Course Description

As C++ inventor Bjarne Stroustrup says, our civilization runs on software. Because individuals, organizations, and nations today depend increasingly on software, it would do well for future software engineers and IT professionals to be familiar with various practices and methods, both plan-driven as well as agile, that are useful in the production and delivery of quality, timely, and cost-effective software products. This 3.0-unit course will introduce students to the practices of a full spectrum of software development approaches and methods, from the more plan-driven, documentation-intensive approaches of PSP, TSP, and CMMI, to the more agile methods of XP and Scrum.

Course Pre-requisite

Introduction to Software Engineering (INTROSE): Software development phases and disciplines, UML

Course Objectives

By the end of this course, students should be able to:

- Describe and critique, based on one’s own data and experience in the course, the PSP approach to personal software process improvement;
- Describe and critique various software development approaches, methods, and practices, both plan-driven and agile; and
- Describe and critique various software refactoring techniques.

Course Outline and Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reference and Reading Assignment</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Course Requirements; Introduction: SE Past and Present</td>
<td>(Boehm, 2006)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Software Methods Spectrum: From Plan-driven to Agile</td>
<td>(Boehm &amp; Turner, 2004, chaps. 1-2)</td>
<td></td>
</tr>
<tr>
<td>Week</td>
<td>Topic</td>
<td>Reference and Reading Assignment</td>
<td>Deadline</td>
</tr>
<tr>
<td>------</td>
<td>-------------------------------------------</td>
<td>-------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>3</td>
<td>Personal Software Process (PSP)</td>
<td>(Humphrey, 1995, chaps. 2-5)</td>
<td>Project Proposal*</td>
</tr>
<tr>
<td>4</td>
<td>Team Software Process (TSP)</td>
<td>(Humphrey, 2000)</td>
<td>PSP 1A Report*</td>
</tr>
<tr>
<td>5</td>
<td>Capability Maturity Model Integration (CMMI)</td>
<td>(CMMI, 2002)</td>
<td>PSP 2A Report*</td>
</tr>
<tr>
<td>6</td>
<td>(Rational) Unified Process ((R)UP)</td>
<td>(Jacobson et al., 1999, chaps. 1,2-5)</td>
<td>PSP 3A Report*</td>
</tr>
<tr>
<td>7</td>
<td>eXtreme Programming (XP)</td>
<td>(Beck, 2000, chaps. 10-11)</td>
<td>PSP 4A Report*</td>
</tr>
<tr>
<td>8</td>
<td>Scrum</td>
<td>(Schwaber, 2004, chap. 1)</td>
<td>PSP 5A Report*</td>
</tr>
<tr>
<td>9</td>
<td>Refactoring Techniques</td>
<td>(Fowler, 1999) or Slides 8a-8g</td>
<td>PSP Final Report*</td>
</tr>
<tr>
<td>10</td>
<td>Design Patterns</td>
<td>(Gamma et al., 1995)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Project Presentations (Refactoring, Pair Programming)</td>
<td></td>
<td>Project Report and Demo*†</td>
</tr>
<tr>
<td>13</td>
<td>SE Trends (esp. Service Systems Engineering)</td>
<td>Integration</td>
<td></td>
</tr>
</tbody>
</table>

* A hard copy of the report will be submitted to the professor on the first meeting of the week. If submitting a group project report, the software (including source and executable files, on CD) must be submitted together with the hard copy.

† A corrected soft copy of the project report and slides will be e-mailed to the professor within 24 hours of the oral presentation. The subject of the e-mail must be:

```
ADVANSE (section) - Project Report and Slides - Gassignedgroupnumber.
```

Note that there is exactly one space before and after each dash. For example, if your section is S11 and your assigned group number is 1, then the subject of your e-mail should be:

```
ADVANSE - Project Report and Slides - G1.
```

**Course Requirements**

This course has four requirements, as shown in the table below. To pass this course, one must accumulate at least 60 points.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Maximum Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class participation</td>
<td>15</td>
</tr>
<tr>
<td>Final exam</td>
<td>30</td>
</tr>
<tr>
<td>PSP exercises</td>
<td>20</td>
</tr>
<tr>
<td>Group project</td>
<td>35</td>
</tr>
<tr>
<td>TOTAL POINTS</td>
<td>100</td>
</tr>
</tbody>
</table>

*Class participation (recitation, occasional exercises, special oral reports)*

- Students may accumulate up to 45 points through class participation: all points in excess of 15 will be credited toward the final exam; however, the sum of the class participation and final exam points cannot exceed 45.
- The slides of any special oral reports must use the masters of the slides of this course, and must be e-mailed, with corrections, to the professor within 24 hours of the oral presentation. The subject of the e-mail must be:

```
ADVANSE - Special Report - lastname, firstname.
```

**Final exam**
There will only be 30 items in the final exam, covering all lectures and non-project-related oral reports. As the coverage is very comprehensive, the best way to get a good score in the final exam is to understand every lecture (and lecture slide) well.

**Individual PSP programming exercises**
- The deadlines of these programming exercises and associated reports are specified in the course schedule, while all the details (programming specs, process scripts to follow, forms to fill out and submit) of these programming exercises and reports are found in the URL given above. Further details can be obtained from (Humphrey, 1995), which is available at the DLSU Library’s Circulation-Reserve section.

**Group project**
- Each group will have 4 members and will develop from scratch a PSP Tool for ADVANSE (to support up to PSP 1.1) with and without the use of pair programming.
  - Each group will split itself into two pairs. One pair will use pair programming, the other will not. Both pairs will develop the module proposed by, and approved for, the group. The better product will be presented in class, along with an analysis of the group’s pair programming experience.
- The required project report contents and points breakdown are found in the URL specified above.

**Course References**


Boehm, B. & Turner, R. (2004). Balancing agility and discipline. Reading, MA: Addison-Wesley. This is the only book that harmonizes the older, more disciplined plan-driven approaches (e.g., CMM/I, TSP, PSP) with the “newer” agile methods (e.g., XP, Scrum) of software development.


Fowler, M. (1999). Refactoring: Improving the design of existing code. Reading, MA: Addison-Wesley. Continues to be the bible for refactoring, which is a major component of agile methods, especially XP. Available at the DLSU Library.


General Report Formatting Guidelines

When submitting any written document in this course, make sure to follow every single guideline below. Nonadherence to any guidelines will mean a deduction of n points.

Use Arial 10 points, single line spacing, and 1-inch top, bottom, left, and right margins on standard (8.5x11") bond paper. Insert a blank line before each paragraph; do not indent the first line. Use the American Psychological Association's (APA) style for references. Do not print back-to-back. Place page numbers on the lower right corner of each page.

Use Arial 11 points, bold for section headings; and Arial 10 points, bold for subsection headings. Insert one blank line before headings. All headings will be flushed to the left margin. Do not number the headings/subheadings.

Center figures (e.g., screenshots) between the left and right margins in portrait (not landscape) orientation, and place captions below them. Preface each caption with “Figure” followed by the figure number and a period (all in Arial 9 points, bold). Screenshots should be resized to a height of 3", aspect ratio locked.

Center tables between the left and right margins in portrait (not landscape) orientation, and place captions above them. Preface each caption with “Table” followed by the table number and a period (all in Arial 9 points, bold). Be sure to explain all figures and tables.

Use Arial 8 points for code listings.

The header on your paper’s first page should be exactly as above, but with a descriptive (and not generic) title of your report replacing “Syllabus”, and your (or your group leader’s) name+section and e-mail address replacing the professor’s. Below your e-mail address, replacing “URL”, write “Submission Date:” then the actual date and time of submission. (You may write the actual date and time of submission by hand.) In the box on the upper right corner of the header, write your number in class. Get this number from the professor on the second week of classes.

If the document is longer than 2 pages (all the PSP and Project Reports will be longer than 2 pages), begin the actual report on the second page. On the first page, place a detailed table of contents (with the page numbers of the sections and subsections specified) below the header prescribed above.

Staple the sheets together or place them unstapled in a Manila envelope. If you decide to use a Manila envelope, do not write anything on it but the following: For a submission by an individual, write on the upper right corner of the envelope the section and number of the individual in class. For a submission by a group, write on the upper right corner of the envelope the letter “G” followed by the group’s assigned number.