**Title (Units):** **COMP4117 Information Systems: Design and Integration (3,1,2)**

**Course Aims:** This course aims at developing students' ability to make use of advanced software tools and programming techniques for information systems development, and to apply a methodological approach to the development and integration of information systems, by thorough analysis, good systems design and comprehensive documentation. The project simulates a real-life working environment in the classroom, so that students gain experience of working as team members participating in systems development. The demonstration of development deliverables can improve students' presentation and communication skills.

**Prerequisite:** COMP3047 Software Engineering

**Course Intended Learning Outcomes (CILOs):**
Upon successful completion of this course, students should be able to:

| No. | Course Intended Learning Outcomes (CILOs) |
|---|---|
| | **Knowledge** |
| 1 | Explain what a professional information system development and integration project should contain via the requirements and concerns of all stages of system development life cycle. |
| 2 | Describe and explain how advanced software tools and programming techniques can be used for system implementation. |
| | **Professional Skill** |
| 3 | Identify and analyze problems. Propose, design, and implement solutions in a group to solve the identified problems using a principled methodology for information systems design and integration |
| 4 | Go through a complete system development life cycle with various development techniques and manage a project in a group. Produce a complete technical project report with all stages of a project documented. |
| 5 | Communicate effectively via oral presentations for all stages of a project. Develop communication and time management skills in the context of a group development project as well as related presentation by going through a series of development checkpoints with deadlines |
| 6 | Interact with group members and the supervisor (conflict resolution) so as to complete a project |

**Calendar Description:** This course provides a chance to students to apply a methodological approach to the development and integration of information systems. Students will work as a team and go through phases in system development life cycle, and implement solutions to the identified problems with exposure to systems integration in practice. They will also practice the presentation and communication skills in team management, report submission and project demonstration.

**Teaching and Learning Activities (TLAs):**

| CILOs | Type of TLA |
|---|---|
| 1 | Students will be guided by the checkpoints described in the development project handbook and also the illustration in lectures, to fulfil the requirements of all stages in the systems development life cycle. |
| 2 | Students will learn and practice advanced software tools and programming techniques via lab sections. |
| 3,4 | Students will propose the scope and objectives of a development project. Students will identify the problems, propose solutions, and complete an application to achieve the project objectives based on the skills and techniques learned in other courses. |
| 4,5,6 | As part of the requirements of the course, students will conduct regular meetings in a team, and with supervisor to discuss and arrange various development tasks. |
| 4,5 | Students will prepare a professional technical report in a group and present the development progress at different checkpoints. |

**Assessment:**

| No. | Assessment Methods | Weighting | CILOs to be addressed | Description of Assessment Tasks |
|---|---|---|---|---|
| 1 | Group Assessment | 70% | 1 - 6 | A group project is designed to facilitate students working in a team environment to analyze, design and implement an information system. Students must obtain a satisfactory result for this group project in order to pass this course.<br><br>Each group is assessed based on the quality of:<br>- overall project analysis, systems design, and implementation (40%)<br>- project report/documentation (10%)<br>- project presentation/demonstration (20%)<br><br>Group assessment measures students' achievements in the Knowledge, and Skill domains. |
| 2 | Individual Assessment | 30% | 2 - 6 | Students are assessed individually based on their performance of software lab, development work and presentation, and contribution to the project. |

**Peer assessment will also be used to facilitate students' reflection of their leadership skills and sense of responsibility. Scores from peers are included in group and individual assessment.**

**Assessment Rubrics:**

| | |
|---|---|
| **Excellent (A)** | • Achieves all six CILOs, demonstrating a good mastery of both the theoretical and practical aspects of the knowledge and skills associated with stages of information systems development and integration<br><br>• Able to develop an information system to problems, accompanied by in-depth analysis and insight<br><br>• Able to draw on a variety of techniques and relevant knowledge and appropriately apply them to new information systems development and integration situations and problems<br><br>• Able to play a major role in a group and interact proactively with team members and project supervisor<br><br>• Able to document a comprehensive systems development report<br><br>• Demonstrates the ability to communicate effectively the project progress and results in oral presentation |
| **Good (B)** | • Achieves all six CILOs, demonstrating a good understanding of stages of information systems development and integration<br><br>• Able to develop an information system to problems, accompanied by adequate analysis<br><br>• Able to make use of appropriate techniques and knowledge and apply them to information systems development and integration situations and problems<br><br>• Able to work in a group effectively and interact with team members and project supervisor<br><br>• Able to document a good systems development report |

| | |
|---|---|
| | • Demonstrates the ability to communicate the project progress and results in oral presentation |
| **Satisfactory (C)** | • Achieves most of the six CILOs, demonstrating a basic level of understanding of stages of information systems development and integration<br>• Able to develop an acceptable an information system to problems<br>• Able to make use of some techniques and knowledge and apply them to information systems development and integration situations and problems<br>• Able to cooperate in a group and interact with team members and project supervisor<br>• Able to document a systems development report that fulfills adequate documentation requirement<br>• Demonstrates the ability to communicate the project progress and results in oral presentation in an acceptable level |
| **Marginal Pass (D)** | • Achieves most of the six CILOs, with minimal understanding of stages of information systems development and integration<br>• Able to develop an information system to simple problems<br>• Able to apply some techniques and knowledge to a limited extent of information systems development and integration situations and problems<br>• Play a passive role in a group with limited interaction with team members and project supervisor<br>• Able to document part of a systems development report that fulfills minimum documentation requirements<br>• Demonstrates the ability to communicate the project progress and results in oral presentation in a minimum acceptable level |
| **Fail (F)** | • Achieves less than three of the six CILOs, with little understanding of stages of information systems development and integration<br>• Unable to develop an information system to simple problems<br>• Unable to apply techniques and knowledge to information systems development and integration situations or problems<br>• Unable to cooperate in a group and no interaction with team members and project supervisor<br>• Unable to demonstrate the ability to document a systems development report<br>• Unable to communicate the project progress and results in oral presentation |

**Course Content and CILOs Mapping:**

| **Content** | | **CILO No.** |
|---|---|---|
| I | Concepts and Case Studies on Information Systems Design & Integration | 1, 3 - 6 |
| II | Software Tools and Programming Techniques | 2 |

**References:**


- OGCIO, Professional Methodologies,URL: http://www.ogcio.gov.hk/en/infrastructure/methodology/ (retrieved April 23, 2015)
- Boyd L. Summers, Effective Methods for Software and Systems Integration, Auerbach Publications, 2013
- Jamshid Gharajedaghi, System Thinking: Managing Chaos and Complexity: A Platform for Designing Business Architecture, Morgan Kaufmann, 2011
- Jeffrey O. Grady, System Integration, CRC Press, 2020
- Tom Kelley and David Kelley, Creative Confidence: Unleashing the Creative Potential Within Us All, Crown Business, 2013


**Course Content:**

**Topic**

I. Concepts and Case Studies on Information Systems Design & Integration
   A. Design thinking and innovation workshops
   B. Feasibility studies
   C. Methodology for information systems integration, such as the continuous integration approach
   D. Risks associated with information systems integration
   E. Deployment and maintenance

II. Software Tools and Programming Techniques
   A. Restful APIs and token-based authentication.
   B. WebSocket protocol
   C. Web services
   D. Software testing tools
   E. Mobile device APIs.