
</tr>
<tr>
<td>6, 7, 8 and 9 (Book-2)</td>
<td></td>
<td>5</td>
<td>System Design and Object Design</td>
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Lab Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Title</th>
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<tbody>
<tr>
<td>2, 3 (4 marks)</td>
<td>Review Java programming and JUnit (for testing) using NetBeans IDE.</td>
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<tr>
<td>4 (3 marks)</td>
<td>Procedural Abstraction - Implement and specify procedures with requires, modi and effects clauses.</td>
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<tr>
<td>5 (3 marks)</td>
<td>Implement an application using Interfaces and Abstract Classes.</td>
</tr>
<tr>
<td>6 (4 marks)</td>
<td>Data Abstraction – Provide and implement the rep invariant and abstract functio each given class.</td>
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<tr>
<td>7, 8 (6 marks)</td>
<td>UML Modeling - Analyze system requirements of a software system, design with UML diagrams, implement and test the system.</td>
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<tr>
<td>9, 10, 11, 12</td>
<td>Project</td>
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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 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 who need academic accommodation support should register with the Academic Accommodation Support office (formerly called the Access Centre). Before the first graded work is due, registered students should inform their instructors through an “Accommodation Form for Professors” that they are registered with Academic Accommodation Support and what accommodations are required.

Academic Integrity and Plagiarism

Ryerson’s Policy 60 (now called the Academic Integrity policy) applies to all students at the University. The policy and its procedures are triggered in the event that 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. Students may refer to the Ryerson Library’s list of Citations and Style Guides for more information.

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 found to have committed 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 work, include a grade of zero for the work.
- A grade reduction in the course greater than a zero on the work. (Note that this penalty can only be applied to course components worth 10% or less, that any additional penalty cannot exceed 10% of the final course grade, and that information explaining that such a penalty will be assigned must be included on the course outline.)
- 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 Academic Integrity policy and to the Academic Integrity website.

**Important Resources Available at Ryerson**

- **The Library** provides research workshops and individual assistance. Inquire at the Reference Desk on the second floor of the library, or go to www.ryerson.ca/library/info/workshops.html
- **Student Learning Support** offers group-based and individual help with writing, math, study skills and transition support, and other issues.