

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**  
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**College of Computing Sciences**  
**New Jersey Institute of Technology**

<b>Instructor</b>	Sameh Sabet	<b>Office Hours</b>	by appointment (please email first) Online Thursday, Friday 5pm-8pm
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**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**

<b>ACTIVITY</b>	<b>POINTS</b>
Exam	30
Project	40
Labs, Discussions and Participation	30

<b>TOTAL POINTS</b>	<b>100</b>
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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**

"Software Engineering: A Practitioner's Approach," R. Pressman, McGraw Hill, NY 2003.

"Software Requirements: Objects, Functions and States," A. Davis, Prentice Hall, Englewood Cliffs, NJ, 1993.

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 has 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:

Session	Date	Topic	Readings	Deliverables
Session 1	09/03	Introduction	CH 1 , 11	
Session 2	09/09	SDLC Models: Basics, Comparative Analysis	CH 2 "Software Chronic Crisis," W. Wayt Gibbs, Scientific American, September 1994, pp. 86-95.  "No Silver Bullet" by Fred Brooks, 1987, <a href="#">Brooks87.pdf</a>	Project Teams Formed
Session 3	09/16	Process models (cont.) Requirements Engineering	CH3  Wikipedia explanation of RUP:	Project Proposal

		Process: Activities, Standards, Documentation	<u>Wikipedia &amp; RUP</u>  <u><i>A Rational Development Process</i></u>	
Session 4	09/23	Requirements Modeling & Specification Overview: Structured and OO Approach, Use Cases, Informal and Formal Specifications, Data Flow Analysis; Methods: Data Flow Diagrams (DFD), Data Dictionary (DD), BNF, Process Description Examples	CH 4	
Session 5	09/30	Requirements Modeling & Specification (Cont.) Methods: Use Cases and Scenarios Examples	CH 5	
Session 6	10/07	Project Management, Risk Management Cost Estimation	CH 22, 23	
Session 7	10/14	Requirements Management Software Tools for Requirements Management, Modeling & Specification Tools	CH 25	Project Plan Due
Session 8	10/21	Design: Basic	CH 6	Req Due

		Concepts System & Software Architecture Design Methods & Tools	“A field study of the software design process for large systems” by Bill Curtis, Herb Krasner, and Neil Iscoe (1988) <a href="#">BC-SDP.pdf</a> “	
Session 9	10/28	Design Methods and Notations Transitioning from Requirements to design - heuristics and guidelines Introducing Design Quality: Basic Elements, Cohesion & Coupling, Reviews, Verification	CH 24  Abstractions for Software Architecture and Tools to Support Them", M. Shaw, R. DeLine, D. V. Llein, T.L. Ross, D. M.Young and G. Zelesnik, IEEE Transactions on Software Engineering, April 1995, V.21. No 4.  <a href="#">UNICON-MS.pdf</a>	
Session 10	11/04	Object Oriented Analysis & Design (OOAD): Basics Concepts, Static & Dynamic Views, Object Dictionary, OOD Overview	CH 7  Dewayne E. Perry and Alexander L. Wolf. “Foundations for the Study of Software Architecture". ACM SIGSOFT Software Engineering Notes, 17:4 (October 1992). – <a href="#">DP-AW-FSA.pdf</a>	Architecture Doc Due
Session 11	11/11	OOAD - continued UML: Introduction,	CH 16	



		Notation, Diagrams HCI		
Session 12	11/18	Design Patterns Change control	CH 7 (7.3), CH. 17	
Session 13	11/25	Quality Frameworks: SEI Maturity Model & ISO 9000	CH 26	Entire Project Package Due
NOTHING DUE	12/02	BACK FROM THANKSGIVING BREAK		
Session 14	12/09	Course Summary, Q&A - Exam Preparation		Project Presentation
Session 15	12/13	Final	Take Home/Online 48 hours to complete Over the weekend	

## **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 ACCOMODATIONS**

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.