# System Analysis and Design
# IS 390, Section 102 – Spring 2019

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## Administrative Information

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| **Class Time:** | Mondays  6:00pm-9:00pm |
| **Instructor:** | Mark Barnabei |
| **Email:** | **mark.d.barnabei@njit.edu** |
| **Office Hours:** | Virtual Office Hours: by appointment |
| **Class Web Site:** | **All** course materials will be available via Moodle |
| **Prerequisites:** | CS 101, CS 111, CS 113, CS 115 or IS 118 |

## Required Text

 I highly recommend the following book as a **reference**:

***Systems Analysis and Design with UML***
by Alan Dennis, Barbara Haley Wixom David P. Tegarden
Publisher: John Wiley & Sons Inc; 6th International student edition (April 19, 2012) ISBN-10: 1118092368
ISBN-13: 978-1118092361

## Selected Online Readings

To be announced via Moodle

## Course Summary

This course is designed to be a study of the information systems development life-cycle, from the initial stages of information requirements analysis and determination to the ultimate activities involving systems design. The course offers theory, methodologies and strategies for information requirements analysis, including the assessment of transactions and decisions, fact-finding methodologies, structured analysis development tools, strategies of prototype development, and an overview of computer-aided software engineering (CASE) tools. The course includes theory, methodologies and strategies for systems design, including design of user-interfaces, particularly menu-driven and keyword dialogue strategies, and issues in the proper design of computer output.

As the industry need for a robust IT infrastructure arise, companies realize the need for people who understand both the basics of information technology and the essence of the business domain, people who could communicate with both computer programmers and business managers, people who serve as the "bridge" between the IS department and other business function units. These people are called **system analysts / business analysts**.

The purpose of this class is to prepare you to become such people by giving you a thorough understanding of different types of information systems as well as business processes that they support. In this class, systems analysis and design methods that facilitate an object oriented approach to the modeling of the data and applications supporting these processes will be introduced and practiced. This course lays out a solid foundation for more advanced technical courses such as database management or networking by offering you a systematic methodology that should be followed when managing the development of any information systems.

## Course Objectives

When you complete this course you will have the ability to:

- Be familiar with different types of System Development Life Cycle (SDLC) models; Know how to choose appropriate SDLC models based on the nature of system development projects
- Effectively use UML diagrams and process models for system analysis phase
- Be able to use Rational Modeler to develop UML models
- Master the designing skill for interface, database and program design frequently used in business information systems
- Participate as an analyst/team member on a systems development team working with a **real world organization**
- Effectively utilize appropriate data gathering tools and techniques associated with the collection of system user requirements, constraints and expectations
- Describe, structure and plan an information systems development project's activities using basic Project Management techniques and tools
- Perform basic feasibility study activities associated with systems proposals
- Understand the basics of object-oriented system analysis and design methods

## Grades

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|---|---|---|---|
| **Exams** | 40 **points** | 3 In-Class quiz exams: | 30 points |
| | | Comprehensive final exam: | 10 points |
| **Team Project** | **25 points** | Project mile stone 1 | 5 points |
| | | Project mile stone 2 | 5 points |
| | | Project mile stone 3 | 5 points |
| | | Project mile stone 4 | 5 points |
| | | Team Presentations | 5 points |
| **Assignments** | **25 points** | Assignment 1 | 5 points |
| | | Assignment 2 | 5 points |
| | | Assignment 3 | 5 points |
| | | Assignment 4 | 5 points |
| | | Assignment 5 | 5 points |
| **Participation** | **10 points** | In-class attendance, discussion, practices, etc | |

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|--------|------------|
| **Total** | **100 points** |

Letter grades will be assigned approximately as follows (the grades may be curved):

| **Marks** | **Letter Grade** |
|-----------|------------------|
| 90% and above | A |
| 80% to 89% | B |
| 70% to 79% | C |
| 60% to 69% | D |
| Below 60% | F |

# Team Projects

One of the biggest difficulties for many students in this class is their lack of real world system development experiences -- Imagine trying to learn how to drive through a series of lectures without ever touching a car! That is why the team project is **extremely** important for your learning in this class.  The team project should be based on a **real life business** situation where the team is engaged in a significant portion of a systems project. You will work together as a project team. Your team will be responsible for preparing key project deliverables consisting of (but not limited to):

- A real world client and a project plan  (Milestone 1)

- A description of the current systems environment (Milestone 2)
- Requirement Analysis: *interviews* (Milestone 2)
- Requirement Analysis: *use cases* (Milestone 2)
- Project  Time Table: *Gantt chart* (Milestone 2)

- System Analysis: *More interviews* (Milestone 3)
- System *Class Model* (Milestone 3)
- *Sequence & Collaboration Diagrams* (Milestone 3)
- *Use Case Realization* (Milestone 3)

- System Design: *Database Design* (Milestone 4)
- System Design: *Interface Design* (Milestone 4)
- System Design: *Program Design* (Milestone 4)
- System Design: *Cost & Benefit Analysis* (Milestone 4)

- Final Report that incorporates all of the above (Milestone 4)

It is **extremely important** that you do not miss any of the milestones above --- failure to deliver on time will result in a 0 grade for your milestone.

Do not worry if you have no clue about the above milestones – this class is designed so that the lectures are "*synchronized*" with the real world project milestones. For example, one week after we discuss how to conduct interviews, your project team will schedule the actual interviews with your clients. I will highlight the knowledge

points that will be applied in your projects in my lectures, and explain how you could use them effectively in the real world setting – so it is extremely important that you come to class!

At the end of the semester, we will have a presentation session where all teams present their work. Your client will be invited to the events and grade your performance.

## Assignments

You will be given five assignments throughout the semester. Some of them **are individual assignments** – you should independently work on the problems and find the solution. Others are **team-based** – you are expected to work closely with your teammates to collectively design a solution. Details of the assignments will be posted online.

## Participation

You may have noticed that in-class performance is worth 10% of your total grade. Here is how I measure it:

During each class, I will give out several questions for you to think about. I will pose the questions to the class in general for anyone to answer. If I don't get a response I will randomly pick two or three of you to answer these questions (and to challenge me with follow-up questions, if you have any). In addition to attendance, your performance in answering these questions throughout the semester will be the basis on which I grade your inclass performances. Some questions will be group-based, in which case the whole group will be evaluated based on your answers.

## Academic Standards

All students are expected to pursue the highest standards of academic honesty. Plagiarism or cheating on an assignment or examination can lead to an E on the assignment or examination, an E in the course, and other disciplinary action.

Plagiarism or academic dishonesty will not be tolerated. 'Plagiarism' means the intentional unacknowledged use or incorporation of any other person's work in, or as a basis for, one's own work offered for academic consideration or credit for public presentation. Plagiarism includes, but is not limited to, representing as one's own, without attribution, any individual's words, phrasing, ideas, sequence of ideas, information or any other mode or content of expression. All work submitted for this class should be original; that is, it should be your own. Also, do not turn in work that you have turned in for other classes.

The NJIT Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students.

## TENTATIVE CLASS SCHEDULE

| WEEK | Lecture | Assignment | Project Milestone |
|---|---|---|---|
| 1 (9/4) | Introduction – SDLC | **Assignment 1** Introduce Yourself, | |
| 2 (9/11) | Project Management & Selection | | |
| 3 (9/18) | Requirements Determination: - Interview Techniques - Requirement Gathering Techniques | | **Milestone 1** Form A Team, Find a Client |
| 4 (9/25) | Use Case Modeling - Exam 1 | | |
| 5 (10/2) | Process Modeling : - Data Flow Diagrams - Sequence & Collaboration Diagrams - Behavioral Modeling | **Assignment 2** Interview | |
| 6 (10/9) | Data Modeling: - ER & Class Diagrams - Data Normalization | | **Milestone 2** System Planning |
| 7 (10/16) | Moving Into Design | **Assignment 3** Use Case Modeling | |
| 8 (10/23) | Architecture Design – Exam 2 | | |
| 9 (10/30) | User Interface Design | **Assignment 4** Class Modeling | |
| 10 (11/6) | Program Design: Moving From Logical to Physical | | **Milestone 3** System Analysis |
| 11 (11/13) | Data Storage Design – Exam 3 | | |
| 12 (11/20) | No Class – Thursday Classes Meet | | |
| 13 (11/27) | Implementation: - Testing & Documentation | **Assignment 5** Database Design | |
| 14 (12/4) | Transition to the New System | | |

| 15 (12/11) | Final Presentation & Final Exam | | **Milestone 4** <u>Final Report</u> |
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