Template of Course Specification

Faculty: CIT
Department: CS
Program(s): Software Engineering

I. General information about the course:						
1.	Course Title:	Software Process and Modeling				
2.	Course Code and Number :					
3.	Credit Hours: 3	Lecture	Seminar/Tutorial	Practical	Training	Total
		2		2		3
4.	Study Level and Semester:	Level 3 or 4 / Semester 6 or 7				
5.	Pre-requisites (if any):	- Software Engineering (CS325)				
6.	Co-requisites (if any):					
7.	Program in which the course is offered	Software Engineering				
8.	Teaching Language:	English / Arabic				
9.	Study System :	Course Based				
10.	Prepared by:	Course Facilitator (Fahd N. Al-Wesabi)				
11.	Approval date :					
12.	Approved by:					

II. Course Description :

This course aims to covers the key concepts, development approaches and methodologies, modeling techniques. This includes a review of Object-Oriented concepts and modeling with UML: Structural Modeling, Behavioral Modeling, System architecture design, User Interface Design, Object Persistence Design, Class and Method Design, Object-Oriented Testing, Unified Process development cycle, Use case analysis, Sequence diagrams, Encapsulation, Inheritance, Polymorphism, Design principles of coupling and cohesion, Design patterns. Students will be also exposed OO case tools, UML Generating tools, standard templates, and software quality and standards. Students will participate in a group project on object-oriented software methodologies and modeling using OO case tools.

III. Course Aims

1. An ability to describe system development concepts, process, environment, methods and terms used in the object-oriented approach.
2. Enable students to understand OO modeling techniques to build static and dynamic models that fit to develop various types of software systems..
3. To learn how to apply OO techniques to model the business problem requirements.
4. Enable students to understand OO design techniques to build system, architecture and object design.
5. Providing students with the necessary knowledge and skills in using object-oriented CASE tools.
6. Enable students to perform research on different discipline of software issues, and keep abreast of professional development skills.

VI. Course Intended Learning Outcomes (CILOs) :

Knowledge and Understanding:

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Knowledge and Understanding PILOs	Knowledge and Understanding CILOs	
After completing this program, students would be able to:	After completing this course, students would be able to:	
A4. Understand the software process life cycles, for small, medium and large software projects, and different approaches of software development, software project management, risk and quality management, and human-computer interaction.	a1	Describe the principles, terminology, process activities of system development life cycle, business oriented systems, real time systems, embedded systems, and distributed systems.
	a2	Explore the concepts of software development modeling, approaches, methods and models, design patterns and techniques associated with the OO paradigm and apply them to solve problems, and recognize the principal tasks and risks of software project management.
	a3	Define the key issues that have to be considered when modeling, designing, implementing and testing various types of software systems, including issues of quality, reliability, enterprise, software reuse and open-source development.

Intellectual Skills :

Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)

Intellectual Skills PILOs		Intellectual Skills CILOs
After completing this program, students would be able to:		After completing this course, students would be able to:

B1. Determine and analyze criteria, specifications and requirements appropriate to specific computing problems and formulate strategies to solve them.	b1	Systematize the principal requirements gathering, analysis, modeling and validation, and the relationships between these activities.
B3. Choose the most appropriate methods and tools including deploying appropriate theory, practices, and tools for the specification, design, implementation, and maintenance as well as the evaluation of computer-based systems.	b2	Propose and use the appropriate OO models, UML techniques and tools for the development and maintain of each type of software systems.
B4. Criticize systems in terms of general quality attributes and possible tradeoffs presented within the given problem	b3	Systematize project plan and risk management procedures in a software project.

Professional and Practical Skills		
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)		
Professional and Practical Skills PILOs		**Professional and Practical Skills CILOs**
After completing this program, students would be able to:		**After completing this course, students would be able to:**
C1. Apply fundamental concepts of computer science, software engineering, human-computer interaction, science and mathematics in the modeling and design of computer systems.	c1	Use CASE tools, graphical models, and diagram types in UML to prepare requirement document, prototype, modeling, design patterns, user interface design, testing.
C2 -Develop a wide range of software through all stages of their life cycle, namely problem analysis, requirements specification, design, construction; verification and evolution using appropriate methods and tools.		
C3. Operate computing equipment and software systems effectively and efficiently.		
C4. Evaluate software process and artifacts in terms of software quality and models.		
C5- Plan, undertake, and monitor software projects.		

Transferable (General) Skills :		
Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)		
Transferable (General) Skills PILOs		**Transferable (General) Skills CILOs**
After completing this program, students would be able to:		**After completing this course, students would be able to:**
D1. Communication skills: Make succinct presentations to a range of audiences about technical problems and their solutions. This may involve face-to-face, written communication or electronic communication.	d1	Clearly prepare and deliver coherent and structured verbal and written technical reports, communicate and describe various types of software systems, in both oral presentation and in written documentation
D2. Teamwork: Be able to work effectively as a member of a development team.		
D4. Self-management skills: Manage one's own learning and development, including		

time management and organizational skills.		
D5. Professional development skills: Keep abreast of current developments in the discipline to continue one's own professional development.		

IV. Alignment of CILOs to Teaching and Assessment Strategies

First: Alignment of Knowledge and Understanding CILOs

Knowledge and Understanding CILOs	Teaching Strategies	Assessment Strategies
a1. Describe the principles, terminology, process activities of system development life cycle, system development environment, approaches and methods, and techniques associated with the OO paradigm and apply them to solve problems.	- Lectures and Tutorials - Case studies - Classroom and tutorial assignments (problem solving) - Research	- Homework reports - Written exams (Quiz, Midterm and Final Exams). - Interaction with discussions - Research report and seminar presentation
a2. Explore the concepts of system analysis and design, software development processes, software process models, and quality standards and measurements, and recognize the principal tasks and risks of software project management.		
a3. Define the key issues that have to be considered when designing and implementing software systems, including issues of quality, reliability, enterprise, software reuse and open-source development.		

Second: Alignment of Intellectual Skills CILOs

Intellectual Skills CILOs	Teaching Strategies	Assessment Strategies
b1. Systematize the principal requirements gathering, analysis and validation, and the relationships between these activities.	- Lectures and Tutorials - Homework - Classroom and tutorial assignments (problem solving) - Classroom discussion of real problems (brain storming)	- Homework reports - Written exams (Quiz, Midterm and Final Exams). - Interaction with discussions
b2. Propose and use the appropriate OO models and UML techniques and tools for the development and maintain of each type of software system		
b3. Systematize project plan and risk management procedures in a software project.		

Third: Alignment of Professional and Practical Skills CILOs		
Professional and Practical Skills CILOs	**Teaching Strategies**	**Assessment Strategies**
c1. Use CASE tools, graphical models, and diagram types in UML to prepare requirement document, OOA and OOD	- Lectures and Tutorials - Case studies - Classroom discussion of real problems (brain storming) - Group-based project.	- Written exams (Quiz, Midterm and Final Exams). - Interaction with discussions - Project report and presentation

Fourth: Alignment of Transferable (General) Skills CILOs		
Transferable (General) Skills CILOs	**Teaching Strategies**	**Assessment Strategies**
d1. Clearly prepare and deliver coherent and structured verbal and written technical reports, communicate and describe business information systems, in both oral presentation and in written documentation	- Lectures and Tutorials - Classroom and tutorial assignments (problem solving) - Classroom discussion of real problems (brain storming) - Group-based project. - Research	- Interaction with discussions - Project report and presentation - Research report and seminar presentation

V. Course topics and sub-topics (theoretical and practical) with contact hours and alignment to CILOs

Topics/Units of Course Contents					
First: Theoretical Aspects					
No.	**Course Topics/Units**	**Sub-topics**	**No. of Weeks**	**Contact Hours**	**CILOs**
1	Introduction to System Development Life Cycle		1	2	a1, a2, b1
2	Requirements gathering and Specification	Traditional requirements gathering techniques, Prototyping, Agile modeling,	1	2	a1, a2, b1, b2, c1, d1

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		Requirements specification			
3 4	Data & Process Modeling using Functional oriented approach	Process modeling using DFD, Data modeling using ERD	2	4	a1, a2, b2, c1, d1
5	Use-Case Modeling and Use-Case Scenario	Use-Case Modeling and Use-Case Scenario	1	2	a2, b1, b2, c1, d1
6	Mid Term Exam		1	2	
7	Structural & Behavioral Models	Activity diagram, sequence diagram, Class diagram	1	2	a2, b1, b2, c1, d1
8 9 10	Transition to Systems Design	Transition to Systems Design	3	6	a3, b2, c1
11	System Architecture Design	System Architecture Design, Object Persistence Design; Class & Method Design	1	2	a3, b2, c1
12	User Interface Design	User Interface Design	1	2	a3, b2, c1, d1
13	Testing Strategies and System Evaluation	Testing Strategies and System Evaluation	1	2	a2, a3, b1, b2, b3, c1, d1
14	Final Projects Presentations	Final Projects presentations	1	2	ALL
15	Review		1	2	ALL
16	Final Exam	Final Exam	1	2	ALL
Total number of weeks and hours			**16**	**32**	

Second: Practical/Tutorial/Clinical Aspects

Write up practical/tutorial/clinical topics

No.	Practical/Tutorial/Clinical topics	No. of Weeks	Contact Hours	CILOs
1	Projects and groups preparation	1	2	ALL
2	JAD and Prototyping: Case Study	1	2	a1, b1, c1, d1
3	Prototyping case tools	1	2	a1, b1, c1, d1
4	Project Discussion I	1	2	ALL
5	DFD & ERD Case Study CASE tools (Smart Draw / Power designer)	2	4	a1, a3, b1, c1
6	OO modeling case study	2	4	a2, b2, c1
7	UML analysis and Design	3	6	a2, b1, b2, c1, d1
8	Requirement management and Power	3	6	a2, a3, b1, b3,

	Designer			c1, d1
9	Project Presentations	2	4	ALL
Total number of weeks and hours		16	32	

VI. Teaching Strategies

- Lectures, PPT and lecture notes
- Homework
- Classroom discussion of a real problems (Brainstorming)
- Group-based project.
- Research and self-learning
- Problems Solving
- Classroom Tutorial (Applying case studies using CASE tools, DFD and Smart Draw, UML)

VII. Tasks and Assignments :

No.	Task/Assignment	CILOs	Week due	Mark
1	Exercises & Homework & Quizzes	ALL	Every 3 weeks	10
2	Project (group)	ALL	Week 15	20
3	Research	ALL	One Deadline in week 10	5
4	Interactive class discussion & Research	ALL	Weekly	5
5	Mid-term Exam (theoretical)	ALL	Week 8	10
6	Final Exam (theoretical)	ALL	Week 16	50

VIII. Learning Resources :

(Author, (Year), Book Title, Edition, Publisher, Country of publishing)

Textbooks-not more than 2

1. S. Bennett, S. McRobb, and R. Farmer (2006). Object-Oriented Systems Analysis and Design Using UML. 3rd Edition, McGraw-Hill.
2. Alan Dennis, Barbara H. Wixom, and David Tegarden (2009), Systems Analysis And Design with UML Version 2.0—An Object-Oriented Approach, 3nd edition, John Wiley & Sons, Inc.

Essential References-not less than 4

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2. Booch et al. (2007). Object-Oriented Analysis and Design with Applications. 3rdEdition, Addiso Wesley.
3. C. Larman (2005). Applying UML and Patterns: An Introduction to Object-Oriented Analysis an

Design. 3rd Edition, Prentice Hall
4. Shelly, Cashman, and Rosenblatt (2006), System Analysis & Design, 6th edition, Course Techno
5. Stephen R. Schach (2004), An Introduction to Object-Oriented Systems Analysis and Design wit UML and the Unified Process, McGraw-Hill.

Electronic Materials and Web Sites

- **Ref3:** http://en.wikipedia.org/wiki/Software_development_process
- **Ref4:** http://en.wikipedia.org/wiki/Rational_Unified_Process
- **Ref5:** http://www.uml-diagrams.org/profile-diagrams.html

IX. Course Policies:

1	**Class Attendance:** - Attendance in all lectures and practical classes are required, except in very emergency circumstances, such as serious illness or death in the family with providing an acceptable documentation approved by the university and forwarded by the chairman of the department. Otherwise the absence shall be considered unexcused. - In accordance with the university rules, if the percentage of student's absence exceeds 25 % of the total lectures or practical classes, the student involved shall be disqualified in the final written and practical examination of the course and shall be deemed to have failed in the course.
2	**Tardy:** - Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable cause, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.
3	**Exam Attendance/Punctuality:** - It is incumbent on student to report at the examination hall for checking in and rolls calling at least 15 minutes before the commencement of examination. - A student is not allowed to submit answer booklet and leave the examination hall only on or after the passage of the half examination duration. - A student who comes late shall not be admitted to the examination hall, only within the first 30 minutes of the examination. After this time, the student will be considered to be missed in the examination and shall be deemed to have failed in the course. - When a student misses the final examination due to a legitimate medical problems or death in the family, an acceptable documentation approved by the university medical unit for the excused absence must be provided no later than three weeks and consequently the student shall be disqualified in the examination but with the excused absence.
4	**Assignments & Projects:** Assignments and reports are to be submitted in hardcopy in due date in the class, unless otherwise that may be specified by the teacher. Email submissions of assignments are not accepted. Late assignments and reports will be penalized at least 5 % per day (including weekends and holidays). Depending on the circumstances the penalty may be higher, for example, if an assignment is received after the solution has been discussed.
5	**Cheating:** If a student is found cheating in examination (midterm or final or quizzes) (copying

	from unauthorized materials and another students' work or allowing other students to copy from his/her own work), the student involved shall be disqualified in the examination and shall be deemed to have failed in the course and also suspended from examinations of two more courses. If a student is found engaging in any unauthorized communications (oral, sign, call, etc.), while the examination is in progress or in possessing of any authorized materials or electronic devices before the distribution of examination papers , the student involved shall be disqualified in the examination and shall be deemed to have failed the course.
6	**Plagiarism:** Plagiarism is the presentation of any material (text, data or figures) from any other source in preparation of assignments or practical reports without clear and adequate acknowledgement of the source. Plagiarism is also the use or copy of other students' work (with, or without payment) to prepare all or part of undertaken assignments or practical reports of work submitted for assessment. All types of plagiarism are unacceptable and are considered dishonest practices. If a student is found plagiarism, the student involved shall be subjected to the same penalties as in the case of cheating as already mentioned above policies.
7	**Other policies**: Students are expected to be punctual, and, as always, to conduct themselves professionally and courteously: Using electronic devices or speaking with each other is not allowed, the student involved shall be expelled out of the class and shall be considered to be absent

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Course Syllabus

Faculty: CIT
Department: IS
Program(s): All

I. General information about the course instructor :							
Name	Fahd Nasser A. Al-Wesabi	**Office Hours(3 Hours Weekly)**					
Location & phone number	**Sana'a, 60th street**	**Sat**	**Sun**	**Mon**	**Tue**	**Wed**	**Thu**
Email	fwesabi@gmail.com						

X. General information about the course:						
13.	**Course Title:**	Software Process and Modeling				
14.	**Course Code and Number :**					
15.	**Credit Hours: 3**	**Lecture**	**Seminar/Tutorial**	**Practical**	**Training**	**Total**
		2		2		3
16.	**Study Level and Semester:**	Level 3 or 4 / Semester 6 or 7				
17.	**Pre-requisites (if any):**	- Software Engineering (CS323)				
18.	**Co-requisites (if any):**					
19.	**Program in which the course is offered**	**Software Engineering**				
20.	**Teaching Language:**	English / Arabic				
21.	**Study System :**	Course Based				
22.	**Prepared by:**	Course Facilitator (Fahd N. Al-Wesabi)				
23.	**Approval date :**					
24.	**Approved by:**					

I. Course Description :

This course aims to covers the key concepts, development approaches and methodologies, modeling techniques. This includes a review of Object-Oriented concepts and modeling with UML: Structural Modeling, Behavioral Modeling, System architecture design, User Interface Design, Object Persistence

Design, Class and Method Design, Object-Oriented Testing, Unified Process development cycle, Use case analysis, Sequence diagrams, Encapsulation, Inheritance, Polymorphism, Design principles of coupling and cohesion, Design patterns. Students will be also exposed OO case tools, UML Generating tools, standard templates, and software quality and standards. Students will participate in a group project on object-oriented software methodologies and modeling using OO case tools.

XI. Course Aims

1. An ability to describe system development concepts, process, environment, methods and terms used in the object-oriented approach.
2. Enable students to understand OO modeling techniques to build static and dynamic models that fit to develop various types of software systems..
3. To learn how to apply OO techniques to model the business problem requirements.
4. Enable students to understand OO design techniques to build system, architecture and object design.
5. Providing students with the necessary knowledge and skills in using object-oriented CASE tools.
6. Enable students to perform research on different discipline of software issues, and keep abreast of professional development skills.

I. Course Intended Learning Outcomes (CILOs) :

1. Describe the principles, terminology, process activities of system development life cycle, business oriented systems, real time systems, embedded systems, and distributed systems.
2. Explore the concepts of software development modeling, approaches, methods and models, design patterns and techniques associated with the OO paradigm and apply them to solve problems, and recognize the principal tasks and risks of software project management.
3. Define the key issues that have to be considered when modeling, designing, implementing and testing various types of software systems, including issues of quality, reliability, enterprise, software reuse and open-source development.
4. Systematize the principal requirements gathering, analysis, modeling and validation, and the relationships between these activities.
5. Propose and use the appropriate OO models, UML techniques and tools for the development and maintain of each type of software systems.
6. Systematize project plan and risk management procedures in a software project.
7. Use CASE tools, graphical models, and diagram types in UML to prepare requirement document, prototype, modeling, design patterns, user interface design, testing.
8. Clearly prepare and deliver coherent and structured verbal and written technical reports, communicate and describe various types of software systems, in both oral presentation and in written documentation

I. Course topics and sub-topics (theoretical and practical) with contact hours and alignment to CILOs

Topics/Units of Course Contents				
First: Theoretical Aspects				
No.	**Course Topics/Units**	**Sub-topics**	**No. of Weeks**	**Contact Hours**
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2	Requirements gathering and Specification	Traditional requirements gathering techniques, Prototyping, Agile modeling, Requirements specification	1	2
3	Data & Process Modeling using Functional oriented approach	Process modeling using DFD, Data modeling using ERD	2	4
4				
5	Use-Case Modeling and Use-Case Scenario	Use-Case Modeling and Use-Case Scenario	1	2
6	Mid Term Exam		1	2
7	Structural & Behavioral Models	Activity diagram, sequence diagram, Class diagram	1	2
8	Transition to Systems Design	Transition to Systems Design	3	6
9				
10				
11	System Architecture Design	System Architecture Design, Object Persistence Design; Class & Method Design	1	2
12	User Interface Design	User Interface Design	1	2
13	Testing Strategies and System Evaluation	Testing Strategies and System Evaluation	1	2
14	Final Projects Presentations	Final Projects presentations	1	2
15	Review		1	2
16	Final Exam	Final Exam	1	2
Total number of weeks and hours			**16**	**32**

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Second: Practical/Tutorial/Clinical Aspects			
Write up practical/tutorial/clinical topics			
No.	**Practical/Tutorial/Clinical topics**	**No. of Weeks**	**Contact Hours**
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2	JAD and Prototyping: Case Study	1	2
3	Prototyping case tools	1	2
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8	Requirement management and Power Designer	3	6
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Total number of weeks and hours		**16**	**32**

I. Teaching Strategies

- Lectures, PPT and lecture notes
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