

## Course Syllabus

|   |  |  |   |
|---|--|--|---|
| <b>STI VISION:</b><br>To be the leader in innovative and relevant education that nurtures individuals to become competent and responsible members of society.   |  | <b>STI INSTITUTIONAL OUTCOMES:</b>   |   |
| <b>STI MISSION:</b><br>We are an institution committed to provide knowledge through the development and delivery of superior learning systems.<br><br>We strive to provide optimum value to all our stakeholders - our students, our faculty members, our employees, our partners, our shareholders, and our community.<br><br>We will pursue this mission with utmost integrity, dedication, transparency, and creativity. |  | <b>Character (IO1):</b> An STler is a person of character. An STler takes responsibility for his/her actions, treats people with respect, and lives with integrity.<br><br><b>Critical thinker (IO2):</b> An STler is a critical thinker. An STler challenges and analyses all information through sound questioning and is unafraid to push for creative ideas.<br><br><b>Communicator (IO3):</b> An STler communicates to understand and be understood. An STler discerns the value of information read or heard and effectively expresses his/her own emotions when sharing information, may it be spoken or written.<br><br><b>Change-adept (IO4):</b> An STler is change-adept. An STler can adjust, adapt, and reinvent continuously to changing circumstances. An STler believes in letting go of the old and embracing the new to achieve his/her fullest potential. |   |
| <b>SERIAL NUMBER:</b> IT1814  | <b>COURSE TITLE:</b> APPLICATION DEVELOPMENT AND EMERGING TECHNOLOGIES   | <b>CREDIT:</b> 2 units lec, 1 unit lab (2 hrs. lecture per week, 3 hrs. laboratory per week)   |   |
| <b>COURSE DESCRIPTION:</b>  | This course covers the development of applications using Web, mobile, and emerging technologies with emphasis on requirements management, interface design, usability, testing, and deployment, including ethical and legal considerations.  |  |   |
| <b>PREREQUISITE:</b>  | Computer Programming 2   |  |   |
| <b>COURSE OUTCOMES:</b>   | After successful completion of this course, the student should be able to: (PI1 – ITPO01), (PI1 – ITPO02), (PI2 – ITPO03), (PI2 – ITPO04), (PI3 – ITPO05), (PI3 – ITPO06), (PI4 – ITPO07)<br><br>CO1. Develop specifications for a software development effort that precisely articulates the function requirements, expected execution paths, and the explicit use of cutting edge emerging technologies which include hardware devices and software library APIs;<br>CO2. Select and use a defined coding, documentation writing, and licensing standards in a sufficiency complex software project where coding idioms and mechanisms for implementing designs to achieve desired properties such as reliability, efficiency, and robustness are practiced with respect to legal and ethical considerations; and<br>CO3. Undertake, as part of the team activity, an inspection of the source code and unit testing of the functional units of a sufficiently complex software project. |  |   |
| <b>MANDATED BOOK:</b>   | None   |  |   |
| <b>PREPARED BY:</b><br>Jester Lhee I. Pandio  |  | <b>VERIFIED BY:</b><br>Alyanna R. Tobias, Ed. M  | <b>REVIEWED BY:</b><br>Beronika A. Peña |
|   |  | <b>APPROVED BY:</b><br>Aisa Q. Hipolito, M.Ed. EL  |   |

|  |   |         |     |          |     |            |     |               |            |  |      |         |     |  |     |                          |            |  |      |
|--|---|---------|-----|----------|-----|------------|-----|---------------|------------|--|------|---------|-----|--|-----|--------------------------|------------|--|------|
| <b>REFERENCES:</b>                     | <ol style="list-style-type: none"> <li>1. Dennis, A., Wixom, B.H., &amp; Tegarden, D. (2015). <i>Systems analysis &amp; design. An object-oriented approach with UML</i> (5<sup>th</sup> ed.). Hoboken: John Wiley &amp; Sons, Inc.</li> <li>2. Dooley, J.F. (2017). <i>Software development, design, and coding. With patterns, debugging, unit testing, and refactoring</i> (2<sup>nd</sup> ed.). New York City: Apress.</li> <li>3. Joshi, B. (2016). <i>Beginning SOLID principles and design patterns for asp.net developers</i>. New York City: Apress.</li> <li>4. O'Regan, G. (2017). <i>Concise guide to software engineering: From fundamentals to application methods</i>. Cham, Switzerland: Springer.</li> <li>5. Seidl, M., Scholz, M., Huemer, C. &amp; Kappel, G. (2015). <i>UML @ classroom. An introduction to object-oriented modeling</i>. Cham, Switzerland: Springer International Publishing.</li> <li>6. Walkinshaw, N. (2017). <i>Software quality assurance. Consistency in the face of complexity and change</i>. Cham, Switzerland: Springer International Publishing.</li> </ol> |         |     |          |     |            |     |               |            |  |      |         |     |  |     |                          |            |  |      |
| <b>COURSE REQUIREMENTS:</b>            | <ul style="list-style-type: none"> <li>• Class participation (<i>eLMS Activities, Recitation, Seatwork, Group activities, etc.</i>)</li> <li>• Performance tasks (<i>Laboratory Exercises, Case Studies, etc.</i>)</li> <li>• Major examinations</li> </ul>   |         |     |          |     |            |     |               |            |  |      |         |     |  |     |                          |            |  |      |
| <b>GRADING SYSTEM:</b>                 | <p>The following percentage distribution shall be followed:</p> <table> <tr> <td>Prelims</td> <td>20%</td> </tr> <tr> <td>Midterms</td> <td>20%</td> </tr> <tr> <td>Pre-finals</td> <td>20%</td> </tr> <tr> <td><u>Finals</u></td> <td><u>40%</u></td> </tr> <tr> <td></td> <td>100%</td> </tr> </table> <p>The following are the periodical grade components for this course:</p> <table> <tr> <td>Quizzes</td> <td>20%</td> </tr> <tr> <td>Performance Tasks/Laboratory Exercises</td> <td>50%</td> </tr> <tr> <td><u>Major Examination</u></td> <td><u>30%</u></td> </tr> <tr> <td></td> <td>100%</td> </tr> </table>  | Prelims | 20% | Midterms | 20% | Pre-finals | 20% | <u>Finals</u> | <u>40%</u> |  | 100% | Quizzes | 20% | Performance Tasks/Laboratory Exercises | 50% | <u>Major Examination</u> | <u>30%</u> |  | 100% |
| Prelims                                | 20%   |         |     |          |     |            |     |               |            |  |      |         |     |  |     |                          |            |  |      |
| Midterms                               | 20%   |         |     |          |     |            |     |               |            |  |      |         |     |  |     |                          |            |  |      |
| Pre-finals                             | 20%   |         |     |          |     |            |     |               |            |  |      |         |     |  |     |                          |            |  |      |
| <u>Finals</u>                          | <u>40%</u>  |         |     |          |     |            |     |               |            |  |      |         |     |  |     |                          |            |  |      |
|  | 100%  |         |     |          |     |            |     |               |            |  |      |         |     |  |     |                          |            |  |      |
| Quizzes                                | 20%   |         |     |          |     |            |     |               |            |  |      |         |     |  |     |                          |            |  |      |
| Performance Tasks/Laboratory Exercises | 50%   |         |     |          |     |            |     |               |            |  |      |         |     |  |     |                          |            |  |      |
| <u>Major Examination</u>               | <u>30%</u>  |         |     |          |     |            |     |               |            |  |      |         |     |  |     |                          |            |  |      |
|  | 100%  |         |     |          |     |            |     |               |            |  |      |         |     |  |     |                          |            |  |      |

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## Course Outline

| Learning Objectives (LO) |  | Week | LEC Hours | LAB Hours | TOPICS   | Slides | I-Guide | Student Handouts | Teaching and Learning Activities | Assessment Tasks         |
|--------------------------|--|------|-----------|-----------|--|--------|---------|------------------|----------------------------------|--------------------------|
| 1                        | Determine the concepts of how technologies emerge in the real world (CO1)  | 1    | 2         | 3         | <b>Emerging Technologies</b><br>Overview of Emerging Technologies<br>Emerging Technology Areas<br>The Fourth Industrial Revolution   | 15     | 13      | 3                | Lecture                          | Seatwork                 |
| 2                        | Analyze the potential application of various emerging technologies in a wide variety of settings (CO1)                       |      |           |           |  |        |         |                  | Hands-on Activity                | Recitation               |
| 3                        | Create reports on a topic of emerging technologies (CO1)   |      |           |           |  |        |         |                  | Research Writing – Case Study    | 01 eLMS Activity 1       |
|                          |  |      |           |           |  |        |         |                  | Digital Learning Activity        |                          |
| 4                        | Create a detailed requirements definition report that lists functional and nonfunctional requirements (CO1)                  | 2-4  | 6         | 9         | <b>Requirements Analysis and Modeling</b><br>Requirements Determination<br>Requirements-Gathering Techniques<br>Requirements Analysis<br>Modeling with Unified Modeling Language (UML) | 36     | 14      | 15               | Lecture                          | Group Activity           |
| 5                        | Use requirements-gathering techniques for collecting information (CO1)   |      |           |           |  |        |         |                  | Demonstration                    | 02 Laboratory Exercise 1 |
| 6                        | Analyze the gathered information using requirements checklist (CO1)  |      |           |           |  |        |         |                  | Hands-on Activity                | 02 Laboratory Exercise 2 |
| 7                        | Create functional models of business processes using use-case diagrams when gathering and defining system requirements (CO1) |      |           |           |  |        |         |                  | Research Writing – Case Study    | 02 Task Performance 1    |
|                          |  |      |           |           |  |        |         |                  |                                  | 02 eLMS Activity 1       |
|                          |  | 5    | 1         |           | <b>PRELIMINARY EXAMINATION</b>   |        |         |                  | Pen and paper test               |                          |

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| Learning Objectives (LO)                     |  | Week  | LEC Hours                                       | LAB Hours | TOPICS  | Slides                                  | I-Guide | Student Handouts | Teaching and Learning Activities   | Assessment Tasks  |
|--|--|-------|---|-----------|---|---|---------|------------------|--|---|
| 8  | Compare the scope of applicability of the different design principles (CO2)              | 6-7   | 2   | 3         | <b>Design Principles</b><br>Overview of Design Principles<br>Single Responsibility Principle<br>Open-Closed Principle<br>Liskov Substitution Principle<br>Interface Segregation Principle<br>Dependency Inversion Principle | 21                                      | 8       | 6                | Lecture  | Group Activity<br><br>03 Laboratory Exercise 1<br>03 eLMS Activity 1        |
| 9  | Apply design principles when designing object-oriented systems (CO2)                     |       |   |           |   |   |         |                  | Demonstration<br><br>Hands-on Activity<br><br>Research Writing – Case Study<br><br>Digital Learning Activity |   |
| 10   | Compare the scope of applicability of different categories of design patterns (CO2)      | 8-9   | 6   | 9         | <b>Design Patterns</b><br>Designing with Patterns<br>Creational Patterns<br>Structural Patterns<br>Behavioral Patterns  | 26                                      | 7       | 14               | Lecture  | Group Activity<br><br>04 Laboratory Exercise 1<br><br>04 Task Performance 1 |
| 11   | Implement design patterns when developing a software project (CO2)                       |       |   |           |   |   |         |                  | Demonstration<br><br>Hands-on Activity<br><br>Research Writing – Case Study                                  |   |
|  |  | 10    | 1   |           | <b>MIDTERM EXAMINATION</b>  |   |         |                  | Pen and paper test   |   |
| 12   | Analyze the drivers of software quality assurance (CO3)                                  | 11    | 2   | 3         | <b>Prototyping and Quality Assurance</b><br>The Software Quality Assurance<br>Software Quality Assurance through Prototyping<br>Models of Prototyping and Tools   | 11                                      | 11      | 2                | Lecture  | Group Activity<br><br>05 Laboratory Exercise 1                              |
| 13   | Determine what model and tools must be used in developing a prototype (CO3)              |       |   |           |   |   |         |                  | Demonstration  |   |
| 14   | Develop an effective prototype considering the gathered requirements (CO3)               |       |   |           |   |   |         |                  | Hands-on Activity<br><br>Research Writing – Case Study   |   |
| 15   | Determine the factors that influence the effectiveness of a software inspection to build | 12-13 | 4   | 6         | <b>Software Review and Inspection</b><br>Overview of Software Review and Inspection   | 20                                      | 7       | 4                | Lecture<br><br>Demonstration   | Group Activity<br><br>06 Laboratory Exercise 1                              |
| <b>PREPARED BY:</b><br>Jester Lhee I. Pandio |  |       | <b>VERIFIED BY:</b><br>Alyanna R. Tobias, Ed. M |           |   | <b>REVIEWED BY:</b><br>Beronika A. Peña |         |                  | <b>APPROVED BY:</b><br>Aisa Q. Hipolito, M.Ed. EL  |   |

| Learning Objectives (LO) |   | Week  | LEC Hours | LAB Hours | TOPICS  | Slides | I-Guide | Student Handouts | Teaching and Learning Activities                       | Assessment Tasks                                  |
|--------------------------|---|-------|-----------|-----------|---|--------|---------|------------------|--|---|
| 16                       | quality into the software product (CO3)<br>Apply code reviewing techniques to identify faults in source codes (CO3) |       |           |           | Code Reviewing Techniques<br>Software Inspection Techniques<br>Modern Code Review   |        |         |                  | Hands-on Activity<br><br>Research Writing – Case Study | 06 Task Performance 1                             |
| 17                       | Execute software inspection meetings to identify defects in the software project (CO3)                              |       |           |           |   |        |         |                  |  |   |
|                          |   | 14    | 1         |           | PRE-FINAL EXAMINATION   |        |         |                  | Pen and paper test                                     |   |
| 18                       | Write unit tests using white-box and black-box testing approaches (CO3)   | 15-17 | 6         | 9         | Software Testing and Deployment<br>Objectives of Software Testing<br>Test Process in Software Testing<br>Unit Testing and Test-Driven Development<br>Software Deployment and Deployment Tools | 25     | 6       | 4                | Lecture  | Group Activity                                    |
| 19                       | Determine the importance of software testing in software projects (CO3)   |       |           |           |   |        |         |                  | Demonstration  | 07 Laboratory Exercise 1                          |
| 20                       | Use deployment tools to automate the deployment process (CO3)   |       |           |           |   |        |         |                  | Research Writing – Case Study                          | 07 Laboratory Exercise 2<br>07 Task Performance 1 |
|                          |   | 18    | 1         |           | FINAL EXAMINATION   |        |         |                  | Pen and paper test                                     |   |

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