CSC 490: Senior Project, Fall ’15
Credits: 3:3

Syllabus

Lectures: Tuesdays and Thursdays, 11:00-12:15, Petty 007
Instructor: Jing Deng
Office: Petty Building 164
Office Hours: Wednesdays 10:00-12:00
E-mail: jing.deng@uncg.edu (preferred contact)

Prerequisites: Grades of at least C in CSC 340 and senior standing or permission of instructor. You must plan to graduate with a CS degree at the end of the semester in order to take CSC 490.

Catalog Description: Application of fundamental knowledge and skills in computer science to solve real-world problems and to develop research and development skills.

Course Objectives: The primary target of this capstone course is undergraduate students at their senior standing. The goal is to allow students to

- develop openness to new ideas in computer science, develop the ability to draw reasonable inferences from observations and learn to formulate and solve new computer science problems and situation using analytical and problem-solving skills;
- develop the ability to synthesize and integrate information and ideas, develop the ability to think creatively, develop the ability to think holistically and develop the ability to distinguish between facts and opinion;
- develop the ability to work individually and as part of a team, develop a commitment to accurate work, develop management skills, improve speaking and writing skills, improve the ability to follow directions, instructions and plans, and improve the ability to organize and use time effectively;
- develop a commitment to personal achievement, the ability to work skillfully, informed understanding of the role of science and technology, a lifelong love of learning, and cultivate a sense of responsibility for one’s own behavior and improve self-esteem/self confidence.

Course Outcomes: Upon successful completion of this course students will be able to

1. (Knowledge, Comprehension) identify project/research problems; understand information and grasp meaning; translate knowledge into new context; use information, methods, concepts, and theories of fundamental topics in computer science in new situations;
2. (Application and Evaluation) apply computer science principles and practices to a realworld problem; demonstrate in-depth knowledge in the area of the project they have undertaken; solve problems using required knowledge and skills; implement and test solutions/algorithms;
3. (Analysis) identify potential solutions/algorithms for the project problem; see patterns and modularize the problem, recognize hidden meanings and identify components, show proficiency in software engineering principles;
4. *(Synthesis)* create new ideas using the old ones; generalize from given facts in the project they undertake, relate knowledge from several areas in systematic scientific approach, predict and draw conclusions relevant to the project they undertake;

5. *(Team Work)* show evidence (group collaboration, regular meetings, email communications, significant knowledge and skills contributions, etc.) of working productively as an individual and in a team on a project that produces a significant software product;

6. *(Communications)* show evidence of competency in oral and written communications skills through oral presentations (project presentation, department seminar or conferences), technical reports and/or published research papers in conferences and/or journals;

7. *(Lifelong Learning)* use modern techniques, skills and tools necessary for computer science practices relevant to the project they undertake; use techniques in recent research papers to solve problems.

**Class Web Page:** UNCG Canvas. All announcements will be made on Canvas. Please check it often, turn on appropriate notification in Settings/Notifications/Notification Preferences, or even install the app. This is the first time I am using Canvas, so keep in mind that there might be technical glitches, such as announcements, due dates, submissions, etc. Email me if you have any question instead of waiting for the reply of a probably unread message in Canvas. Feel free to use the Discussions tool on Canvas and notify me through email if you expect me to respond there.

**Teaching Methods:** No formal lectures will be given. Students are expected to choose an appropriate project/research topic in consultation with their instructor. Students must carry out a requirements elicitation/analysis or literature survey and then identify potential solutions to the problems stated in the project. Students are expected to attend regularly assigned class meetings and individualized conference sessions. Students are also expected to attend their regular group meetings. Students must develop projects that will demonstrate that they have a working knowledge of the basic and advanced concepts in computer science and also demonstrate a reasonable knowledge of recent development in computer science. Each project should include software development that has been approved by the instructor. **Students write preliminary reports and present seminars that describe the project background, proposed solutions and plans to implement and test the solutions.** The next major phase of the project is to implement and test the solutions to the identified problems. **On completion students will produce a technical report and deliver an oral presentation as well as presenting in front of the Industrial Advisory Board (IAB) of the Computer Science department.** In case of a group project, every member of the group must present (oral and technical report) the entire project activities pointing out their contribution to make the project successful.

All of the Thursday lecture time slots, except one (note below), will be designated to your project group meetings. Assign one of you to write a short minute of your meeting every time and you can rotate the task. Polish your minute and submit it on the same day of your meeting. I plan to attend some of the group meetings and observe, among other things, the participation level of each group members (see grading policy).
Tentative Grading Policy:
Progress reports will be graded based on WI-writing intensive, SI-speaking intensive, and TC-technical content.

<table>
<thead>
<tr>
<th>Phases and Reports</th>
<th>WI</th>
<th>SI</th>
<th>TC</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Project definition or Requirements Specification (Progress Report 1):</td>
<td>3%</td>
<td>3%</td>
<td>4%</td>
<td>10%</td>
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<tr>
<td>System/Algorithm Analysis (Progress Report 2):</td>
<td>2%</td>
<td>2%</td>
<td>6%</td>
<td>10%</td>
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<tr>
<td>System/Research Design (Progress Report 3):</td>
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<td>3%</td>
<td>4%</td>
<td>10%</td>
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<tr>
<td>Coding and Testing (Progress Report 4):</td>
<td>2%</td>
<td>4%</td>
<td>4%</td>
<td>10%</td>
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<tr>
<td>Implementation and Conversion (Progress report 5):</td>
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<td>-</td>
<td>2%</td>
<td>3%</td>
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<td>Evaluation (Progress Report 6) will be divided into:</td>
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<td>- Final Presentation:</td>
<td>5%</td>
<td>3%</td>
<td>7%</td>
<td>15%</td>
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<tr>
<td>- Source Code and User Manual</td>
<td>8%</td>
<td>-</td>
<td>2%</td>
<td>10%</td>
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<tr>
<td>- Technical Report/Research Papers:</td>
<td>3%</td>
<td>3%</td>
<td>4%</td>
<td>10%</td>
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<tr>
<td>IAB Poster:</td>
<td>5%</td>
<td>5%</td>
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<td>10%</td>
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<tr>
<td>Team Participation</td>
<td></td>
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<td></td>
<td>5%</td>
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<td>ETS Comprehensive Exam:</td>
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ETS Comprehensive Exam will be factored in as below:

- Score
- Grade
- If you do not take ETS exam without prior permission unless medical emergency
- You score < 30 percentile
- You score within 30 and 70 percentile (inclusive)
- You score > 70 percentile
- 0/10
- 5/10
- 10/10
- 15/10 (i.e., 5 points extra credit)

Speaking and Writing Requirements:
Students are required to write multiple reports and give multiple presentations during the course of the semester. While the instructor will give feedback and assist students in improving the quality of their written and oral communication, students are advised that additional help is available from the following university centers:

- The University Writing Center provides assistance to students in writing tasks from organizing thoughts to the mechanics of effective writing. The Writing Center provides individual consulting for students through either face-to-face or online sessions. For more information, please refer to the Writing Center web site at http://www.uncg.edu/eng/writingcenter/
- The University Speaking Center provides tutoring and services that help students improve their oral communication skills. Consultants at the Speaking Center can provide assistance in the preparation and delivery of speeches, as well as assistance in developing group or team communication skills. For more information, their website is http://speakingcenter.uncg.edu

Required Texts/Readings/References:
To be determined by student or group of students, with approval of instructor based on the research or project topic.

As an example, for a computer system design project the following textbooks will be used:
For a software engineering project the following books will be used:


**ETS Exam:**
This course has been designed to satisfy many of the ABET accreditation requirements. One of such requirements is that students are required to take the ETS exam to pass this course. The department will pay your ETS exam fee. The exact exam date/time will be scheduled within a week or two after the semester starts.

**Final Presentation and Poster Session:**
At the end of the semester, your team will present your project in front of a small team of faculty evaluators to assess the quality of your project as well as your presentation. The presentation date is often scheduled on the Thursday of the last full week of the semester. On the Friday of the same week, you will present your poster during a poster session that will be viewed by students, faculty, and the Industry Advisory Board.

**Document Submissions:**
Write your submission as a Word document and submit it through Canvas assignments. You will be given a code name for your project once your project team is formed. Name your files as codename-minutes-20150924.docx, codename-report1.docx, etc. When necessary, create a new folder to store multiple files and zip it for submission.

All documents should have 12-point font.

**Team Communications and Teamwork Reflection:**
Feel free to use whatever method you prefer to arrange team communications. Email me your planned group meetings.

At the end of the semester, each student will be required to write a one-page teamwork reflection document that describes his/her experiences and thoughts on how the team functioned.

**Mandatory Sections in Final Report:**

Besides the usual sections (Introduction, Background, etc.), there are several mandatory sections in final report of your project. Each of these sections should be at least half page in length, if not longer. These include:
A. **Team Definition Section:** The section should define the collaborative work of your team and how it functions in details.

B. **Requirements Section:** The final report must include a Requirements section that explains all the necessary components that are required for the project to function, as well as how they are used to accomplish the tasks. These may include, but not limited to, necessary software, hardware, compilers, tools, etc.

C. **Design Section:** The design section should explain how the system architecture is designed and underlying reasons for such designs. Detailed explanation should be provided for each component in the system design.

D. **Implementation Section:** An implementation section must be included with the following subsections and appropriate discussions:

   1. Implement the system in a manner consistent with the design
   2. Incorporate current software engineering techniques in the design and development of software
   3. Program effectively, using both procedural and object-oriented techniques
   4. Select the proper programming language and/or data structure to solve a problem
   5. Utilize modern object-oriented techniques in software implementation

There will be other requirements such as additional sessions posted on Canvas with regard to your final report. Please adhere to those requirements in generating your report.

E. **Evaluation Section:** The evaluation section should explain how you evaluated the product, e.g., in what environment, under what conditions, and using what system parameters, as well as how different prospects of the product are tested to ensure its correct behavior and functionalities.
### Tentative Schedule:

<table>
<thead>
<tr>
<th>Project Phases</th>
<th>Submission Requirements</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>0 Proposal</td>
<td>Outline of proposal</td>
<td>Week 1</td>
</tr>
</tbody>
</table>
| 1 Project Definition, & Requirements Specification | Progress Report 1 and Oral Presentation  
- Approach and System profile  
- Feasibility and Draft models          | Week 3   |
| 2 System/Algorithm Analysis                | Progress Report 2 and Oral Presentation  
- Systems/Algorithm Analysis report with data & process models  
- Data Dictionary                        | Week 5   |
| 3 System/Research Design                   | Progress Report 3 and Oral Presentation  
- Amended models  
- Detailed designs and controls          | Week 7   |
| 4 Coding & Testing                         | Progress Report 4 and Oral Presentation  
- Plan and Testing                        | Week 10  |
| 5 Implementation & Conversion              | Progress Report 5 and Oral Presentation  
- Conversion plan  
- Training plan  
- Preliminary demonstration               | Week 12  |
| 6 Evaluation                               | Progress Report 6 and Oral Presentation  
- Final presentation  
- Source code and User Manual  
- Technical report  
- Evaluation by Client and Instructor      | Week 13  |
| 7 Final Report                              | Final Report Due                                                                        | Week 14  |

**Academic Integrity:** Students are expected to be familiar with and abide by the UNCG Academic Integrity Policy, which is online at http://academicintegrity.uncg.edu/. Assignments in this class are for individual work, unless explicitly stated otherwise. General concepts and material covered in the class may be discussed with other students or in study groups, but specific assignments should not be discussed and any submitted work should be entirely your own. It is expected that the class textbook will be used as a reference, but if any other reference materials are used in preparing homework solutions they should be clearly cited. Any incidents of academic dishonesty will be handled strictly, resulting in either a zero on the assignment or an F in the class, depending on the severity of the incident, and incidents will be reported to the appropriate UNCG office. By submitting your homework or exam answer sheet, you have implicitly signed the Academic Integrity Pledge, which states that “I have abided by the UNCG Academic Integrity Policy on this assignment or submission.”

**Collaborations:** Collaborations are highly recommended. Collaborations usually can be achieved with group activities. While some students prefer to lead in a group and others prefer to sit back and work on details, it is suggested that roles should be rotated so that each student is exposed to the requirements/challenges of all different roles.

**Attendance Policy:** Attendance of lectures is mandatory unless you have legitimate reasons of
not coming. Prior notification through email is required if you can't make it to a lecture. Pop quiz will be given to check your attendance and participation in class. The university allows for a limited number of excused absences for religious observances --- students who plan to take such an absence should notify the instructor at least two weeks in advance so that accommodations can be made (also see the late work policy later).

**On-line Lectures:** Closure of university facilities and classrooms in response to flu outbreak or other emergency does not mean that this class is halted, and students should check Canvas for announcements about how the class will proceed in the event of such an emergency. We may proceed with on-line chat or voice recording lectures in combination with slides.

**ADA Statement:** UNCG seeks to comply fully with the Americans with Disabilities Act (ADA). Students requesting accommodations based on a disability must be registered with the Office of Disability Services located in 215 Elliott University Center: (336) 334–5440.