Al-Imam Muhammad ibn Saud Islamic University  
College of Computer and Information Sciences  
Information Systems Department

Syllabus – IS792 Integrated Capstone

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<tr>
<th>Instructor</th>
<th>Office No.</th>
<th>Phone</th>
<th>e-Mail</th>
<th>Office Hours</th>
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<tbody>
<tr>
<td>Dr. Muhammad Badruddin Khan</td>
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<td><a href="mailto:badruddin@ccis.imamu.edu.sa">badruddin@ccis.imamu.edu.sa</a></td>
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Course Description:
The course is designed to provide opportunities for students to integrate the knowledge gained from their core courses, to gain insight into the meanings of professional practice and to reflect on the norms of the IS discipline. In this course students will learn by doing (action) and reflection. Instructor will provide guidance and serve as advisors or coaches and will provide some reading material that may help you with certain tasks. Also, instructors will discuss with students how to approach the project and answer any questions that they face. Moreover, instructors will review and critique students written work and presentations.

We established a competency based approach to content of the core courses. Students should integrate what they have been studied in the previous semesters. In particular, students will work on an integrated project and deliver it in the following steps:

1. **Understanding the current system dynamics:**
   - Understanding different concepts related to System (Systems thinking, System Theory, System Dynamics, Modeling and Simulation, Operations Research)
   - What to look for when assessing current System? (Inputs and Outputs, Goal seeking, Hierarchy, Interdependence, Holism, differentiation, equifinality, multifinality)
   - Justification for Alternative System

2. **Exploring new technologies required to develop a new solution/system:**
   - Improvement in Data management and Manipulation Side (Databases, Data warehouse, OLAP, Data Mining, Big Data, Business Intelligence)
   - Improvement in hardware side (Processing speed, memory)
   - Improvement in communication side (Networking)

3. **Analyzing and designing the system:**
   - Functional and Non-functional Requirement determination
   - Understanding Business Process, Functional, Structural and Behavioral Modeling issues,
   - Transformation of analysis models into design models after verification and validation
4. **Project planning and management:**
The project plan must be designed in such a way that the project outcome also meets the objectives of the parent organization, as reflected by the project portfolio or other strategic selection process used to approve the project. Because the plan is only an estimate of what and when things must be done to achieve the scope or objectives of the project, it is always carried out in an environment of uncertainty. Therefore, the plan must include allowances for risk and features that allow it to be adaptive, i.e., to be responsive to things that might disrupt it while it is being carried out. One such disruption—“scope creep,” or the tendency of project objectives to be changed by the client, senior management, or individual project workers with little or no discussion with the other parties actively engaged in the work of the project—is particularly common in software projects. In addition, the plan must also contain methods to ensure its integrity, which is to say it must include means of controlling the work it prescribes.

5. **Positioning the system in the enterprise context and relate it to the enterprise architecture:**
Students should work with stakeholders, both leadership and subject matter experts, to build a holistic view of the organization's strategy, processes, information, and information technology assets. The role of the student as an enterprise architect is to take this knowledge and ensure that the business and IT are in alignment. The student shall link the business mission, strategy, and processes of an organization to its IT strategy, and documents this using multiple architectural models or views that show how the current and future needs of an organization will be met in an efficient, sustainable, agile, and adaptable manner.

6. **Identifying and analyze the required technological infrastructure:**
Follow set of practices for IT service management that focuses on aligning IT services with the needs of business. Students shall describe processes, procedures, tasks and checklists used by an organization for establishing integration with the organization's strategy, delivering value and maintaining a minimum level of competency. Establishing a baseline from which organizations can plan, implement and measure.

7. **Study the impact of the project on the organization and the environment:**
This topic will shed the light on four workable ethical theories, i.e.: Act Utilitarianism, Rule Utilitarianism, Kantianism, and Social Contract Theory; as tools to study the impact of the project on the organization and the environment. The study will be constrained on intellectual property, privacy, security, reliability and professional code of ethics. In details, the students should have the following sub tasks:
- Reviewing four workable ethical theories and learning their short case studies
- Analyzing the impact of the students’ project on intellectual property, privacy, security, reliability by applying the four workable ethical theories.
- Difference between ethics and moral
Tentative Semester Schedule
A sample project consisting of four standard ERP module will be used as reference point for this course.

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<th>Week</th>
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<tr>
<td>Week 01</td>
<td>Introduction to Systems Integration</td>
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<td>Week 02</td>
<td>Enterprise Systems</td>
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<td>Week 03</td>
<td>1st Deliverable (Project Plan)</td>
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<td>Week 04</td>
<td>How to write Requirement for ERP</td>
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<td>Week 05</td>
<td>2nd Deliverable (Requirement Specification)</td>
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<td>Week 06</td>
<td>System Analysis and Design</td>
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<td>Week 07</td>
<td>3rd Deliverable (UML and DB Design)</td>
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<td>Week 08</td>
<td>Where ITIL and Enterprise Architecture Meet?</td>
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<td>Week 09</td>
<td>4th Deliverable (Enterprise Architecture and IT Management Alignment)</td>
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<td>Week 10</td>
<td>User Interface of the system</td>
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<td>Week 11</td>
<td>5th Deliverable (User Interface Prototyping)</td>
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<td>Week 12</td>
<td>Study the Impact of the Project/System on the Organization and the Environment</td>
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<td>Week 13</td>
<td>6th Deliverable (Evaluation of Impact of Proposed System)</td>
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<td>Week 14</td>
<td>Integration: Final Compiled Report</td>
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<td>Week 15</td>
<td>Final Evaluation</td>
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Deliverables Descriptions

Project Plan:
The plan must include any constraints on activities and input materials proscribed by law and society. In brief, the project plan should include the following deliverable:
1. Steps required accomplishing the project objectives
2. Tasks needed to be done at each step (using Work Breakdown Structures)
3. Estimate of how much effort each task requires
4. The resources required for each task
5. (Given 3. and 4.) Calculation of how long each task/step will take
6. (Given 4. and 5.) Calculation of task, step and project costs
7. The inter-dependencies of tasks
8. The schedule for each task and the whole project (Milestones, Deliverables, payments)

Requirements Specification Document:
- Identification of Stakeholders
- Planning the stakeholders requirements elicitation
- Derivation of system requirements
- Use case diagram based on the requirements analysis performed earlier

UML and DB Design Document:
- Relevant activity diagrams
- Detailed class diagram
- System behavioral diagrams (Sequence/Communication/Behavioral State Machine)
Enterprise Architecture and IT Management Alignment Report:

Students should work with stakeholders, both leadership and subject matter experts, to build a holistic view of the organization’s strategy, processes, information, and information technology assets. The role of the student as an enterprise architect is to take this knowledge and ensure that the business and IT are in alignment. Deliverable should include the adoption of one of the frameworks (e.g. Zachman or TOGAF). Report might include:

1. Road maps (technology, process, people road maps. Study the maturity, adoption and business application of specific technologies, processes)
2. Application portfolio management (includes management of “AS IS” information (application, infrastructure, information, business, finance, organization), assessment and recommendation to eliminate over-laps)
3. Scenario Planning (what if analysis for an organization)
4. Standards & policies (Technology, processes, products, patterns)
5. IT Risk management (aligned to the enterprise risk management plan)

User Interface Prototype:

Prototyping is an important technique to reduce the cost and risk involved in developing complex software systems. To build a successful interface developers need to acquire several kinds of information about the system to be built. The information ranges from an analysis of the tasks that users are expected to perform with the system, to detailed descriptions of the look and feel of the system. The deliverable should contain following information.

1. Task Specification
2. System functionality
3. Interface functionality
4. Screen layouts and behaviors
5. Design Rationale
6. User feedback [if there exist users]

For further information, see PDF file at:

Evaluation Report:

The project has brought us many benefits, but it has also raised many social and ethical concerns. This report ought to approach the project in a thoughtful manner, considering not just its short-term benefits, but also how its long term use will affect our lives. The deliverables of this report include:

1. Kantianism, act utilitarianism, rule utilitarianism, and social contract theory to evaluate a variety of problems arising from the introduction of student’s project into society. The impact is subject to intellectual property, privacy, security, and project reliability.
2. List of clauses in the Software Engineering Code of Ethics and Professional Practice support the legitimacy of the project
3. List of clauses in the Software Engineering Code of Ethics and Professional Practice that might be violated by the project