Course Number	CSE 582
Course Title	Software Process Practicum: Lessons in Software Quality and Leadership
Instructors	Judy Bamberger and James Hook
Days	Tuesdays, Thursdays (and one Saturday)
Times	5:30pm - 7:00pm
Number of Units	3 credits

The software process practicum is designed to immerse the working student in topics relevant to software process improvement and quality management, and to introduce them to the supporting theory. Topics include process management frameworks (capability maturity model, ISO 9000), measurement for process improvement, and key team skills necessary for effective collaborative software engineering efforts. At the end of the course the student will be able to demonstrate that the software development process can be managed and controlled, leading to increased software quality. In addition to lectures, the class will include one Saturday workshop.

OBJECTIVES / VISION

After this class, the students will understand and have demonstrated that:

- Software processes can be managed and controlled.

- They understand that software engineering is a social process, too.

- They have real skills they can apply today at work.

- They have a framework on which to build their own educated decisions about applying software quality principles and tools to personal, project, and corporate software activities.

- They have identified three things to improve at their own work place (or within their own personal process) and are working on them.

> To the Students:
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> This is a list of required and recommended books.
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> Readings will be derived from the three required books throughout the semester.
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> The recommended books will provide additional breadth and assistance throughout the class.
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> We have selected these books because we believe they will be useful to you after this course, in your work environment. Your feedback throughout the course and afterward will be appreciated.

Required Books

(1)   Weinberg, Gerald M, *Quality Software Management, Volume 2, First-Order Measurement*, Dorset House Publishing, 1993

(2)   Scholtes, Peter R et al, *The TEAM Handbook*, Joiner, 1998

(3)   Grady, Robert B and Caswell, Deborah L, *Software Metrics: Establishing a Company-Wide Program*, P T R Prentice Hall, 1986

Recommended Books

(1)   Brassard, Michael, *The Memory Jogger Plus+*, GOAL/QPC, 1989

(2)   Weinberg, Gerald M, *Quality Software Management, Volume 1, Systems Thinking*, Dorset House Publishing, 1993

GRADING CRITERIA

- Homework - individual/team   20%
- Week #5 project - team   20%
- Week #9 - team   30%
- Final project/exam   30%
- Class participation (individual) subjective

OFFICE HOURS

- Judy Bamberger: Tuesday, 7:00pm - 8:00pm at OGI and by appointment
- Jim Hook: Thursday, 7:00pm - 8:00pm and by appointment

Week	Class	Day Date	Topic, Overview Readings to be done before class Homework to be done	
1	1	Tuesday 27 September (Jim)	Topic:	Introduction, Ice Breaking, and Motivation
				Reader's Digest Guide to the History of the "Quality Movement"
			Overview:	Set expectations for the course, including logistics and mechanics
				Provide rationale for the course
				Review briefly the work of the quality "gurus," including Shewart, Deming, Juran, Crosby
				Discuss how those principles can be applied to software processes
			Readings:	none
			Homework:	(H1a) Write your "process biography" using the questionnaire we provide (we will use this info to tailor future exercises) [turn in at class #2]
				(H1b) Make three distinct contacts (informal, using personal contacts) into software development organizations (preferably three different companies/research labs); using the questionnaire we provide, characterize each one's software quality activities; consider which contact might work with you on some future exercises - scope their time commitment (guaranteed no more than 40 hours total over next 10 weeks) and what they will get in return (e.g., copies of results, articles from class, or ...); your team (yes; you will work in teams a lot) will select one (hopefully) organization as a "partner" [turn in at class #3]

1	2	Thursday 29 September (Jim)	Topic:	Background: Statistical Process Control; Several Basic Quality Tools
			Overview:	Discuss some of the tools that can be - and are being - used to assist in managing software development projects
			Readings:	(R2a) one case study from Walton's *Deming Management at Work* (R2b) Juran and Gryna's *Quality Planning and Analysis*, Chapters 1 and 2 (R2c) Crosby's *Quality is Free*, Chapters 2 and 3
			Homework:	Begin thinking about how you will build your team for class projects
2	3	Tuesday 4 October (Judy)	Topic:	How does the "I" fit into "TEAM"?
			Overview:	Introduce components of effective meeting management
				Look at different models for style preference (primarily social style), and how that impacts team effectiveness
				Introduce the team growth model and "Teamness"
			Readings:	(R3a) selections from Wilson Learning (R3b, R3c) team-related articles (provided at a later date) *Team Handbook*, Chapters 3 and 4 Weinberg Volume 2, Chapters 1 and 2
			Homework:	(H3a) Analyze the strengths and weaknesses of each of the social styles according to the questions and situations we provide.
				Read one of two other models ((H3b, H3c, H3d) selection from Keirsey/Bates, *Please Understand Me* or (H3e) Creatrix Inventory), see what the instrument indicates as natural tendencies, and discuss (3-5 pages) how these characteristics manifest themselves in your team interactions at work [turn in at class #4]

2	4	Thursday 6 October (Judy)	Topic:	Problem Solving Paradigms
			Overview:	Review results of homework
				Look at different models for solving problems, including resolving conflict and making decisions, referencing "styles" from previous session and homework
				Select and begin building your team for class projects
			Readings:	(R4a) Sequent/Xerox problem solving process Weinberg Volume 2, Chapters 3 and 4
			Homework:	(H4) As a team, using the basic tools discussed in session #2 (see also *Memory Jogger +* and the *Team Handbook*), discuss (5-8 pages) how you would solve the problem we provide; document the solution strategy; include a discussion of team strengths, weakness, individual styles, improvements to make for future team exercises, and overall effectiveness; include a discussion of effective use of team-together time (e.g., "meeting management"); also - indicate where you believe your team is on the Team Growth Model. [turn in at class #5]
3	5	Tuesday 11 October (Judy)	Topic:	Process Definition Techniques
			Overview:	10-15-minute each team summary of homework
				Introduce "week five" homework team project [turn in at class #10; presentation at class #11]
				Begin focus on software process; look at (software) process definition techniques
			Readings:	(R5a) selections from *Managing the Software Process* by Watts Humphrey (R5b) selections from the *IBM Systems Journal*, 1985
			Homework:	(H5a) Demonstrate the process representation and definition techniques on the sample process description we provide [turn in at class #6]

3	6	Thursday 13 October (Judy)	Continuation of Topic from class #5
			Readings: (R6a) selections from the *Capability Maturity Model for Software* and the *Key Practices* Weinberg Volume 2, Chapters 5 - 7 (R6b) selections from the *IBM Systems Journal*, 1985
			Homework: [focus on "week five" homework]
4	7	Tuesday 18 October (Judy)	Continuation of Topic from class #5
			Readings: read subset (at least 2) of quality frameworks: (R7a) ISO 9000-3; (R7b) Trillium; (R7c) QSR - Motorola; (R7d) Bootstrap; (R7e) Malcolm Baldridge Weinberg Volume 2, Chapters 8 and 9
			Homework: [focus on "week five" homework]
4	8	Thursday 20 October (Judy)	Topic: Capability Maturity Model for Software (CMM)
			Overview: Review process management concepts and the CMM
			Talk about the application of CMM (assessments, evaluations, personal software process)
			Discuss how these concepts can be used in software development organizations
			Readings: [nothing new]
			Homework: [focus on "week five" homework]
5	9	Tuesday 25 October (Judy)	Topic: Quality Frameworks: Applying the Concepts to Process Improvement
			Overview: Discuss the strengths/weaknesses of each model read as homework based on a framework we provide
			Readings: Weinberg Volume 2, Chapters 10 - 12
			Homework: [focus on "week five" homework]

5	10	Thursday 27 October (Judy)	Topic:	Quality Technique #1 - Formal Inspections
			Overview:	Collect "week five" homework
				Walk through the formal inspection process; set up the homework and expectations for running the formal inspection(s) on Saturday
			Readings:	(R10a) ST Inspection Handbook (NJBrenner, Oracle) (R10b) Fagan's *Design and code inspections to reduce errors in program development* (1976) (R10c) Fagan's *Advances in Software Inspections* (1986) --- and optional readings (helpful references) --- (R10d) Grady and Van Slack's *Key Lessons in Achieving Widespread Inspection Use* (R10e) Weller's *Lessons from Three Years of Inspection Data* (R10f) Ackerman, Fowler, and Ebenau's *Software Inspections and the Industrial Production of Software*
			Homework:	Do pre-inspection meeting work [prepare for Saturday workshop]
5	11	Saturday 29 October (Judy and Jim)	Topic:	Let's Have Some Fun; Let's Learn by Doing - Big Time!
			Overview:	Review inspection process
				Run the formal inspection; debrief
				Discuss metrics that can/are/should be gathered
				Do metrics; debrief
				Do root cause analysis, Ishikawa charts, discuss opportunities to improve; debrief
				Lunch - "on us!"
				Presentations of "week 5" homework
			Readings:	[nothing new; be sure to prepare for this session!]
			Homework:	[nothing new, honest!]

6	12	Tuesday 1 November (Jim)	Topic:	Software Metrics
			Overview:	Introduce "week 9" homework [turn in at class #16; team presentation at class #17]
				Discuss rationale for and use of software metrics, both for the product and the process
				Provide overview of some of the more useful software metrics, and why they are useful
				Discuss integrating metrics and process definition, and how this provides the basis for quantitative process improvement
			Readings:	(R12a) *Software Modeling and Measurement: The Goal/Question/Metric Paradigm*, by Vic Basili *Software Metrics: Establishing a Company-Wide Program*, by Robert B Grady and Deborah L Caswell, chapters 5-6 and 12-15 (please use this as a minimum guideline; we would have like to have assigned the entire book)
			Homework:	(H12a) Identify a problem at work and do a "detailed impact case study" following Weinberg Volume 2, section 8.4, and a "subjective impact study" following Weinberg Volume 2, section 9.3 (keep them as simple, short, and precise as Weinberg's) [turn in at class #13]

6	13	Thursday 3 November (Judy)	Topic:	Process Improvement Models
			Overview:	Discuss the "big picture" of process improvement models
				Build on basic process improvement tools
				Introduce action planning
				Exercise: GQM (metrics package)
			Readings:	(R13a) selections from the *Quality* issue of Business Week (R13b) selections from ODI materials, the *Team Handbook*, chapter 5
			Homework:	(H13a) Discuss (3-5 pages) what appears to you to be the "top six" characteristics of high-quality organizations; discuss how those characteristics are manifest in your organization (e.g., relative strengths and weaknesses of your organization as compared against those "top six" common themes) [turn in at class #14]
7	-	Tuesday 8 November	no class; instructors teaching and presenting at TRI-Ada '94 [focus on "week nine" homework]	
	-	Thursday 10 November	no class;instructors teaching and presenting at TRI-Ada '94 [focus on "week nine" homework]	
8	14	Tuesday 15 November (Judy)	Topic:	Organizational Infrastructure for Sustained Process Improvement
			Overview:	Look at several organizational structures and motivations for continuous and sustained process improvement
				Discussion of characteristics of effective leaders
			Readings:	(R14a) Juran and Gryna's *Quality Planning and Analysis*, Chapter 7 (R14b) selections from *The Leadership Challenge* by James Kouzes and Barry Posner Weinberg Volume 2, Chapters 13 - 15
			Homework:	[factor these concepts into "week 9" homework]

	15	Thursday 17 November (Judy)	Topic:	Technology Transition; Managing Change
			Overview:	Discuss key components of change and technology transition - organizational and individual points of view
			Readings:	(R15a) Software Manager, *The nature of change agents* (R15b) Schaffer and Thomson, *Successful Change Programs Begin with Results* (R15c) Armstrong, *Strategies for Implementing Change: An Experiential Approach* (Delta process) Weinberg Volume 2, Chapters 16 - 19
			Homework:	[factor these concepts into "week 9" homework]
9	16	Tuesday 22 November (Judy)	Topic:	Quality Technique #2 - Quality Function Deployment (QFD)
			Overview:	Collect "week 9" homework Introduce and practice some QFD steps Discuss relevance to software
			Readings:	(R16a) *The House of Quality*, by John Hauser and Don Clausing (R16b) *The Deming Way to software quality*, by Richard Zultner (R16c) *QFD for Software - Satisfying Customers*, Richard Zultner --- and optional readings (helpful references) --- (R16d) *QFD Integrated with Software Engineering*, MaryAnn Betts (R16e) *Quality Function Deployment*, Barbara Bicknell
			Homework:	TBD [there will be a short assignment]
		Thursday 24 November	no class; Thanksgiving	

10	17	Tuesday 29 November (Judy)	Topic:	Team Presents: "Week 9" Homework
			Overview:	Each team gives a presentation on their "week 9" homework
			Readings:	(R17a) selections from *Teaching the Elephant to Dance* by James Belasco
			Homework:	[nothing new]
	18	Thursday 1 December (Judy)	Topic:	Review and Summary
			Overview:	Open discussion; tying things together; preparation for final paper; set expectations for final paper
				Course evaluation, focusing on continuous improvement
			Readings:	[nothing new]
			Homework:	[nothing new]
	-	Thursday 8 December (at OGI)	Final Paper Due	