Jordan University of Science & Technology

Software Engineering Department

Project Handbook

Revision 2.1

23-January-2019

Introduction

The Final year project is comprised of two courses which are the SE491 (Graduation Project 1) and SE492 (Graduation Project 2). SE491 provides the senior student with the opportunity to undertake a substantial graduation project under the supervision of a faculty member. At least two weeks prior to registration, an interested student must submit to the department chair a written request for permission to select a project. The request is to include a preliminary description of the proposed project and the name of the supervising faculty member. During this course, the student is expected to specify and design the proposed system or software. SE 492 is a continuation of SE491, where the student implements, tests and presents the proposed system or software to a 3-member faculty committee that includes the project's supervisor. A written report is to be submitted to the department and the examination committee.

Project Identification

This process starts by forming the project group. The project group should be from 3 to 5 students. The project group is responsible for finding the supervisor for their project. The supervisor will work with the group on identifying a valid project topic. The project should be feasible and the size of the project should fit the designated time and the available resources.

Progress Monitoring

The supervisor is responsible for monitoring the progress of the project team and provides guidance, advice and support. The supervisor should notify the group of any divergence from the project objectives, timelines, and the target quality. The supervisor should also monitor the following:

1. Project Identification. The supervisor may propose some problems to the team. However, the team could also bring their ideas regarding the topics they would like to work on. Once the team agrees with the supervisor on the topic, the team should provide the problem statement for their project supported by a background document.
2. Requirements Specifications. Involves an understanding of the domain of the project's topic. The students are free to use any of the available requirements elicitation techniques such as questionnaires, interviews, workshops, brainstorming, and consulting with subject matter experts.

Courses

SE491- Graduation Project 1

Course Catalog: Provides the senior student with the opportunity to undertake a substantial graduation project under the supervision of a faculty member. At least two weeks prior to registration, an interested student must submit to the department chair a written request for permission to select a project. The request is to include a preliminary description of the proposed project and the name of the supervising faculty member. During this course, the student is expected to specify and design the proposed system or software.

No.	Outcome	Marks	Program Outcomes
CLO1	Able to define a proper problem statement	5	D2p
CLO2	Able to conduct domain understanding, gather requirements by surveying similar products related to their problem statement	5	EP4p, D3p
CLO3	Able to provide detailed specifications to their problem statement	20	D4p
CLO4	Able to provide detailed design of their project including domain modeling, database schema, and user interface design	30	D4p
CLO5	Able to manage their project deliverables by meeting schedule and identifying risks	25	D2p, D5p
CLO6	Able to demonstrate their knowledge in writing proper documentation and in how to present their work verbally.	10	D6p
CLO7	Ability to communicate and collaborate within team members	5	D6p

SE492- Graduation Project 2

Course Catalog: This is a continuation of SE 491, where the student implements, tests and presents the proposed system or software to a committee of 3 faculty members other than his/her project's supervisor. A written report is to be submitted to the department and committee.

Course Learning Outcomes

CLO	Outcome	Marks	Program Outcomes
CLO1	Able to implement the project using modern programming languages and technologies	20	EA3p
CLO2	Able to test their software and deliver a reliable product	10	EA2p
CLO3	Able to manage their project deliverables by meeting schedule and identifying risks	35	D2p, D5p
CLO4	Able to demonstrate their knowledge in writing proper documentation and in how to present their work verbally.	15	D6p
CLO5	Able to communicate and collaborate within team members	10	D6p
CLO6	Able to write an efficient user manual describing how to install and run the software system	10	D6p

Deliverables

SE491: Graduation Project 1

The project includes two types of deliverables: group and individual reports.

A. Group Report

At the completion of the project, a group report should be submitted which includes the following deliverables:

1. Problem Statement and Solution Plan which include:
    - A description of the problem, the scenarios in which the problem may occur, a description of the solution and its feasibility and the project plan.
2. Software Requirements Specifications.

- Product Features. Gain an overall summary of the features in the product or component.
- External interface requirements, Functional requirements, Performance requirements, Design constraints, Standards Compliance, Logical database requirements.
- Software System attributes such as Reliability, Availability, Security, Maintainability and Portability.
- Other requirements

3. Software Architecture and Design which include logical view of the system, physical view, development view and process view.
    - Structural Design. (Internal structure of the product's components and the interfacing between them).
    - Behavioral Design. (Describes the internal behavior of the product's components).
    - Data and Storage Design. (data types, identification, integrity, business rules)
4. Testing plan
5. Implementation plan
6. User Interface Design which includes the GUI Prototypes.

Please refer to the project report template for further information

B. Individual Report

Additionally, each group member should submit an individual report that discusses his/her individual contributions and the set of lessons learned during the project. This document is evaluated by the examination committee to assess the individual contribution of each team member. Please refer to the individual reflection report template file.

SE492 Graduation Project 2

The project includes the following deliverables.

A. Working Software

The team should submit the source code and executables for their project. They also should provide a demonstration of the software features during the oral examination.

B. Project Report

At the completion of the project, a group report should be submitted which includes the following deliverables:

1. Test Design which includes System Testing, Usability Testing, and Acceptance Testing etc.
2. Working software: the students should submit their final executable along with the source code.
3. Installation Manual: instructions on how to install and configure the software.
4. User Manual: Instruction on how to use the software.

C. Individual Report

Additionally, each group member should submit an individual report that discusses his/her individual contributions and the set of lessons learned during the project. This document is evaluated by the examination committee to assess the individual contribution of each team member. Please refer to the individual reflection report template file.

Evaluation

Each project should be evaluated by the examination committee which includes the project supervisor and two members from the department. Project 1 (SE491) includes an oral presentation of the project report. However, in Project 2 (SE492), the students should provide a demonstration of their working software.

The grade for each student is determined according to the following table where it shows that the individual evaluation counts for 40% of the total project grade.

	Group Evaluation	Individual Evaluation	Total
Supervisor	30%	20%	50%
Examiner 1	15%	10%	25%
Examiner 2	15%	10%	25%
Total	60%	40%	100%

Individual Evaluation: each group member will be evaluated individually based on their individual report (submitted to the committee) and their performance during the presentation. The total individual grade will count for 40% of the total project grade.

Each project has two kinds of evaluation sheets (the group evaluation sheet and the induvial evaluation sheet). The evaluation sheets are indexed as follows:

- Page 7: SE491 Group Evaluation Sheet.
- Page 8: SE491 Individual Evaluation Sheet.
- Page 9: SE492 Group Evaluation Sheet.
- Page 10: SE492 Individual Evaluation Sheet.

The final grade for each student will be calculated as follows:

Student Grade = Supervisor Group Grade * 30% + Supervisor Individual Grade * 20% + Examiner 1 Group Grade * 15% + Examiner 1 Individual Grade * 10% + Examiner 2 Group Grade * 15% + Examiner 2 Individual Grade * 10%

SE491- Group Evaluation Sheet

Project Title		**Supervisor**	
Student 1		**Student 2**	
Student 3		**Student 4**	
Student 5		**Examiner**	

CLO	Expected Deliverable	Unacceptable	Below Standard	Acceptable	Competent	Superior	Grade
CLO1 (5)	**Problem statement and motivation**	**Mark: [1]** The product does not address any real need.	**Mark: [2]** The product addresses a minor problem that affects few users.	**Mark: [3]** The product addresses a significant problem that affects a significant number of users.	**Mark: [4]** The product addresses a major problem that affects many users.	**Mark: [5]** The product addresses a very hard problem that affects a very large number of users.	
CLO2 (5)	**Related existing systems**	**Mark: [0-2]** The team did not research alternate products.	**Mark: [3-4]** The team researched few alternate products, listed them, and did not explain the pros and cons.	**Mark: [5-6]** The team researched some alternate products, listed them, and did not explain their pros and cons.	**Mark: [7-8]** The team researched some alternate products, listed them, and explained their pros and cons.	**Mark: [9-10]** The team researched many alternative products, listed them, and explained their pros and cons.	
CLO3 (20)	**Software Requirements Specification**	**Mark: [0-5]** The report barely details the user's expectation of the product. The scope and nature of the project are hard to discern.	**Mark: [6-9]** The report somewhat details the user's expectation of the product. The scope and nature of the project are confusing at times.	**Mark: [10-14]** The report reasonably details the user's expectation of the product. The scope and nature of the project are reasonably laid out.	**Mark: [15-17]** The report mostly details the user's expectation of the product. The scope and nature of the project are mostly laid out.	**Mark: [18-20]** The report completely details the user's expectation of the product.	
CLO4 (10)	**Software Architecture**	**Mark: [0-2]** The architecture was poorly conveyed barely illustrating the key design decisions. No supporting diagrams used to illustrate the application's architecture. The design choice is inappropriate for the application.	**Mark: [3-4]** The architecture weakly conveyed and only illustrating the key design decisions. No modular components. Diagrams were poorly organized and sloppy.	**Mark: [5-6]** Adequate design choice for the application. The system is organized into components but with transparent architecture. Diagrams were reasonably organized and clear.	**Mark: [7-8]** The architecture conveyed the key design decisions, well illustrating the key designs clearly and concisely. The selected architecture reasonably organizes the system into components that interact with each other using well specified ports. Diagrams were well organized and clear.	**Mark: [9-10]** The architecture conveyed the key design decisions extremely well and is built based on a systematic tradeoff analysis between several other alternatives. Modular architecture. Well defined ports. Diagrams were very well organized and extremely clear.	
CLO4 (20)	**Software Detailed Design**	**Mark: [0-5]** The detailed design failed to capture most of the major software specifications. The team showed lack of understanding of the design patterns. The detailed design is highly coupled.	**Mark: [6-9]** The detailed design failed to capture some of the major software specifications. The team failed to apply suitable design patterns. The detailed design is highly coupled.	**Mark: [10-14]** The detailed design captures most of the software specifications and they are traceable back to the software specifications. The team tried to apply some design patterns to improve the software quality attributes. The team tried to achieve decoupled design.	**Mark: [15-17]** The detailed design fully captures software specifications and fully traceable back to the software specifications. The team tried to apply some design patterns to improve the software quality attributes. The team tried to achieve decoupled design.	**Mark: [18-20]** The detailed design fully captures software specifications and fully traceable back to the software specifications. The detailed design applies the suitable design patterns to improve the software quality attributes. Decoupled design with clear interfaces.	
CLO5 (10)	**Testing Plan**	**Mark: [0-2]** The application was not tested.	**Mark: [3-4]** The application was tested only with manual test issues in a mostly non-systematic method.	**Mark: [5-6]** A reasonable number of tests were documented and systematically performed.	**Mark: [7-8]** A significant number of tests were documented and systematically performed.	**Mark: [9-10]** A significant number of tests were documented and systematically performed and shown to be complete.	
CLO5 (5)	**Implementation Plan**	**Mark: [1]** No tools were used to manage the software development process.	**Mark: [2]** A tool was used to manage an aspect of the software development process.	**Mark: [3]** A few tools were used to manage some aspects of the software development process.	**Mark: [4]** Tools were used together to manage most aspects of the software development process.	**Mark: [5]** Appropriate tools were used together at every level of the software development process.	
CLO5 (10)	**Prototype User Interface Design**	**Mark: [0-2]** The prototype looked poor and was unintuitive.	**Mark: [3-4]** The prototype looked poor, but was a bit intuitive.	**Mark: [5-6]** The prototype looked ok and was reasonably intuitive.	**Mark: [7-8]** The prototype looked good and was intuitive to use.	**Mark: [9-10]** The prototype looked excellent and was very intuitive.	
CLO6 (10)	**Presentation Organization and Style**	**Mark: [0-2]** The presentation addressed few of the specified content areas. The presentation's flow was chaotic. Material does not support the topic.	**Mark: [3-4]** The presentation addressed some of the specified content areas. The presentation flowed from one section to another in a jump fashion	**Mark: [5-6]** The presentation addressed many of the specified content areas. The presentation flowed from one section to another in many cases well.	**Mark: [7-8]** The presentation addressed most of the specified content areas. The presentation flowed from one section to another in most cases well.	**Mark: [9-10]** The presentation addressed all the specified content areas. The presentation flowed from one section to another well.	
CLO6 (5)	**Questions & Answers**	**Mark: [1]** The team demonstrated little knowledge of the deliverables. They were not able to explain coherently or elaborate on any of the questions.	**Mark: [2]** The team demonstrated some knowledge of the deliverables. Difficulty in explaining and elaborating on the majority of the questions	**Mark: [3]** The team demonstrated reasonable knowledge of the deliverables. They explained and elaborated on many of the questions.	**Mark: [4]** The team demonstrated significant knowledge of the deliverables. They explained and elaborated on most questions.	**Mark: [5]** The team demonstrated full knowledge of the deliverables. They explained and elaborated on all questions.	
						Total (100)	

The rubric below will be used for each student in the group.

SE491- Individual Evaluation Sheet

Supervisor		**Date**	
Project Title		**Student Name**	
Student ID			
Examiner			

	Criteria	Unacceptable	Below Standard	Acceptable	Competent	Superior	Grade
1	Contributions **(50)** **(based on individual report)**	**Mark: [0-9]** The individual did not contribute to the project and failed to meet major responsibilities	**Mark: [10-19]** The individual contributed to the project but failed to meet some responsibilities	**Mark: [20-29]** The individual did not contribute as heavily as others, but did meet all responsibilities	**Mark: [30-39]** The individual contributed as others and did meet all responsibilities	**Mark: [40-50]** In addition to meeting all responsibilities, the individual contributed in a valuable way to the project.	
2	Lessons Learned **(10)** **(based on individual report)**	**Mark: [0-2]** Conclusions and lessons learned simply involved restating information without reflective thought	**Mark: [3-4]** Conclusions and lessons learned mostly involved restating information with a basic level of analysis and reflective thought	**Mark: [5-6]** Conclusions and lessons learned are fairly analyzed. The level of analysis and reflection could have been deeper	**Mark: [7-8]** Conclusions and lessons learned are analyzed and demonstrated a fair reflection to the learning outcomes	**Mark: [9-10]** Conclusions and lessons learned are deeply analyzed and demonstrated a strong reflection to the learning outcomes	
3	Questions and Answers **(40)** **(Viva Voce - oral presentation)**	**Mark: [0-4]** The student demonstrated little knowledge of the deliverables. The student was not able to explain coherently or elaborate on any of the questions.	**Mark: [5-9]** The student demonstrated some knowledge of the deliverables. Difficulty in explaining and elaborating on the majority of the questions	**Mark: [10-14]** The student demonstrated reasonable knowledge of the deliverables. The student explained and elaborated on many of the questions.	**Mark: [15-17]** The student demonstrated significant knowledge of the deliverables. The student explained and elaborated on most questions.	**Mark: [18-20]** The student demonstrated full knowledge of the deliverables. The student explained and elaborated on all questions.	
						Total (100)	

Date: **SE492 – Graduation Project II** Group Evaluation Sheet

Project Title		**Supervisor**	
Student 1		**Student 2**	
Student 3		**Student 4**	
Student 5		**Examiner**	

CLO	Expected Deliverable	Unacceptable	Below Standard	Acceptable	Competent	Superior	Grade
CLO1 (20)	**The Prescriptive Architecture Matches the Descriptive Architecture:** The prescriptive (documented) architecture should match the descriptive (implemented) architecture to prevent architecture decay and architecture drift.	**Mark: [0-5]** No match. The components in the architectural design documents cannot be traced to the source code.	**Mark: [6-9]** Major mismatch. Most of the major components in the architectural design cannot be traced to the source code.	**Mark: [10-14]** Most of the major components in the architectural design are easily traced to the source code.	**Mark: [15-17]** All major components in the architectural design are easily traced to the source code.	**Mark: [18-20]** The components in the architectural design are easily traced to the source code.	
CLO2 CLO5 (20)	**Programming language and technology:** A list of the programing languages, technologies, CASE tools, software and databases used to implement the software system.	**Mark: [0-5]** No use of modern technologies	**Mark: [6-9]** Very basic used old technologies (ASP, JSP)	**Mark: [10-14]** Humble use of modern technologies	**Mark: [15-17]** Used modern technologies (i.e. J2EE, .NET, PHP, Angular, etc.)	**Mark: [18-20]** Used cloud-based technologies (AZURE, AWS, Google APIs, etc.)	
CLO3 (15)	**Testing Process:** Designing and implementing the test cases and executing them. Recording the testing coverage (i.e., statement coverage, branch coverage, etc.) and understanding the results of the test cases execution.	**Mark: [0-4]** The application was not tested.	**Mark: [5-7]** Few test cases were performed. The test cases don't cover most of the test levels, i.e., unit testing, integration testing, system testing, etc.	**Mark: [8-11]** Testing tools have been used to automate the testing process. A reasonable number of tests were systematically performed and the results were recorded. The test cases cover some test levels, i.e., unit testing, integration testing, system testing, etc.	**Mark: [12-13]** Modern testing tools have been used to automate the testing process. A significant number of tests were systematically performed and the results were recorded. The test cases cover most of the test levels, i.e., unit testing, integration testing, system testing, etc.	**Mark: [14-15]** Modern testing tools have been used to automate the testing process. A significant number of tests were systematically performed and the results were recorded and accurately discussed. The test cases cover all test levels (unit testing, integration testing, system testing, etc.)	
CLO3 (10)	**Software demonstration:** Demonstrate a completed and working solution that satisfies the project's requirements.	**Mark: [0-2]** The final application did not function well.	**Mark: [3-4]** The final application was demonstrated with some of functionality as dictated by the requirements document.	**Mark: [5-6]** The final application was demonstrated with a reasonable amount of its functionality as dictated by the requirements document.	**Mark: [7-8]** The final application was demonstrated with most of its functionality complete as dictated by the requirements document.	**Mark: [9-10]** The final application was demonstrated with complete functionality as dictated by the requirements document.	
CLO3 (10)	**User Interface Design:** Provide snapshots for the graphical user interface screens of the system.	**Mark: [0-2]** The application looked poor and was unintuitive.	**Mark: [3-4]** The application looked poor, but was reasonably intuitive.	**Mark: [5-6]** The application looked ok and was reasonably intuitive.	**Mark: [7-8]** The application looked good and was intuitive to use.	**Mark: [9-10]** The application looked excellent and was very intuitive to use.	
CLO6 (10)	**User Manual:** A document that precisely describe how to install and use the developed software system.	**Mark: [0-2]** The user manual is poorly written and hard to follow.	**Mark: [3-4]** The user manual poorly describes how to *use, install, or run* the software.	**Mark: [5-6]** The user manual describes how to *use* the software system but failed to explain how to install it and run it.	**Mark: [7-8]** The user manual precisely describes how to *install*, *run*, and *use* the software system.	**Mark: [9-10]** The user manual precisely and easily describes how to *install*, *run*, and *use* the software system.	
CLO4 (10)	**Presentation Organization and Style:** Good overview, Material presented in logical order, continuity of subject matter, focused, timing, appropriate level for audience.	**Mark: [0-2]** The presentation addressed few of the specified content areas. The presentation's flow was chaotic	**Mark: [3-4]** The presentation addressed some of the specified content areas.	**Mark: [5-6]** The presentation addressed many of the specified content areas. The presentation flowed from one section to another in many cases well.	**Mark: [7-8]** The presentation addressed most of the specified content areas. The presentation flowed from one section to another in most cases well.	**Mark: [9-10]** The presentation addressed all the specified content areas. The presentation flowed from one section to another well.	
CLO4 (5)	**Questions & Answers:** Properly handled, able to respond appropriately, concise and direct, complete.	**Mark: [1]** Demonstrated little knowledge of the deliverables.	**Mark: [2]** Demonstrated some knowledge of the deliverables.	**Mark: [3]** The team demonstrated reasonable knowledge of the deliverables. They explained and elaborated on many of the questions.	**Mark: [4]** The team demonstrated significant knowledge of the deliverables. They explained and elaborated on most questions.	**Mark: [5]** The team demonstrated full knowledge of the deliverables. They explained and elaborated on all questions.	
						Total Grade (100)	

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Student ID			
Examiner			

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						Total (100)	