

## Software Development Project (67-373) Course Description and Syllabus

---

**Instructors:** Larry Heimann ([profh@cmu.edu](mailto:profh@cmu.edu))  
Joe Mertz ([joemertz@cmu.edu](mailto:joemertz@cmu.edu))  
Jeria Quesenberry ([iquesenberry@cmu.edu](mailto:iquesenberry@cmu.edu))  
Chris Ruch  
Ryan Smalley  
Raja Sooriamurthi ([raja@cmu.edu](mailto:raja@cmu.edu))  
Don Taylor  
Randy Weinberg ([rweinberg@cmu.edu](mailto:rweinberg@cmu.edu))

**Term:** Spring 2014

**Logistics:** Mondays and Wednesdays  
10:30 AM - 11:20 AM  
DH 2302

Additional meetings with project advisors and clients will be scheduled as needed during the semester.

### Course Overview:

Software Development Project is a junior level team-based project course in Information Systems that focuses on working as a team to build a solution to meet the needs of a client. With your teammates, you will work with an actual client to design, build, and deliver an information system solution while following a disciplined software project life cycle approach. By term's end, your team must provide a sustainable solution that fits the client's objectives, organization constraints and capabilities.

### Course Description:

Many real-world software projects in development today will be costly failures that do not fully address organizational and user problems. Most of these projects will exceed their schedule and budget targets before they are delivered. According to the noted author Steve McConnell, half of the most expensive software projects will be canceled for being out of control. Many others will simply be abandoned, written off, deployed but never used, or of such poor quality that they cannot be effectively used in practice. Most of these projects do not fail for technical reasons; they fail due to poor project management, poor project control, and ineffective teamwork. In other words, they fail for reasons related to people and process rather than technology.

Developing useful software for real users is a complex activity. Because of its intangible and intellectual nature, some experts claim it is the most difficult, and one of the most risky of all engineering activities. Recognizing this, industry practitioners and academics have developed and refined numerous approaches – with varying degrees of success – to the software development process over the years. Of course improved languages and tools enable developers to write code faster, but generally, this represents only a part of the software development activity. Ultimately, it is an effective combination of ‘people, process, and technology’ that produces satisfactory results.

To help build skills in all areas of ‘people, process, and technology’ you will work in a engagement with a community partner. *Each project team will propose, define, design and implement a working information system or application with the project client.* Teams should act as *consultants* working 'with' and not 'for' their project clients. Successful teams never assume ownership of a client's project. Rather, they work hard to build sustainable, maintainable solutions and partner capacity.

Throughout the semester you will work to deliver and integrate a working solution to your clients satisfaction into their organization. It will be accompanied by documentation, training and support materials. Because of our short time frame and absolute deadline, you must employ careful and skillful project management throughout. You must deliver your solution on time; extensions beyond the semester are not possible.

### **Learning Objectives:**

Upon successful completion of the course, each student should be able show to tangible evidence of growth and maturity in the following areas:

1. Identify, research, evaluate and recommend appropriate 'right sized' solutions to meet sponsor's articulated requirements.
2. Design, develop and deliver an appropriate solution that adapts tools, techniques, technologies, environments and methods in order to achieve project goals.
3. Apply skills in key phases of a typical, rapid system development lifecycle – articulation of project vision and requirements; systems analysis and detailed design; systems implementation and testing and documentation.
4. Coordinate and collaborate effectively as a team member on a small software development project to build principles of effective teamwork, problem solving, and professional communication.
5. Apply practical project management techniques to a real project of significant importance.

## **Deliverables:**

To help you achieve these learning objectives, your team will follow a disciplined life cycle approach and produce a series of documents and software deliverables throughout the term. At the end of the term, your team will complete: two major written reports (a project proposal and a final report), a series of sprint status reports, and a working system.

### **1. Project Proposal**

**DUE: February 7, 2014 at 11:59 PM (midnight)**

### **2. Sprint Reports**

**DUE: Every Monday at 10:30 AM (starting February 24, 2014)**

### **3. Peer Reviews**

**DUE: February 24, March 31, and April 30, 2104 at 10:30 AM**

### **4. Final Report**

**DUE: April 30, 2014 at 10:30 AM**

### **5. Final Presentation\***

**DUE: May 9, 2014 at 12:30 PM**

\*A graded faculty evaluation of your working term project will be conducted during final exams. during a public event with team project demonstrations with your client. This session will be held on May 9, 2014 from 12:30 PM - 4:30 PM in UC Rangos.

Recognizing the individual nature and nuances of each project, your team should work with your faculty advisor to customize the process or deliverables to create a good 'fit' with your project. *In addition to the scheduled deliverables, the IS faculty may require additional deliverables, project management documentation, project management surveys, presentations or proof of performance from any team or any individual.*

In addition, each student must complete a time log of all hours spent on course related activity - hours spent in meetings, doing analysis, design, programming, testing, documentation, etc. This information is most accurately maintained while completing the work, rather than filling in estimates at the time the sheets are due. Turn in weekly summaries as required, and in the format, required by the instructor.

## **Evaluation:**

The partnerships teams form with their clients are the ultimate foundation for success. Your client's needs should be the main driver of your activity in this course. Listening carefully to partner needs, requirements and expectations is essential. Going beyond the stated problem, all the relevant social, organizational, and technical aspects must be considered. If lasting benefits are to be realized, any solution must be ultimately useful

and useable by the client organization. Your first major task, therefore, will be to understand and articulate the client's requirements and develop a realistic proposal and draft agreement with your client.

At the end of the semester, your project client will evaluate the team's performance and deliverables. 10% of your final grade will come from the client's evaluation. Any team that fails to deliver a solution of real value to the client will not earn higher than a 'B' in this course. Subject to factors under the team's control, solutions that are basically incomplete, not deployed in the organization, not properly tested or documented or miss the client's basic intentions or organizational capabilities will be evaluated appropriately.

### ***Teamwork***

Each team will earn a final team grade for the overall project based on various factors. Ultimately, to earn an 'A' for the overall project, the team must meet client expectations by delivering high quality, sustainable work products - on time and complete - to the client's satisfaction. Absent this, a grade of 'B' or lower will be submitted for the team. Be advised that experience tells us that roughly half the projects will earn 'A' (Outstanding) grades.

Furthermore, we expect top quality work from all teams and all individuals consistently throughout the term. This is our benchmark. Please do not submit sloppy, incomplete, late or substandard work. If the work you submit is not up to the team's highest standards of excellence, you can be sure it will not be up to ours.

### ***Grading Weights***

- 10% - Homework + meeting reports to the teaching assistants
- 20% - Proposal
- 30% - Final report & information systems solution
- 05% - Final exam
- 15% - Sprint reports
- 05% - Final presentation
- 10% - Client assessment
- 05% - Professionalism

Final project grades will be adjusted for each individual, as needed, by the peer evaluations, attendance, time commitment, assessment of individual contributions and other factors, as below:

### ***Attendance***

Regular attendance at all weekly team meetings and class sessions is required.

Your final course grade will be lowered by 1/3 of a letter grade for each unexcused or undocumented absence. Further, arriving to class or a meeting late will count as an absence. Be advised that a poor attendance record will not go

unnoticed by your fellow team members, and will likely be reflected in your peer evaluations also.

Documentation of a personal emergency or other unavoidable contingency will be required to avoid attendance penalties. If you have a legitimate excuse such as an interview trip, alert your advisor a day or more in advance. If you are feeling ill, then email your advisor well before the meeting time. After-the-fact excuses are not good professional communication and instead indicate a lack of commitment to your team, client, and project.

### ***Deadlines***

Professional behavior dictates that deliverables (for the class, your team, and your client) be on-time. Items that are late without a prior arrangement will lose 10% per day.

### ***Individual Contributions***

Working in a team brings with it a high level of responsibility. Each of you needs to depend on the skills, talents, and contributions of the other team members.

All members of the team are expected to contribute in meaningful and significant ways to the project's technical work throughout the semester. No one or two individuals should be expected to, shoulder the bulk of the technical responsibilities for the project. (This is a serious risk factor, and simply unfair to those individuals.) Individuals should expect that their course grade will be lowered for failure to perform a fair share of the team's technical work.

We expect every team member to act respectfully and professionally to team members, clients and faculty members throughout the semester. Students who are consistently disrespectful, uncooperative or non-participating may be dismissed from their teams upon recommendation of the team and agreement by the faculty. Under such circumstances (which we expect to occur only rarely) a dismissed student must make up the units or complete an assigned project on his or her own.

### ***Peer Evaluation Adjustment (+10, 0, -30 of individual final grade)***

Peer Evaluations are due three times during the term, at the dates and times below. **Be aware that peer evaluations can increase your final individual grade by 10% - or reduce it by 30%.** Late penalties of 10% per day may be applied. Feedback from the first two peer reviews will be shared with each individual reviewed, but the final review will only be accessible to the IS Faculty. Instructions for completing peer evaluations will be provided well in advance.

The faculty will use these peer evaluations to assess each individual's relative contributions to the project. Your individual grade may be adjusted upward or downward as a result of the peer evaluations. Summaries of peer evaluations will

be returned to students during the semester; written comments will be held confidential. The final round of peer evaluations at term's end will be entirely confidential; they will not be returned or be made available for inspection by team members. Grade penalties will apply for those individuals who do not complete peer evaluations in a timely way when they are due.

### ***Faculty Adjustment***

While your project will be evaluated as a whole, your individual grade may be quite different. Every individual is responsible for doing his or her fair share of the team's work and consistently demonstrating such throughout the semester. The faculty will reward those who have been consistent contributors to all aspects of the project, and will penalize those who do not contribute their fair share. If you cannot demonstrate, document or present your contributions, there will be little basis for justifying a high grade. Faculty advisors may require proof of performance or demonstration of work products from any student during the semester.

### ***Time Commitment***

Software Development Project is a 12-unit course in the Information Systems major. **This means that, on average, students are expected to commit 12 hours of their time to this course each week.** Students who, for whatever reasons, are unable or unwilling to make this commitment or who consistently fall below the average, either weekly or in cumulative hours throughout the term, will receive reduced grades in the course. Claiming to be too busy with other coursework, job interviews, extracurricular activity, Carnival, or other causes will not be considered as valid justification for failing to commit the time.

Very simply, there is no substitute for time on task during the term. We know from experience that time lost is seldom made up in subsequent weeks. Insisting that the project must be scaled down during the last few weeks of the semester because the team or individuals have not committed the expected time is poor practice and is not acceptable.

### ***Quality Work Requirements***

A word of advice - your course grade reflects on your team's commitment to produce high quality work consistently throughout the semester. Quality work will result in high grades. Teams and individuals focusing on points and grades will ultimately be disappointed and unrewarded. Given every team's potential to do high quality work and the faculty's expectations of the same, we do not follow a 90/80/70/60 curve for grading. An 80 grade on a major team project of this sort or written report would generally be considered unacceptable and cause for serious concern and rework. Concentration on doing the highest quality work possible is your best strategy for securing high grades in this course.

Students whose commitment and project contributions are consistent with expectations for a 12 unit course and whose contributions are considerably above average will earn 'A' grades. Students whose commitment or project contributions are less than expectations for a 12 unit course or performing at average or below should expect grades of 'B' or 'C'.

Some sure-fire methods to earn 'B' or 'C' grades or lower include the following:

- Unexcused absences at weekly team meetings
- Failure to commit the expected average 12 per week to the project
- Avoiding the team's difficult technical work by declaring yourself weak or uninterested in technical design, technical details or programming
- Providing misleading or vague statements about your project contributions to avoid responsibility for underperformance
- Failure to accept responsibility for keeping your commitments to the team
- Demonstrating disrespectful, disruptive or repeated 'me' centered behaviors that diminish the team's effectiveness

### **Grading Review Policy**

Although we strive for consistency and accuracy in grading, we know that grading mistakes and misunderstanding can occur. All regrading requests should be accompanied by a written statement highlighting and explaining the items the team feels were misgraded. If a written report or key deliverable is below your advisor's expectations, you may be required to rework the phase or deliverable for regarding before continuing.

### **Team Meetings:**

Your team will meet with its IS faculty advisor, assigned teaching assistant and clients as shown on the course schedule. We expect that every group member will attend each meeting. We expect all team members to be prepared to actively participate in their weekly meetings. Project managers, those who take on leadership positions within the team, should showcase each team member's contributions each week and to resist the temptation to speak for the others.

### **Agendas**

Your team should prepare an agenda, in advance, for each meeting. Teams should be prepared to discuss the past week's progress, goals for the coming week, and any problems encountered. Consider carefully what you like to accomplish during our time together. Make sure that materials needed for review are distributed well before the meeting begins.

### **Preparation**

We expect all team members to be prepared to actively participate in these meetings. Everyone will be expected to **demonstrate material progress** and his or her **contributions to the team's efforts**. These can be substantiated through time logs, documentation, code or other work products, and will be reflected on the sprint reports. Each meeting, you should prepare to show what you have done, discuss your time commitment, describe problems encountered and plans for the next sprint. Understand

that vague, misleading or inconsequential statements of progress or intention will be interpreted as signs of low commitment, low productivity and ineffective teamwork. Project managers, or those who take on leadership positions within the team, are expected to showcase each team member's contributions each week and to resist the temptation to speak for the others.

### **Timeliness**

You are expected to be on time for your weekly meetings. Don't waste everyone's by being late, unprepared, having nothing to discuss, coming with computers that don't work or regularly counting on others to cover for you. As indicated above, penalties apply for absences, lateness, or being unprepared to participate.

### **Working in Teams:**

Working in a team brings with it a high level of responsibility. Your team will, for the most part, manage itself and assume responsibility for successful completion of all phase requirements and the project. Each of you will depend on the skills, talents, and contributions of the other team members. The overall success of the team's effort depends on the fullest participation of each and every member. The work you turn in for evaluation reflects on the commitment and efforts of the entire team.

While your team will select a "Project Manager" and a "Quality Assurance Manager," everyone on the team is ultimately and fully accountable for the team's performance. The team, as a whole, is responsible for learning from the team experience, addressing problems and mistakes, and improving processes so that productivity, effectiveness and quality are increased. Your team will need to develop its own methods for making decisions and dealing with conflicts that inevitably will occur. You will also need to carefully manage your time and resources so that the work gets completed, at high quality, and on time.

We expect you to attempt to work out problems your team encounters throughout the semester - whether technical, operational, or with individual team members. However, since we are on a tight schedule this term, do not spend large amounts of time dealing with problems beyond your control, or with problem group members. You should consult with your faculty advisor about any such problems that are bogging you down. We will work with you to try to solve these problems. Anything you wish us to consider as confidential will be so held. You must also bring any problems that threaten the successful, on-time completion of your term project to the faculty's attention. Festering, unresolved problems can have a serious negative effect on your overall performance and on your grades.

NOTE: All members of the team must contribute in meaningful and significant ways to the technical work throughout the term and demonstrate their competence and contributions in the project's technical areas. Coding, testing, designing databases, and creating technical documentation should be reasonably distributed throughout the team. No one or two individuals should be expected to shoulder the bulk of the technical

responsibilities for the project. This is a serious risk factor, and simply unfair to those individuals.

Every person assuming primary responsibility for any technical work product should have one or more backup members of the team who act as partners and, *at a minimum*, carefully review all designs, code, test plans, and technical documentation. This strategy provides valuable cross-training, yields higher quality, and reduces the risk that valuable knowledge and skills will reside in the mind of only one person. **You may not offload your responsibility to contribute to the difficult technical work by simply claiming you are not interested, or skilled in, these aspects.**

Every team member is expected to take the personal initiative to get things done. There is never a shortage of project work to do. Waiting for assignments, detailed instructions, technical problems or computers to be fixed, or waiting for future meetings wastes time and detracts from the team's progress. **Be certain to make sure your team and advisor know what you are doing, where you have problems, where you need help and what you expect to accomplish.** Having nothing to do for days at a time is a sure sign of inadequate teamwork and inadequate project management.

Students who show initiative and leadership will be recognized. Students who show little initiative should expect to earn lower grades than their teammates who take the lead on getting things done. Be advised that your instructor may require you to provide tangible evidence of your technical contributions throughout the semester.

### Schedule:

The schedule below should give you a general framework for how the work for this course will be distributed throughout the semester. A continually updated version of this schedule is available online at <http://x.vu/373schedule>. When in doubt, refer to the most recent online version of the schedule.

| Date   | Topics   | Required Weekly Meetings  | Due to Blackboard   | Due to Client |
|--------|--|---|---|---------------|
| 13-Jan | Class Overview<br>Syllabus                           |   |   |               |
| 15-Jan | Alternative consulting models                        |   | ASSIGNED: Ayole HW  |               |
| 20-Jan | Pre-research:Due diligence before meeting the client | If applicable, meet prior team: project outcomes, existing systems, required technology | DUE: Ayole HW<br>ASSIGNED: Pre-research<br>ASSIGNED: 67-272 lab refresher   |               |
| 22-Jan | Structuring unstructured problems                    |   | DUE: 67-272 lab refresher<br>ASSIGNED: Relationship mgmt & team building HW |               |
| 27-Jan | Relationship management &                            |   | DUE: Relationship mgmt &  |               |

|        |   |                              |  |   |
|--------|---|------------------------------|--|---|
|        | team building   |                              | team building HW<br>ASSIGNED: Preparation for initial client meeting<br>ASSIGNED: Client context initial analysis    |   |
| 29-Jan | Initial client meeting - UC Rangos 2  |                              | DUE: Preparation for initial client meeting  |   |
| 3-Feb  | Advisor breakout meeting: Reviewing the client context and brainstorming solutions. | Client meeting<br>TA meeting | DUE: Client context initial analysis w/ 5 user stories<br>ASSIGNED: Proposal<br>ASSIGNED: Proposal Peer Presentation |   |
| 5-Feb  | Crafting the proposal   |                              | DUE Friday Midnight: Proposal  |   |
| 10-Feb | Advisor breakout meeting: Proposal peer presentation & review                       | Client meeting<br>TA meeting | DUE: Proposal Peer Presentation  |   |
| 12-Feb | Advisor breakout meeting: Proposal peer presentation & review                       |                              | ASSIGNED: Git HW?  |   |
| 17-Feb | Team collaborative software development best practices                              | Client meeting<br>TA meeting | DUE: Git HW<br>ASSIGNED: Git HW2   | Revised Proposal  |
| 19-Feb | Project management & project metrics  |                              | DUE: Git HW2   | Once defined in your proposal, process and product deliverables are due to your client each week. |
| 24-Feb | Advisor breakout meeting  | Client meeting<br>TA meeting | DUE: Sprint report<br>DUE: Peer Reviews  |   |
| 26-Feb | Communicating with a non-technical audience   |                              |  |   |
| 3-Mar  | Elevator speeches   | Client meeting<br>TA meeting | DUE: Sprint report   |   |
| 5-Mar  | Sustainability & capacity-building  |                              |  |   |
| 10-Mar | Spring Break  |                              |  |   |
| 12-Mar | Spring Break  |                              |  |   |
| 17-Mar | Advisor breakout meeting  | Client meeting<br>TA meeting | DUE: Sprint report   |   |
| 19-Mar | Documenting outcomes  |                              | ASSIGNED: Outcomes HW  |   |
| 24-Mar | TBD (Guest speaker)   | Client meeting<br>TA meeting | DUE: Sprint report   |   |
| 26-Mar | TBD (Guest speaker)   |                              | DUE: Outcomes HW   |   |
| 31-Mar | Advisor breakout meeting  | Client meeting<br>TA meeting | DUE: Sprint report<br>DUE: Peer Reviews  |   |
| 2-Apr  | Writing the final report  |                              | ASSIGNED: Final Report   |   |
| 7-Apr  | Final project deliverables  | Client meeting<br>TA meeting | DUE: Sprint report   |   |

|        |                             |                              |  |              |
|--------|-----------------------------|------------------------------|--|--------------|
| 9-Apr  | Carnival - no class         |                              |  |              |
| 14-Apr | Advisor breakout meeting    | Client meeting<br>TA meeting | DUE: Sprint report                     |              |
| 16-Apr | Making a final presentation |                              |  |              |
| 21-Apr | Final exam                  | Client meeting<br>TA meeting | DUE: Sprint report                     |              |
| 23-Apr | TBD (Guest speaker)         |                              |  |              |
| 28-Apr | Advisor breakout meeting    | Client meeting<br>TA meeting | DUE: Sprint report                     |              |
| 30-Apr | Process reflection          |                              | DUE: Final Report<br>DUE: Peer Reviews | Final Report |
| 9-May  | Final presentations         |                              |  |              |

Homework and additional assignments will be announced in class.

Throughout the semester your team will be required to meet with assigned teaching assistants and clients. You should work directly with your faculty advisor to determine schedules for these meetings.

The junior project is a great learning opportunity for you. You will benefit in direct proportion to the effort and commitment you make to the course.

We wish you the very best of success this term! We think you will find this to be a very interesting and valuable experience.