



## 50. Course Specification of Graduation Project

I. Course Identification and General Information:						
1.	Course Title:	Graduation Project				
2.	Course Code & Number:	PME415				
3.	Credit hours:	C.H				TOTAL
		Th.	Tu.	Pr.	Tr.	
		4	2	-	-	4
4.	Study level/ semester at which this course is offered:	5 <sup>th</sup> year/ 1 <sup>st</sup> & 2 <sup>nd</sup> semester				
5.	Pre –requisite (if any):	To fulfill the requirements of the Faculty and the courses required by specific projects as determined by the supervisor.				
6.	Co –requisite (if any):	None				
7.	Program (s) in which the course is offered:	Electrical <b>Engineering</b>				
8.	Language of teaching the course:	English				
9.	Location of teaching the course:	Class room and lab				
10.	Prepared By:	Asst. Prof. Dr. Radwan AL Bouthigy				
11.	Date of Approval					

II. Course Description:
<p>This course aims at enhancing the graduates' ability to conduct and apply all concepts, principals, theories, and procedures that were studied earlier in the past years in the electrical engineering including field survey, experimental testing, numerical analysis and designing of electrical engineering projects and systems. To achieve this goal, the graduates are supervised and trained in one or multiple fields of real electrical engineering projects such as power and machine, computer engineering and control, communication network...etc. Upon completion of this course, the students must achieve the electrical engineer professional skills appropriately and sufficiently to begin his/her career after graduation.</p>

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III. Course Intended learning outcomes (CILOs) of the course		Referenced PILOs
a1	Define mathematics and science for an electrical engineering project.	A1
a2	Describe construction & project management, procurement procedures and electrical engineering practices, codes and standards for an electrical engineering project.	A2
a3	Describe the principles of design techniques and IT for an electrical engineering project.	A3
a4	Show the role of the professional engineer in society, including safety, environmental issues, cultural heritage and traditional practices for an electrical engineering project.	A4
b1	Demonstrate competence in identifying, defining and solving an electrical engineering project.	B1
b2	Choose appropriate mathematical and computer-based methods for analyzing an electrical engineering project.	B2
b3	Demonstrate proficiency in the evaluation and integration of information and processes in an electrical engineering project.	B3
b4	Consider the economic, social, and environmental issues as well as management in design an electrical engineering project.	B4
c1	Apply engineering techniques, modern tools, and software packages for an electrical engineering project.	C1
c2	Design an electrical engineering project and process meeting codes, standards and desired needs to solve engineering problems.	C2
c3	Use laboratory and field equipment competently and safely, record, analyze and validate relevant data.	C3
c4	Solve engineering problems using appropriate software and standard specifications.	C4
d1	Work independently and in a team with realization of the importance of leadership.	D1
d2	Engage in life-long learning and conduct searches of literature and use information resources.	D2
d3	Manage workloads, time, projects and people effectively and safely	D3

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<b>d4</b>	Communicate effectively using written, oral and graphical skills	D4
<b>d5</b>	Commit professional and ethical responsibility in conducting work	D5

<b>(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>a1</b> Apply mathematics and science for an electrical engineering project.	Projects Lecture Multimedia Presentations Reading design projects laboratory Group Learning Problem-Based Learning Case Studies.	Project reports group reports Laboratory reports Simulations Student Presentations Project seminar
<b>a2</b> Describe construction & project management, procurement procedures and electrical engineering practices, codes and standards for an electrical engineering project.		
<b>a3</b> Describe the principles of design techniques and IT for an electrical engineering project.		
<b>a4</b> Describe the procedures of laboratory tests and the properties and behavior of power and machine, computer engineering and communication network.		

<b>(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1</b> Demonstrate competence in identifying, defining and solving an electrical engineering project.	Projects Lecture Multimedia Presentations Reading design projects laboratory	Project reports group reports Laboratory reports Simulations Student Presentations
<b>b2</b> Choose appropriate mathematical and computer-based methods for analyzing an electrical engineering project.		

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<b>b3</b>	Demonstrate proficiency in the evaluation and integration of information and processes in an electrical engineering project.	Group Learning Problem-Based Learning Case Studies. supervisor and team interactive discussions, computer simulation	Project and oral presentations. Supervisor follow up student peer assessment
<b>b4</b>	Consider the economic, social, and environmental issues as well as management in design an electrical engineering project.		

© Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>c1</b> Apply engineering techniques, modern tools, and software packages for an electrical engineering project.	Projects Lecture Multimedia	Project reports group reports Laboratory reports Simulations Student Presentations Project seminar Supervisor follow up
<b>c2</b> Design an electrical engineering project and process meeting codes, standards and desired needs to solve engineering problems.	Presentations Reading design projects laboratory	
<b>c3</b> Use laboratory and field equipment competently and safely, record, analyze and validate relevant data.	Group Learning Problem-Based Learning Case Studies.	
<b>c4</b> Solve engineering problems using appropriate software and standard specifications.	computer simulation	

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1</b> Work independently and in a team with realization of the importance of leadership.	Projects Multimedia Student Presentations	Project reports group reports Laboratory reports Simulations Student Presentations Project seminar
<b>d2</b> Engage in life-long learning and conduct searches of literature and use information resources.	design projects laboratory Group Learning Problem-Based Learning	

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<b>d3</b> Manage workloads, time, projects and people effectively and safely	Case Studies. supervisor and team interactive discussions, computer simulation	Assessment of teamwork is through submission of teamwork tasks, student peer and self-assessment, and oral presentations. Supervisor follow up
<b>d4</b> Communicate effectively using written, oral and graphical skills		
<b>d5</b> Commit professional and ethical responsibility in conducting work		

<b>IV. Course Content:</b>					
<b>Graduation Project Content (First Semester)</b>					
<b>Order</b>	<b>Units/Topics List</b>	<b>Learning Outcomes</b>	<b>Sub Topics List</b>	<b>Number of Weeks</b>	<b>contact hours</b>
<b>1</b>	Project objectives and methodology	a1, a2, a3	Review previous projects, studies, researches, and references	1	4
<b>2</b>			Search and collecting graduation project data from different resources	1	4
<b>3</b>			Find study objectives and methodology.	1	4
<b>4</b>			Preparation of full plan and time schedule for the graduation project.	1	4
<b>5</b>	Project parameters and alternatives	a1, a2, a3	Identifying the parameters of filed survey, experimental works, numerical investigations, and design codes and standards	1	4
<b>6</b>			Compare and select appropriate methods, systems, and alternatives	1	4
<b>7</b>			Revise the study plane and time schedule	1	4
Progress evaluation 1				1 (8)	4

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8	Field survey, experimental testing, and numerical analysis	a1, a2, a3, b1, b2, b3, b4, c1, c2, c2, c3, d1, d2, d3	Conduct field survey, experimental testing, numerical analysis	4	16
9			Confirm the results output through comparing with the initial assumptions	1	4
10			Conduct results verifications and comparisons	1	4
11	Results and discussion	a1, a2, a3, b1, b2, b3, b4, c1, c2, c2, c3, d1, d2, d3	Determination the impact of different factors and variables	1	4
12			Progress evaluation 2	1	4
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>64</b>
<b>Graduation Project Content (Second Semester)</b>					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Project design and parametric investigation	a1, a2, a3, b1, b2, b3, b4, c1, c2, c2, c3, d1, d2, d3	Prepare and validate Excel Spread Sheets for designing the project elements	1	4
2			Design the system components according to the relevant code of practice and standards	2	8
3			Conduct the necessary verification and re-analysis the system when non conformity	1	4
4			Sort the design results to facilitate production practical documents for construction process	1	4
5			Conduct parametric study for the system to obtain the impact of different variables and factors	1	4

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Progress evaluation 3			1 (7)	4	
6	Project documentations	a1, a2, a3, b1, b2, b3, b4, c1, c2, c2, c3, d1, d2, d3	Prepare first draft of the project report presenting the carried-out stages, calculations, results, conclusions, and conclusion	4	16
7					
8			Prepare first draft of the project construction documents including, detailed drawings, specifications, tables, notes, and cost estimation	3	12
9	First draft submission and revision		1	4	
	Project examination and discussion		1	4	
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>64</b>	

## V. Responsibilities:

### Advisor Responsibilities:

1. Discuss proposed project(s) with students.
2. Require a project description and a Gantt chart from your team by the end of week
3. Require a Budget Proposal from your team prior to week 11 of GP I.
4. Apply the material of the seminars to the project
5. Evaluate each student's performance during the semester.
6. Provide feedback to your project team members upon receiving the Coordinator Evaluation Sheet.
7. Require a copy of the report drafts at the prescribed dates in the schedule. Provide your team with a critical review of report content and writing style.

### Coordinator Responsibilities:

1. Meet with student teams on a weekly basis to evaluate their progress, presentation skills and class interaction (peer review).
2. Enhance critical thinking amongst teams of various disciplines.
3. Improve the skills of delivery of the assigned teams.
4. Ensure the utilization of lecture materials into the projects.

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**VI. Teaching strategies of the course:**

Lectures (GP orientation, advanced writing and citation.  
 1-Supervising and providing advices for the numerous graduation students activities such as:  
 Survey and research work.  
 Performing analytical and computer aided simulation and analysis of the component and/or the GP Project.  
 Performing experimental and computer-based investigation the performance of the designed GP.  
 Building up the real-world GP Project system (if applicable).  
 Writing up the documentation.  
 Presenting the GP.  
 2- Group discussions

**VII. Students Assignments or Reports.**

Title or description of these assignments or reports	When are these assignments or reports required?
First progress report.	8th week first semester
Second progress report.	13th week first semester
Third progress report.	4th week second semester
Fourth progress report.	6th week second semester
Fifth progress report.	7th week second semester
Sixth progress report.	12th week second semester

**VIII. Students Follow-up:**

- Meet Advisor (Weekly)
- Meet Coordinator (Weekly)
- Group Meetings
- Attend Special Lectures
- Present Progress (Bi-Weekly)

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- Field Trip

## IX. Student Assessment:

**A- Bases of Assessment:**

- 1. Advisor (40%)
- College Coordinator (20%)

Final Exam. Committee 40% GP

**Graduation Projects Examination Guidelines:**

1. **Ensure that each team fulfills the following:**

- Clarity of project objective: Examine if the project falls under a *Design-Build*
- Approach Selection: Did the team consider several approaches? Which one did they choose from their literature search and why? Look at the presented justifications.
- Plan: Is there a clear plan? If the team is not adhering to the proposed plan, then there is a lack in organization.
- Consideration of Environmental, Economic, and/or Social Impact: Each project must have at least two of such elements.
- Adherence to report guidelines: Make sure that the report is prepared according to the 'Writing Report Guidelines'.

## X. Learning Resources:

- Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).

<b>1- Required Textbook(s) (maximum two).</b>	
	1- To be recommended by the supervisor. 2- All the related text books available in the library 3- Manuals, Catalogues and Codes available in the fields.
<b>2- Essential References.</b>	
	List Essential References Materials (Journals, Reports, etc.)
<b>3- Electronic Materials and Web Sites etc.</b>	
	1. List Electronic Materials (e.g. Web Sites, Social Media, Blackboard, etc.)

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	2. Other learning material such as computer-based programs, professional standards or regulations and software.
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XI. Course Policies:	
<b>1.</b>	<b>Class Attendance:</b> The students should have more than 75 % of attendance according to rules and regulations of the engineering faculty.
<b>2.</b>	<b>Tardy:</b> The students should respect the timing of attending the lectures. They should attend within 1 minutes from starting of the lecture.
<b>3.</b>	<b>Exam Attendance/Punctuality:</b> The student should attend the exam on time. The punctuality should be implemented according to the rules and regulations of the engineering faculty for midterm exam and final exam.
<b>4.</b>	<b>Assignments &amp; Projects:</b> The assignment is given to the students after each chapter, the student has to submit all the assignments for checking on time.
<b>5.</b>	<b>Cheating:</b> If any cheating occurred during the examination, the student is not allowed to continue and he/she has to face the examination committee for enquires.
<b>6.</b>	<b>Plagiarism:</b> The student will be terminated from the Faculty, if he/she attends the exam on another student behalf according to the policy, rules and regulations of the university.
<b>7.</b>	<b>Other policies:</b> -Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise the student will be asked to leave the lecture room -Mobile phones are not allowed in class during the examination. -Lecture notes and assignments my given directly to students using soft or hard copy

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**V: Course Structure:**

- A team of 4-6 students supervised by (an) advisor(s)
- Half-monthly follow ups with the teams by advisor Coordinators on progress & communication skills.
- Course Schedule with Deadlines.

Workshops on Project Management, Ethics, Design Process Concept, Product Design Specifications, Quality Assurance, Safety, and Cost Effectiveness.

- Final Report with guidelines.

Reviewed By	<b><u>Vice Dean for Academic Affairs and Post Graduate Studies: Asst. Prof. Dr. Tarek A. Barakat</u></b>
	<b><u>President of Quality Assurance Unit: Assoc. Prof. Dr. Mohammed Algorafi</u></b>
	<b><u>Name of Reviewer from the Department: Asst. Prof. Dr. Adel Ahmed Al-Shakiri</u></b>
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**Sana'a University**  
**Faculty of Engineering**  
**Department: Electrical Engineering**  
**Title of the Program: Communication Engineering and Networks**



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