

## CPS491 - SENIOR SEMINAR

Professors: Russell C. Bjork  
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Hours: (Bjork) MWF 3:20-4:20 pm; Tu 1:30-4:30 pm and by appointment;  
(Tuck) MWF 11:15-12:15, Thurs 2-5, or when door is open, or by appointment

Fall Semester, 2016-2017  
Mondays 4:30-6:00 pm Jenks 114  
<http://www.cps.gordon.edu/courses/cps491-2>  
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**PREREQUISITE:** Permission of the instructor

### COURSE OBJECTIVES:

The primary goal of this course is to help you make the transition from the small-scale projects which have characterized your formal education to the kind of thinking and methodology needed for the medium and large scale projects which are typical in industry. Upon completion of this course, you should have a general familiarity with the principles of the branch of Computer Science known as Software Engineering; and you should have a working knowledge of some of the more important techniques that have grown out of software engineering research.

**TEXT:** Bruegge, Bernd and Allen H. Dutoit. *Object-Oriented Software Engineering: Using UML, Patterns, and Java*. (3rd ed) (Upper Saddle River, NJ: Prentice Hall, 2010)

**RECOMMENDED:** Brooks, Frederick P. Jr. *The Mythical Man-Month*. (Anniversary ed.) (Reading, MA: Addison-Wesley, 1995).

**ON RESERVE:** Brooks, Frederick P. Jr. *The Mythical Man-Month*. (Anniversary ed.) (Reading, MA: Addison-Wesley, 1995).

Schach, Stephen R. *Object-Oriented Software Engineering* (New York: McGraw Hill, 2008)

Shneiderman, Ben. *Designing the User Interface*. 5th ed (Reading, MA: Addison-Wesley, 2010).

### COURSE TECHNIQUE AND PROCEDURES:

This course is structured quite differently from a traditional lecture course. Most of the content will come from your own study and project work, and from class sessions led by class members. The course will have a three-fold thrust:

1. Gaining familiarity with software engineering concepts through reading, oral presentations, and class sessions.
2. Learning how to make and evaluate written and oral technical presentations.
3. Using the specification, design, and prototype implementation of a major project as a case-study for applying software engineering concepts. (Students in the General Concentration will work on their

senior project as part of this course; students in the CIS Concentration will work with a General Concentration team.) Each team of students will present several reports to the class on their project at various milestones during the development process.

**COURSE REQUIREMENTS AND EVALUATION:**

1. Reading and Discussion. For most sessions, you are asked to read material in the main text by Bruegge, the recommended text by Brooks, and/or supplementary materials. In the case of reading in the Bruegge text, you should also look over the “Exercises” at the end of the chapter. For each reading assignment, you must prepare a summary of the major points (1-2 pages, single-spaced), with particular attention to how the reading applies to the project you are working on, and must give 2 or 3 questions you would like to see discussed in class. These may be used as a springboard for class discussion, and the summaries and questions must be turned in at the end of the class for evaluation by the professor. (If the assignment involves more than one chapter, you should summarize each chapter individually, but prepare one set of questions for the entire assignment. Summaries for chapters from Brooks can be quite brief. The length specification is overall length.)

Once during the semester, you and one or two other students will be responsible for leading the class session (or a portion of it) on one of the topics. There will be an opportunity to sign up for specific topics at the second class meeting.

Your journals and class discussion leading, together, will account for 20% of the grade.

2. Throughout the semester you will be preparing written documents plus making oral presentations in the process of doing your project, as shown in the course schedule. Note that, in three cases, you will turn in both a preliminary and a final version of each document. The final version must receive approval signatures from the user and/or departmental representative **BEFORE** you turn it in. (Your grade will be based on the final version.)

These documents and presentations will count in the course grade as follows:

Document	Document Weight	Oral Presentation Weight
Social Impact Statement	5%	
Requirements Analysis Document	10%	
"What and Why"/Social Impact Presentation (In the case of General Concentration students, the formal senior project proposal to the department must be turned in with the preliminary versions of the SIS and RAD)		5%
User Interface Rapid Prototype	(not graded)	5%
Initial System Structure Diagrams (just one version)	5%	
Preparation for and Participation in System Design Brainstorming		5%
Project Subset Prototype	5%	5%
System Design	15%	10%

3. In preparing your oral presentations, please note the following:

- Each presentation is to be prepared for a different audience, which the rest of the class will simulate: management (“What and Why”/Social Impact Statement); prospective system users (Rapid Prototype); fellow technical personnel (System Design). If at all possible, your project “client” should be invited to attend the non-technical presentations.
- If your project is being done by a team, each member must participate in each presentation in a roughly equal fashion.
- The "What and Why/Social Impact" and Rapid Prototype presentation should be planned for about 10 minutes. The System design presentation should be planned for about 15 minutes including some time for discussion. In some cases, this may mean that you will have to limit the scope of your presentation. It is better to cover a few aspects of your project well than to attempt to cover all aspects poorly. Your written documentation will show the professor how much you have actually accomplished, and will be the prime basis for evaluating the scope of your work. The purpose of the oral presentations is to give you practice with some of the kinds of presentation you may be called on to make in industry. **Oral presentations improve with practice. Please practice yours at least twice before coming to class.**
- In the case of documents requiring both a preliminary and a final version, a complete preliminary draft of the required documentation must be turned in at the start of class on the day shown in the schedule. Though it is a preliminary draft, it must be complete to the best of your ability. The professors will return this to you with suggestions for revision, and final written documentation must be turned in by the date shown in the course schedule below.
- In the case of the initial system structure diagrams, you must send copies to the class (and the professors) **BEFORE** the first brainstorming day. **It must be distributed by hand or electronic mail so that everyone has it by noon on the preceding Friday**, so that they may look the material over in advance. Points will be taken off for material distributed late.
- Student evaluation forms will be used for the talks and demonstrations.

**NOTE WELL: ALL REQUIRED DOCUMENTS MUST BE TURNED IN COMPLETE AND (IN THE CASE OF FINAL VERSIONS) WITH THE NECESSARY SIGNATURES IN ORDER FOR YOUR WORK TO BE CONSIDERED COMPLETE. YOU CANNOT RECEIVE A PASSING GRADE IN THE COURSE IF ANY REQUIRED ITEM IS NOT SATISFACTORILY COMPLETED.**

4. You must turn in a personal resume and cover letter prepared in accordance with the process outlined in the resume writing session. This will be worth 10% of the semester's grade.

#### **EXTENSIONS AND INCOMPLETES:**

Due to the nature of the course, extensions and incompletes will be considered only in the most dire of circumstances. If you are in the General Concentration and an incomplete becomes necessary, it must be made up by the start of classes for spring semester in order to continue registered for CPS492. Please note that, if you get behind early in the year, it will be very difficult for you to finish your project on time. You **MUST** keep up!

## **ATTENDANCE POLICY:**

Attendance at all sessions is mandatory. Each unexcused absence will result in a reduction of 1/2 of a letter grade in the term grade.

## **ACCOMMODATION FOR STUDENTS WITH DISABILITIES:**

Gordon College is committed to assisting students with documented disabilities (see Academic Catalog Appendix C, for documentation guidelines). A student with a disability who may need academic accommodations should follow this procedure:

1. Meet with a staff person from the Academic Support Center (Jenks 412 X4746) to:
  - a. make sure documentation of your disability is on file in the ASC,
  - b. discuss the accommodations for which you are eligible,
  - c. discuss the procedures for obtaining the accommodations, and
  - d. obtain a **Faculty Notification Form**.
2. Deliver a Faculty Notification Form to each course professor *within the first full week of the semester*; at that time make an appointment to discuss your needs with each professor.

Failure to register in time with your professor and the ASC may compromise our ability to provide the accommodations. Questions or disputes about accommodations should be immediately referred to the Academic Support Center. See Grievance Procedures available from the ASC.

**TENTATIVE COURSE SCHEDULE - SUBJECT TO CHANGE:**

Date	Topic(s)	Preparation
<b>UNIT I: INTRODUCTORY CONSIDERATIONS</b>		
M 8/29	What is Software Engineering?; Tools and Environments; * For each chapter in Brooks, also read the corresponding section in ch. 18, where he reflects on his original writing 20 years later	Bruegge ch 1; Brooks ch. 1,2 *; Schach (on reserve) ch. 5
M 9/5	<i>Labor Day - no class</i>	
M 9/12	Modeling with UML; Project Communication (Student-led session) + Use of Github	Bruegge ch. 2 (skim portions that are largely review for you; no journal required); Bruegge ch. 3 and Brooks ch. 3, 6, 7, 16 * (read carefully and journal as usual)
M 9/19	Joint session with other science division departments on job search strategies and resume preparation (Schedule discussion topics to lead) [ Meets in KOSC 109 ]	None - but use this time to identify your project and to get ahead on reading
M 9/26	Software Project Planning and Estimating; Risk; Social Impact Statement (Student-led session)	"The Small Batches Principle", Thomas Limoncelli, CACM July 2016 pp. 52-57 Bruegge pp.607-609; Brooks ch. 8, 14 *; Shneiderman (on reserve) §3.8; <b>PROJECT TITLE, NAME OF CLIENT AND DEPT. SUPERVISOR AND PROBLEM STATEMENT DUE</b>
<b>UNIT II: REQUIREMENTS ANALYSIS AND SPECIFICATION</b>		
M 10/3	Requirements Elicitation; Rapid Prototyping (Student-led session)	Bruegge ch. 4; Schach (on reserve)§10.13-10.15; <b>RESUME AND COVER LETTER DUE;</b>
M 10/10	Project "What" and "Why" / Social Impact Statement Reviews (Oral Presentations)	<b>PROJECT PROPOSAL DUE;</b> <b>PRELIMINARY SIS AND REQUIREMENTS DOCUMENTS DUE</b>
M 10/17	Analysis (Student-led session)	Bruegge ch. 5

M 10/24	Project Rapid Prototype Demos (Oral Presentations)	<b>FINAL SIS DOCUMENTS DUE; USER INTERFACE RAPID PROTOTYPE DUE</b>
<b>UNIT III: DESIGN</b>		
M 10/31	Design Goals; System Design (Student-led session)	Skim Bruegge ch. 6 (no journal) paying close attention to anything that seems relevant to your project. Read/journal Bruegge ch. 7 and Brooks ch. 4, 5 *carefully (and journal as usual).
M 11/7	Design (continued - professor led); Rationale Management (student led)	Bruegge ch. 12 <b>FINAL REQUIREMENTS ANALYSIS DOCUMENT DUE</b>
M 11/14	Project System Design Brainstorming	<b>INITIAL SYSTEM STRUCTURE DIAGRAMS DUE</b>
M 11/21	(continued)	
M 11/28	Software Configuration Management Principles	“Why Google Stores Billions of Lines of Code in a Single Repository”, Potvin and Levenberg, CACM July 2016 pp. 78-87; Bruegge ch. 13; <b>PRELIMINARY SYSTEM DESIGN DOCUMENT DUE</b>
M 12/5	Project Subset Prototype Demos	<b>INITIAL PROTOTYPE OF SUBSET OF FUNCTIONALITY DUE</b>
M 12/12	(Time scheduled for final exam) Presentation of 6-8 pm Design Documents	<b>Review of assigned design from another team</b>
R 12/17	(End of fall semester final exam week)	<b>FINAL SYSTEM DESIGN DUE</b>