Fall 2019

IS 663-851: Advanced System Analysis and Design

Sameh Sabet

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IS663 – Advanced Sys Analysis & Design
Syllabus
Fall 2019

Instructor
Sameh Sabet
Information Systems Department
College of Computing Sciences
New Jersey Institute of Technology
Please contact me via Canvas first and/or via email. I generally respond to emails within an hour.

I. COURSE SPECIFICATIONS

Course: IS 663  
Course Title: Advanced System Analysis and Design  
Prepared: August 2019  
Course Prerequisite: IS 531 – some programming knowledge is strongly encouraged

II. COURSE OVERVIEW

This course covers the theory, principles, and applications of the methodologies and tools of software analysis and design. Students will read selected material from the literature, actively participate in discussions, labs and exercises and prepare operational projects for real-world problems. We will spend a considerable amount of time interacting and learning through discussion of assigned readings and other material.

III. ACADEMIC INTEGRITY

Students have the responsibility to know and observe the requirements of The NJIT Honor Code of Student Academic Integrity. This code prohibits cheating, fabrication or falsification of information, multiple submissions of academic work, plagiarism, abuse of academic materials, and complicity in academic dishonesty. These standards of academic integrity will be enforced in this course.

V. GRADE STRUCTURE

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>POINTS</th>
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<tbody>
<tr>
<td>Exam</td>
<td>30</td>
</tr>
<tr>
<td>Project</td>
<td>40</td>
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<tr>
<td>Labs, Discussions and Participation</td>
<td>30</td>
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TOTAL POINTS | 100

Generally speaking the final letter grades will follow a curve. While not an exact prescription, it is a pretty good guide.

A   (25%)
B+  (25%)
B   (30%)
C+/C/F (20%)

VI COURSE TEXTS AND READINGS

A. TEXTS

Required
"Software Engineering," Ian Sommerville, 10th Edition

Recommended
UML Documentation & White Papers: http://www.rational.com/uml

B. READING ASSIGNMENTS (to be read before the indicated session)

Note: The readings listed below are open to change. I will continue to update (add/remove/modify) the readings if/when I find more relevant papers as the semester progresses. I will, however, keep you informed of the changes as they occur.

VII. PROJECTS

The Projects are an opportunity for you to apply the concepts we will discuss throughout the semester to solve “real-world” problems. Working as a team, you are to demonstrate your mastery of the concepts, methods, tools, and techniques covered in class.

You will be required to view the project from many angles - customer, analyst, developer, tester, manager and end user. You will develop and analyze requirements, project plans, designs and will eventually prototype your design.

Details about the project will be discussed on Canvas.
Project teams should be made up of 4 to 6 students.

Deliverables

- Requirements Package 30
- Design Documents 40
- Prototype & Presentation 30

VIII. DISCUSSIONS

Your overall grade for this component will be based on the quality of your effort in leading and participating in class discussions and exercises.

**Leading Class Discussion:** You will be responsible in participating in online discussion on the week’s theme for each class. This assumes you have thoroughly synthesized the information from the readings and have picked out a few relevant points to have a meaningful discussion. The purpose is not only to present your ideas, but also to elicit comments from the rest of the class in a meaningful discussion. A very useful way of doing this is by asking thought-provoking questions.

Each student is expected to post (on Canvas) TWO days ahead of time (i.e. before Monday of that week) at least TWO questions they would like the rest of the class to contemplate (especially while reading the articles for that class). Please be advised that posting questions late or not at all WILL affect your grade.

At the end of the week (Sunday), each student must then pick TWO questions posted to reply to with their thoughts.

Here is the grade point distribution for this component (20 points):

- Online Participation: 10 points
- Posting Questions: 10 points
IX. Grading
Late assignments submissions may be accepted for partial credit, with every day late accruing a 10% penalty.

As a rule of thumb, any assignment you submit to me will be graded and returned within a week.

Online discussion grades will be reflected/updated whenever any other deliverable is graded and posted.

XI. Course Goals

By the end of the semester students should be able to:

1- Choose appropriate development methodology
2- Understand and critique formal software requirements.
3- Evaluate various architecture and design choices for specific systems and choose optimal solution
4- Evaluate and exercise prototyping methodologies.

XI. Schedule Class Meetings

Class materials are due on the following Thursdays:

<table>
<thead>
<tr>
<th>Session</th>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
<th>Deliverables</th>
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<tbody>
<tr>
<td>Session 1</td>
<td>09/03</td>
<td>Introduction</td>
<td>CH 1 , 11</td>
<td></td>
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<tr>
<td>Session 3</td>
<td>09/16</td>
<td>Process models (cont.) Requirements Engineering</td>
<td>CH3 Wikipedia explanation of RUP:</td>
<td>Project Proposal</td>
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<tr>
<td>Session</td>
<td>Date</td>
<td>Topic</td>
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<tr>
<td>Session 5</td>
<td>09/30</td>
<td>Requirements Modeling &amp; Specification (Cont.) Methods: Use Cases and Scenarios Examples</td>
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<td>Session 6</td>
<td>10/07</td>
<td>Project Management, Risk Management Cost Estimation</td>
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<td>Session 7</td>
<td>10/14</td>
<td>Requirements Management Software Tools for Requirements Management, Modeling &amp; Specification Tools</td>
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<tr>
<td>Session 8</td>
<td>10/21</td>
<td>Design: Basic</td>
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Wikipedia & RUP

*A Rational Development Process*
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<tr>
<th>Session</th>
<th>Date</th>
<th>Topic</th>
<th>Reading Material</th>
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<tr>
<td>Session 9</td>
<td>10/28</td>
<td>Design Methods and Notations Transitioning from Requirements to design - heuristics and guidelines Introducing Design Quality: Basic Elements, Cohesion &amp; Coupling, Reviews, Verification</td>
<td>“A field study of the software design process for large systems” by Bill Curtis, Herb Krasner, and Neil Iscoe (1988) BC-SDP.pdf</td>
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<tr>
<td>Session 11</td>
<td>11/11</td>
<td>OOAD - continued UML: Introduction,</td>
<td>CH 16 Architecture Doc Due</td>
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<td>Session 12</td>
<td>11/18</td>
<td>Design Patterns</td>
<td>Change control</td>
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<td>Session 13</td>
<td>11/25</td>
<td>Quality Frameworks: SEI Maturity Model &amp; ISO 9000</td>
<td>CH 26</td>
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<tr>
<td>NOTHING DUE</td>
<td>12/02</td>
<td>BACK FROM THANKSGIVING BREAK</td>
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<tr>
<td>Session 14</td>
<td>12/09</td>
<td>Course Summary, Q&amp;A - Exam Preparation</td>
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<tr>
<td>Session 15</td>
<td>12/13</td>
<td>Final</td>
<td>Take Home/Online 48 hours to complete Over the weekend</td>
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**XI. ANNOUNCEMENTS AND INSTRUCTIONS**

Students are responsible for all postings on Canvas. Students should check Canvas at least two or three times a week for any updates. Any announcements or due dates on Canvas take precedence and are final.

*NOTE: THE SCHEDULES AND PROCEDURES IN THIS COURSE ARE SUBJECT TO CHANGE IN THE EVENT OF EXTENUATING CIRCUMSTANCES. YOU WILL BE NOTIFIED OF DEVIATIONS.*

**X. DISABILITY ACCOMMODATIONS**

If you need accommodations due to a disability please contact Chantonette Lyles, Associate Director of Disability Support Services, Fenster Hall Room 260 to discuss your specific needs. A Letter of Accommodation Eligibility from the Disability Support Services office authorizing your accommodations will be required.