Part I: Course and Instructor Information

<table>
<thead>
<tr>
<th>Semester:</th>
<th>Fall 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course name:</td>
<td>Advanced System Analysis &amp; Design</td>
</tr>
<tr>
<td>Course number:</td>
<td>IS 663</td>
</tr>
<tr>
<td>Instructor name:</td>
<td>Erick Sanchez Suasnabar</td>
</tr>
<tr>
<td>Course location:</td>
<td>CULMLECT 3</td>
</tr>
<tr>
<td>Course Meeting time:</td>
<td>Friday 1:00 – 3:55 PM EDT</td>
</tr>
<tr>
<td>Office hours &amp; location:</td>
<td>Friday 4:00 – 6:00 PM EDT</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:efs3@njit.edu">efs3@njit.edu</a></td>
</tr>
</tbody>
</table>

Part II: Course Description

1. Course description:

This course develops the skills necessary to analyze, design and manage the development of enterprise-scale information system solutions, incorporating contemporary methods and effective organizational and global project management practices. It focuses on technical business system analysis and design techniques, and covers key software engineering principles, methods and frameworks, including process models, agile and lean principles, project and risk management, estimation, requirements elicitation and analysis, modeling, system and software architecture, design patterns, and quality systems. Students will actively participate in discussions, review selected articles, participate in team exercises and collaborate on projects involving analysis and prototyping of applications addressing real-world problems and integrating current and emerging technologies.

For the latest course information go to [http://njit2.mrooms.net/](http://njit2.mrooms.net/)
The information below should help you plan and organize your preparation during the semester.

2. Prerequisite courses and knowledge:

- Prerequisite course: IS 631
- Required background:
  - The students are required to have knowledge of key information systems concept, software development life cycle activities, and project management issues.
  - Good understanding of data modeling techniques and database fundamentals is expected as well.
  - Good understanding of modern trends in business and information analysis, information technology, data modeling, object-oriented principles and agility are a plus.
  - Undergraduate software engineering courses provide a good foundation.

3. Outcomes expected upon the completion of the course:

- Good understanding of classical and modern lifecycle models, including agile methods.
- Hands on analysis and specification skills, using methods such as use cases, scenarios, and user stories.
- Good understanding of project management functions, including risk analysis in global and collaborative projects.
- Practical knowledge of estimation techniques.
- Understanding of architecture and design activities as well as the impact and opportunities provided by modern architectures and infrastructures such as SOA and Cloud computing.
IS 663 SYLABUS

- Hands on modeling skills (UML, agile UML)
- Understanding the fundamentals of Quality Assurances and quality frameworks

4. Ways that students will be assessed throughout the course:

- Team project execution and deliverables - content, mastery of methods discussed in class and creativity; team work; research and analysis skills
- Discussions - active participation and moderation of discussions; free sharing of ideas and information related to the discussion topics; systematic progress with paper reading assignments
- Individual assignments - content, understanding of methods discussed in class and their effective user or application to the assignment; research and analysis skills
- Class participation – open contribution to the discussions and exercises, sharing, collaboration
- Final exam – understanding of the course material and demonstrated effective application of the acquired knowledge and skills to solving practical problems

5. Required & Recommended texts:

- **Lecture Notes**
  Lecture notes are the basic course material for this class. The notes are made available on Moodle every semester.
- **Text**
  - NJIT Bookstore or

- **Articles and Discussion Supporting Materials**
  For the list of readings check the Course Outline available on Moodle as well as Moodle Discussions forum.

- **Books Recommended for Extra Reading**
  - “Design Patterns / Elements of Reusable Objet Oriented Software,” Erich Gamma, Richard helm, Ralph Johnson, and Vlissides (known as the “Gang of 4” of “GOF”), 1994.

6. Required software/hardware:
Free and open software; NJIT supported tools and hosting environments.

7. Web resources:
See Class information on Moodle ([http://njit2.mrooms.net/](http://njit2.mrooms.net/))
8. **Contacting the instructor (including turn-around time for responses)**

Erick Sanchez Suasnabar, Ph.D. Candidate  
Department of Information Systems  
College of Computing Sciences  
New Jersey Institute of Technology  

**Email:** efs3@njit.edu  
(please use subject – IS 663 -- for quick response time)

Please always use as a subject “IS-663” plus any details you would like to add.

**Office:** NJIT, Newark - GITC 5601

### Part III: Mapping Learning Outcomes to Course Assessment

<table>
<thead>
<tr>
<th>Course Learning Outcome</th>
<th>Measure (i.e., exam, homework, rubric)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good understanding of classical and modern lifecycle models, including agile methods</td>
<td>In class and online discussions; team project</td>
</tr>
<tr>
<td>Hands on analysis and specification skills, using methods such as use cases, scenarios, user stories and Product Backlogs</td>
<td>Team project; final exam</td>
</tr>
<tr>
<td>Good understanding of project management functions, including risk analysis in organizational, global and collaborative projects</td>
<td>Team project</td>
</tr>
<tr>
<td>Practical knowledge of estimation techniques</td>
<td>Team project; in class exercises</td>
</tr>
<tr>
<td>Understanding of architecture and design activities as well as the impact an opportunities provided by modern architectures and infrastructures such as cloud computing and SOA</td>
<td>Individual assignment, based on literature analysis; in class and online discussion</td>
</tr>
<tr>
<td>Hands on modeling skills (UML, agile UML)</td>
<td>Final exam</td>
</tr>
<tr>
<td>Understanding the fundamentals of Quality Assurances and quality frameworks</td>
<td>In class and online discussion; team project</td>
</tr>
</tbody>
</table>

### Part IV: Course Outline  
(Note: this course outline is preliminary and subject to change)

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture/Activity/Discussion</th>
<th>Reading (preliminary)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Course logistics and introduction</strong></td>
<td>Text Book: CH 1</td>
</tr>
<tr>
<td></td>
<td>Course introduction – topics, objectives, SAD/SE state of the art, gaps, industry focus and ongoing research</td>
<td>Section 1.2: Software Engineering Ethics</td>
</tr>
<tr>
<td></td>
<td>Reading: 1st reading assigned</td>
<td>Supporting reading - The Dimensions of Software Engineering Success (see Moodle for details)</td>
</tr>
<tr>
<td></td>
<td>Forming Groups for Course Project: teams formed; discussions about topics initiated</td>
<td>General SE information: SIGSOFT Web: <a href="http://www.sigsoft.org/">http://www.sigsoft.org/</a></td>
</tr>
</tbody>
</table>

*Week 1  
Sept 7*
| Week 2 Sept 14 | Process models: fundamentals  
Review of traditional process models, comparative analysis  
**Project start:**  
1) Teams work together to select topic and identify project’s key contributions  
2) Preliminary approval of project topics  
3) To Do: Project proposal posted on Moodle and group member list  
Reading 2 assigned | Text Book: CH 2  
|---|---|
| Week 3 Sept 21 | Iterative – incremental process models: RUP, Agile Models  
Agile Software Development— (e.g., Scrum)  
**Project:**  
1) Market and competitors research  
Reading 3 assigned  
Discussion: Evolution of software development practices; review of week’s one reading (paper 1 “Software Chronic Crisis”) – Is there really a crisis today? | Text Book: CH 2, 3  
Key Scrum Concepts:  
http://www.scrumalliance.org/pages/what_is_scrum  
| Week 4 Sept 28 | Requirements Engineering: Concepts, methods and standards  
Use Cases and User Stores  
Reading 4 assigned  
Discussion: “No Silver Bullet,” Fred Brooks | Text Book: CH 4  
Reading 4: Scrum Guides:  
http://www.scrum.org/Scrum-Guides  
Alistair Cockburn’s Use Cases Reference Page:  
http://alistair.cockburn.us/Use+cases  
Writing Effective Use Cases (see book extract- Chapter 1)  
UC Template |
| Week 5 Oct 5 | Agile estimation and product Backlogs  
**Project meetings- Progress review**  
Discussion: RUP/SCRUM | Product Backlogs (PBLs) and user stories (US) tutorials and examples, Mike Cohn, Scrum Alliance:  
http://www.mountaingoatsoftware.com/agile/user-stories  
| Week 6 Oct 12 | Use Cases and User Stores  
Nonfunctional requirements  
**Project meetings**  
**Progress review** | “Structuring Use Cases with Goals” & Use Case Fundamentals, Alistair Cockburn  
Text Book: CH 4  
Text Book: CH 22, 23 |
| Week 7 Oct 19 | Project Use Cases review (all teams, in class discussion) | “Structuring Use Cases with Goals” & Use Case Fundamentals, Alistair Cockburn  
Text Book: CH 4  
Text Book: CH 22, 23 |
<table>
<thead>
<tr>
<th>Week 8</th>
<th>Oct 26</th>
<th>Specifying the data aspects of RA (informal and BNF)</th>
<th>Project Management: Planning, Risk Management, Estimation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Project meetings</td>
<td></td>
</tr>
<tr>
<td>Week 9</td>
<td>Nov 2</td>
<td>Model Driven Engineering: Introduction to Object Oriented Analysis &amp; Design Concepts; Static View and Diagrams</td>
<td>Exercises: Simple OOA Models explained</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Project meetings</td>
</tr>
<tr>
<td>Week 10</td>
<td>Nov 9</td>
<td>Object Oriented Analysis - Dynamic View and Diagrams</td>
<td>UML Summary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exercises: Modeling; CRC Cards</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Project due date!</td>
<td>Start of Individual Assignment 2</td>
</tr>
<tr>
<td>Week 11</td>
<td>Nov 16</td>
<td>Course Project Presentations!</td>
<td>Online discussion: Current Best Practices (discussion on Moodle)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Every student is expected to find a paper, survey or a classification discussing one or several current best practices and to provide an outline and references on Moodle. All students are expected to comment on at least 2 postings by other students.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Architecture and Design basics</td>
<td>Text Book: CH 6, 7, 15, 18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discussion: Project retrospectives, team work, best current practices</td>
<td><a href="http://www.computer.org/portal/web/software">http://www.computer.org/portal/web/software</a></td>
</tr>
</tbody>
</table>
**IS 663 SYLABUS**

<table>
<thead>
<tr>
<th>Week 13</th>
<th>Quality and Improvement Frameworks (e.g., ISO 9000, CMMI, PSP, TSP, AIM, Six Sigma, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov 30</td>
<td>Discussion/Tentative: CMMI – is it still applicable?</td>
</tr>
<tr>
<td></td>
<td>Course wrap-up and Q&amp;A, Exam Preparation</td>
</tr>
<tr>
<td>Week 14</td>
<td>Wrap Up Course / Cont. Preparation</td>
</tr>
</tbody>
</table>

**Part V: Assignment Weighting (How Your Final Grade is Being Calculated?)**

<table>
<thead>
<tr>
<th>Assessment Item</th>
<th>Percentage of final grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team Project</td>
<td>40% of final grade</td>
</tr>
<tr>
<td>Individual Assignment</td>
<td>8% of final grade</td>
</tr>
<tr>
<td>Final Exam (Comprehensive, closed book)</td>
<td>50% of final grade</td>
</tr>
<tr>
<td>Course Participation</td>
<td>2% of final grade (Active participation in class discussions, Moodle-based discussions, moderation, etc.)</td>
</tr>
</tbody>
</table>

**Grade policy (approximate): A (92%-100%), B+ (85%-91.9%), B (75%-84.9%)**

**Part VI: Delivery Mechanism**

The following delivery mechanisms will be utilized:

- Face-to-face lectures
- Moodle: [http://moodle.njit.edu](http://moodle.njit.edu)
- NJIT on iTunes U: [http://itunes.njit.edu](http://itunes.njit.edu)
- Online resources (other than iTunes):
- Other (see below):

**Part VII: Plagiarism and Academic Integrity**

The approved "University Code on Academic Integrity" is currently in effect for all courses. Should a student fail a course due to a violation of academic integrity, they will be assigned the grade of “XF” rather than the “F” and this designation will remain permanently on their transcript.

All students are encouraged to look over the University Code on Academic Integrity and understand this document. Students are expected to uphold the integrity of this institution by reporting any violation of academic integrity to the Office of the Dean of Students. The identity of the student filing the report will be kept anonymous.

NJIT will continue to educate top tier students that are academically sound and are self-disciplined to uphold expected standards of professional integrity. Academic dishonesty will not be tolerated at this institution.
Part VIII: Getting Help - General

The IST Helpdesk is the central hub for all information related to computing technologies at NJIT. This includes being the first point of contact for those with computing questions or problems.

There are three ways to contact the Helpdesk:
1. Call 973-596-2900. Monday - Friday 8 am - 7 pm.
2. Go to Student Mall Room 48. Monday - Friday 8 am - 7 pm

Part IX: Getting Help - Moodle

In addition to the Helpdesk NJIT has a number of resources available to help you learn/use Moodle. Please be aware of the following:
2. Student Moodle Tutorials: http://moodle.njit.edu/tutorials/students/index.php
3. Student Moodle FAQs: http://moodle.njit.edu/tutorials/students/faq.php