

**11-Course Specification of: Health, Safety and Environment
Management
Course Code (PME540)**

I. General Information About the Course:				
1.	Course Title:	Health, Safety and Environment Management		
2.	Course Code and Number:	PME540		
3.	Credit Hours:	Credit Hours		Total
		Lecture	Practical	
		3	-	-
4.	Study Level and Semester:	Second Semester		
5.	Pre-requisites (if any):	-		
6.	Co-requisites (if any):	-		
7.	Program (s) in which the course is offered:	MSc. in Electrical Power Engineering		
8.	Language of teaching the course:	English		
9.	Study System:	Courses & Thesis		
10.	Prepared By:	Prof. Dr. Eng. Omar H. Al-Sakaf		
11.	Reviewed by:	Dr. Radwan M. AL Bouthigy		
12.	Date of Approval:			

II. Course Description:	
<p>This course aims to teach the science and practice of health, safety and environment HSE management in the context of a team approach. It delivers an understanding of what constitutes an HSE management system and how these systems are applied in the different engineering disciplines to integrate health, safety and environment issues in all activities of the engineering profession and throughout the project life cycle as well. On successful completion of the course, students should be in a position to identify, evaluate and provide solutions to a wide range of health, safety and environmental problems, and function well in a multi-disciplinary team. The comprehensive syllabus recognizes the importance of technical and practical skills as well as the need for good management skills and critical thinking.</p>	

III. Course Intended Learning Outcomes (CILOs):

Upon successful completion of **Health, Safety and Environment Management** Course, the graduates will be able to:

- a1 - Demonstrate understanding of the health, safety and environment (HSE) legal and behavioral issues and the consequent responsibilities relevant to HSE management practices in the engineering profession.
- a2 - Recognize the dynamically changing HSE practices in increasing complex disciplines of engineering and industrial setup.
- b1 - Design appropriate HSE management systems to improve productivity, quality and overall performance.
- b2 - Develop efficient systems for HSE management based on principles for experience feedback and learning.
- c1 - Apply acquired knowledge on real cases to understand businesses' working environment organization and to master the concept HSE risk in relation to work environment and methods for evaluation.
- c2 - Select methods for HSE systems analysis for a given technical system and reflect on the differences and suitability of the methods.
- d1 - Function effectively as an individual or leader in diverse teams and in multi-disciplinary settings so as to provide practical solutions to HSE problems.
- d2 - Communicate effectively on the impact of HSE solutions on productivity, quality and society at large.

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

CILOs		PILOs	
<p>a. Knowledge and Understanding: Upon successful completion of the Health, Safety and Environment Management Course, the graduates will be able to:</p>		<p>A. Knowledge and Understanding: Upon successful completion of the MSc. in Electrical Power Engineering Program, the graduates will be able to:</p>	
a1.	Demonstrate understanding of the health, safety and environment (HSE) legal and behavioral issues and the consequent responsibilities relevant to HSE management practices in the engineering profession.	A1.	Demonstrate in-depth understanding of the theory and practice of modern electrical power systems design and operation and system identification.
a2.	Recognize the dynamically changing HSE practices in increasing complex disciplines of engineering and industrial setup.	A2.	Recognize and comprehend the key role of sustainable energy for national and global sustainable development.
<p>b. Cognitive/ Intellectual Skills: Upon successful completion of the Health, Safety and Environment Management, the graduates will be able to:</p>		<p>B. Cognitive/ Intellectual Skills: Upon successful completion of the MSc. in Electrical Power Engineering Program, the graduates will be able to:</p>	
b1.	Design appropriate HSE management systems to improve productivity, quality and overall performance.	B1.	Identify, formulate, and solve complex power engineering problems by selecting and applying appropriate tools and techniques.
b2.	Develop efficient systems for HSE management based on principles for experience feedback and learning.	B2.	Critically review the scientific literature for effective justification and support of results and decisions.
		B3.	Select appropriate techniques and tools for successful problem solving.
<p>c. Professional and Practical Skills: Upon successful completion of the Health, Safety and Environment Management Course, the graduates will be able to:</p>		<p>C. Professional and Practical Skills: Upon successful completion of the MSc. in Electrical Power Engineering Program, the graduates will be able to:</p>	
c1.	Apply acquired knowledge on real cases to understand businesses' working environment organization and to master the concept HSE risk in relation to work environment and methods for evaluation.	C1.	Apply modern tools for research, computation, simulation, analysis, and design of modern power systems.

c2.	Select methods for HSE systems analysis for a given technical system and reflect on the differences and suitability of the methods.	C2.	Recognize the interdisciplinary nature of technical problems and apply other areas of knowledge to the solution, and work with other professions to arrive at a solution for complex engineering problems.
d. Transferable Skills: Upon successful completion of the Health, Safety and Environment Management , the graduates will be able to:		D. Transferable Skills: Upon successful completion of the MSc. in Electrical Power Engineering Program , the graduates will be able to:	
d1.	Function effectively as an individual or leader in diverse teams and in multi-disciplinary settings so as to provide practical solutions to HSE problems.	D1.	Demonstrate leadership skills in the workplace, to function professionally in a globally competitive world, and to communicate engineering results effectively.
d2.	Communicate effectively on the impact of HSE solutions on productivity, quality and society at large.	D2.	Realize the relevance of economics, ethics and teamwork to the profession.

V. Alignment of CILOs to Teaching and Assessment Strategies

a. Alignment of Knowledge and Understanding CILOs:

Knowledge and Understanding CILOs		Teaching Strategies	Assessment Strategies
a1.	Demonstrate understanding of the health, safety and environment (HSE) legal and behavioral issues and the consequent responsibilities relevant to HSE management practices in the engineering profession.	<ul style="list-style-type: none"> ▪ Lectures ▪ Demonstrations ▪ Interactive class discussions 	<ul style="list-style-type: none"> ▪ Group work ▪ Assignments ▪ Presentations ▪ Written Exams
a2.	Recognize the dynamically changing HSE practices in increasing complex disciplines of engineering and industrial setup.		

b. Alignment of Intellectual Skills CILOs:

Intellectual Skills CILOs		Teaching Strategies	Assessment Strategies
b1.	Design appropriate HSE management systems to improve productivity, quality and overall performance.	<ul style="list-style-type: none"> ▪ Lectures ▪ Demonstrations ▪ Interactive class discussion 	<ul style="list-style-type: none"> ▪ Assignments ▪ Presentations ▪ Exams
b2.	Develop efficient systems for HSE management based on principles for experience feedback and learning.		

c. Alignment of Professional and Practical Skills CILOs:

Professional and Practical Skills CILOs		Teaching Strategies	Assessment Strategies
c1.	Apply acquired knowledge on real cases to understand businesses' working environment organization and to master the concept HSE risk in relation to work environment and methods for evaluation.	<ul style="list-style-type: none"> ▪ Lectures ▪ Demonstrations ▪ Interactive class discussion 	<ul style="list-style-type: none"> ▪ Assignments ▪ Presentations ▪ Exams
c2.	Select methods for HSE systems analysis for a given technical system and reflect on the differences and suitability of the methods.		

d. Alignment of Transferable (General) Skills CILOs:

Transferable (General) Skills CILOs		Teaching Strategies	Assessment Strategies
d1.	Function effectively as an individual or leader in diverse teams and in multi-disciplinary settings so as to provide practical solutions to HSE problems.	<ul style="list-style-type: none"> ▪ Demonstrations ▪ Interactive class discussion 	<ul style="list-style-type: none"> ▪ Assignments ▪ Presentations.
d2.	Communicate effectively on the impact of HSE solutions on productivity, quality and society at large.		

VI. Course Content

1. Theoretical Aspect

Order	Topic List / Units	Sub -Topics List	Number of Weeks	Contact Hours	Course ILOs
1	Introduction	<ul style="list-style-type: none"> Health, safety and the environment HSE management and its relation to business success and growth of companies Reasons for considering health, safety and environment Cost of accidents 	1	3	a.1, a.2
2	Health and Safety	<ul style="list-style-type: none"> Worker safety and health Property safeguarding Main causes of accidents Hierarchy of safety controls 	2	6	a.1, a.2, b.1, b.2, c.1, c.2
3	Environmental Protection and Climate Change	<ul style="list-style-type: none"> Environmental hazards <ul style="list-style-type: none"> - Air pollution -Waste management Pollution control methodologies Environmental permits Regulatory compliance and reporting Environmental sustainability Mitigation & adaptation to climate change adverse impacts Environmental costing/accounting Introduction to EIA, need and scope of EIA 	2	6	a.1, a.2, b.1, b.2, c.1, c.2, d.2
4	HSE Legislative and Regulatory Framework	<ul style="list-style-type: none"> Laws, regulations and management systems International standards Law enforcement 	1	3	a.1, a.2, b.1, b.2, c.1, c.2
5	Midterm Exam		1	3	a.1, a.2, b.1, b.2
6	HSE Management Systems	H&S management systems, ISO 45001	2	6	a.1, a.2, b.1, b.2, c.1, c.2, d.1, d.2
		Environmental management systems, ISO 14001	2	6	
7	Integrating HSE into Engineering Projects	<ul style="list-style-type: none"> Project management approach to HSE Integrating risk management throughout project life cycle HSE managers as project managers HSE organization structure 	1	3	a.1, a.2, b.1, b.2, c.1, c.2, d.1, d.2

		<ul style="list-style-type: none"> • Risk management cycle (PDCA cycle) • HSE software • HSE management plans <ul style="list-style-type: none"> - H&S management plans - Environmental management plans - Combined HSE management plans 			
8	HSE Auditing	<ul style="list-style-type: none"> • Consequences of Poor HSE management • The importance of HSE audits • The concept of compliance in the HSE context • The major auditing steps as described in ISO 19011 (and ISO/IEC 17021) <ul style="list-style-type: none"> - Prepare audit activities - Conduct the audit - Conclude the audit • Write the audit report and follow up • The consequences of HSE non-compliance 	1	3	a.1, a.2, b.1, b.2, c.1, c.2, d.1, d.2
9	Case Studies – HSE Approaches for Selected Engineering Projects	<ul style="list-style-type: none"> • Energy and renewable energy projects • Construction projects • Oil & gas projects • Industrial projects • HSE auditing 	2	6	a.1, a.2, b.1, b.2, c.1, c.2, d.1, d.2
10	Final Exam	All Topics	1	3	a.1, a.2, b.1, b.2
Number of Weeks /and Contact Hours Per Semester			16	48	

2. Practical Aspect		NA		
Order	Practical / Tutorials topics	Number of Weeks	Contact Hours	Course ILOs
1				
2				
Number of Weeks /and Contact Hours Per Semester				

3. Tutorial Aspect: NA				
No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1				
2				
Number of Weeks /and Units Per Semester				

VII. Teaching Strategies:

- Formal lectures
- Interactive discussions
- Group work
- Presentations

VIII. Assessment Methods of the Course:

- Group work
- Assignments
- Presentations
- Written Exams

IX. Tasks and Assignments:

No	Assignments/ Tasks	Individual/ Group	Mark	Week Due	CILOs (symbols)
1	<ul style="list-style-type: none"> Readings: Each week readings; based on each reading/topic, a written assignment will be issued. Students will be asked to write synthetic essays and/or complete analyses pertaining to the reading materials. These will be short (>4, <5 pages double spaced) pieces. Each work assigned for reading will have 1 or 2 presenters assigned to it from the class. In general students will be asked to describe the main points of the paper and to offer a critique of the contents. Students are expected to prepare for class by reading the assigned reading prior to the class for which they are listed, and to participate in class sessions/group discussions. By the end of the semester (Week 14), Student Groups will submit their Final Activity Report and deliver a PowerPoint presentation within a plenary session. 	Group	20	3-14	a.1, a.2, b.1, b.2, c.1, c.2, d.1, d.2
Total Score			20	-	-

X. Learning Assessment:					
No.	Assessment Tasks	Week due	Mark	Proportion of Final Assessment	CILOs
1	Assignments	3-14	20	20%	a.1, a.2, b.1, b.2, c.1, c.2, d.1, d.2
2	Mid-Term Exam	9	20	20%	a.1, a.2, b.1, b.2
3	Final Exam	16	60	60%	
Total			100	100%	-

VIII Learning Resources and Facilities
1- Required Textbook(s)
<ul style="list-style-type: none"> Frances Alston and Emily J. Millikin, 'Guide to Environment Safety & Health Management', CRC Press, 2016. Omar Al-Sakaf, 'Introduction to Industrial Safety', First Edition, 2016.
2- Essential References
<ul style="list-style-type: none"> Stephen Asbury, 'Health and Safety, Environment and Quality Audits - A Risk-based Approach', 3rd Edition, Routledge-Taylor & Francis Group, 2018. Iñaki Heras-Saizarbitoria (Editor), 'ISO 9001, ISO 14001, and New Management Standards', Springer, 2018.
3- Electronic Materials and Websites etc.
<ul style="list-style-type: none"> Course Power Point. Video clips. Links to information resources.
Educational and research Facilities and Equipment Required
Technology Resources (AV, data show, Smart Board, software, etc.)
Data Show, Internet Access
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)
-

• الضوابط والسياسات المتبعة في المقرر Course Policies	
بعد الرجوع للوائح الجامعة يتم كتابة السياسة العامة للمقرر فيما يتعلق بالآتي:	
1	سياسة حضور الفعاليات التعليمية :Class Attendance - يلتزم الطالب بحضور 75% من المحاضرات ويحرم في حال عدم الوفاء بذلك.

	- يقدم أستاذ المقرر تقريراً بحضور وغياب الطلاب للقسم ويحرم الطالب من دخول الامتحان في حال تجاوز الغياب 25% ويتم اقرار الحرمان من مجلس القسم.
2	الحضور المتأخر Tardy: - يسمح للطالب حضور المحاضرة إذا تأخر لمدة ربع ساعة لثلاث مرات في الفصل الدراسي، وإذا تأخر زيادة عن ثلاث مرات يحذر شفويًا من أستاذ المقرر، وعند عدم الالتزام يمنع من دخول المحاضرة.
3	ضوابط الامتحان Exam Attendance/Punctuality: - لا يسمح للطالب دخول الامتحان النهائي إذا تأخر مقدار (20) دقيقة من بدء الامتحان - إذا تغيب الطالب عن الامتحان النهائي تطبق اللوائح الخاصة بنظام الامتحان في الكلية.
4	التعيينات والمشاريع Assignments & Projects: - يحدد أستاذ المقرر نوع التعيينات في بداية الفصل ويحدد مواعيد تسليمها وضوابط تنفيذ التكاليف وتسليمها. - إذا تأخر الطالب في تسليم التكاليف عن الموعد المحدد يحرم من درجة التكليف الذي تأخر في تسليمه.
5	الغش Cheating: - في حال ثبوت قيام الطالب بالغش في الامتحان النصفى أو النهائي تطبق عليه لائحة شؤون الطلاب. - في حال ثبوت قيام الطالب بالغش أو النقل في التكاليف والمشاريع يحرم من الدرجة المخصصة للتكليف.
6	الانتحال Plagiarism: - في حالة وجود شخص ينتحل شخصية طالب لأداء الامتحان نيابة عنه تطبق اللائحة الخاصة بذلك
7	سياسات أخرى Other policies: - أي سياسات أخرى مثل استخدام الموبايل أو مواعيد تسليم التكاليف الخ

Academic Year:

Course Plan (Syllabus): Health, Safety and Environment Management

I. Information about Faculty Member Responsible for the Course:							
Name	Prof. Dr. Eng. Omar H. Al-Sakaf	Office Hours					
Location & Telephone No.	Faculty of Engineering Mobile: 733772328/773332328	SAT	SUN	MON	TUE	WED	THU
E-mail	oalsakaf@gmail.com oalsakaf@yahoo.com		08:00 - 12:00				

II. General Information about the Course:					
1.	Course Title	Health, Safety and Environment Management			
2.	Course Code and Number	PME540			
3.	Credit Hours	Credit Hours		Total	
		Lecture	Practical		Seminar/Tutorial
		3	-	-	3
4.	Study Level and Semester	Second Semester			
5.	Pre-requisites	-			
6.	Co-requisite	-			
7.	Program (s) in which the course is offered	MSc. in Electrical Power Engineering			
8.	Language of teaching the course	English			
9.	Location of teaching the course	Faculty of Engineering			

II. Course Description:

This course aims to teach the science and practice of health, safety and environment HSE management in the context of a team approach. It delivers an understanding of what constitutes an HSE management system and how these systems are applied in the different engineering disciplines to integrate health, safety and environment issues in all activities of the engineering profession and throughout the project life cycle as well. On successful completion of the course, students should be in a position to identify, evaluate and provide solutions to a wide range of health, safety and environmental problems, and function well in a multi-disciplinary team. The comprehensive syllabus recognizes the importance of technical and practical skills as well as the need for good management skills and critical thinking.

IV. Course Intended Learning Outcomes (CILOs):

Upon successful completion of **Health, Safety and Environment Management** Course, the graduates will be able to:

- a1 - Demonstrate understanding of the health, safety and environment (HSE) legal and behavioral issues and the consequent responsibilities relevant to HSE management practices in the engineering profession.
- a2 - Recognize the dynamically changing HSE practices in increasing complex disciplines of engineering and industrial setup.
- b1 - Design appropriate HSE management systems to improve productivity, quality and overall performance.
- b2 - Develop efficient systems for HSE management based on principles for experience feedback and learning.
- c1 - Apply acquired knowledge on real cases to understand businesses' working environment organization and to master the concept HSE risk in relation to work environment and methods for evaluation.
- c2 - Select methods for HSE systems analysis for a given technical system and reflect on the differences and suitability of the methods.
- d1 - Function effectively as an individual or leader in diverse teams and in multi-disciplinary settings so as to provide practical solutions to HSE problems.
- d2 - Communicate effectively on the impact of HSE solutions on productivity, quality and society at large.

IV. Course Content

A – Theoretical Aspects

Order	Topics List	Week Due	Contact Hours
1	Introduction	Week 1	3
2	Health and Safety	Week 2 - 3	6
3	Environmental Protection and Climate Change	Week 4 - 5	6

IV. Course Content			
A – Theoretical Aspects			
4	HSE Legislative and Regulatory Framework	Week 6	3
5	HSE Management Systems - H&S management systems, ISO 45001	Week 7 - 8	6
6	Midterm Exam	Week 9	3
7	HSE Management Systems - Environmental management systems, ISO 14001	Week 10 - 11	6
8	Integrating HSE into Engineering Projects	Week 12	3
9	HSE Auditing	Week 13	3
10	Case Studies – HSE Approaches for Selected Engineering Projects	Week 14 - 15	6
11	Final Exam	Week 16	3
Number of Weeks and Units Per Semester		16	48

• Practical Aspect NA				
Order	Practical / Tutorials topics	Number of Weeks	Contact Hours	Course ILOs
1				
2				
Number of Weeks /and Contact Hours Per Semester				

• Training/ Tutorials/ Exercises Aspects: NA			
Order	Tutorials/ Exercises	Week Due	Contact Hours
1			
2			
Number of Weeks /and Contact Hours Per Semester			

V. Teaching Strategies:
<ul style="list-style-type: none"> • Formal lectures • Interactive discussions • Group work <ul style="list-style-type: none"> • Presentations

VI. Assessment Methods of the Course:
<ul style="list-style-type: none"> ▪ Group work ▪ Assignments ▪ Presentations ▪ Written Exams

IX. Tasks and Assignments:

No	Assignments/ Tasks	Individual/ Group	Mark	Week Due
1	<ul style="list-style-type: none">• Readings: Each week readings; based on each reading/topic, a written assignment will be issued. Students will be asked to write synthetic essays and/or complete analyses pertaining to the reading materials. These will be short (>4, <5 pages double spaced) pieces.• Each work assigned for reading will have 1 or 2 presenters assigned to it from the class.• In general students will be asked to describe the main points of the paper and to offer a critique of the contents.• Students are expected to prepare for class by reading the assigned reading prior to the class for which they are listed, and to participate in class sessions/group discussions.• By the end of the semester (Week 14), Student Groups will submit their Final Activity Report and deliver a PowerPoint presentation within a plenary session.	Group	20	3-14
Total Score			20	-

XI. Learning Assessment:

No.	Assessment Tasks	Week due	Mark	Proportion of Final Assessment
1	Assignments	3-14	20	20%
2	Mid-Term Exam	9	20	20%
3	Final Exam	16	60	60%
Total			100	100%

VIII Learning Resources and Facilities
1- Required Textbook(s)
<ul style="list-style-type: none"> • Frances Alston and Emily J. Millikin, 'Guide to Environment Safety & Health Management', CRC Press, 2016. • Omar Al-Sakaf, 'Introduction to Industrial Safety', First Edition, 2016.
2- Essential References
<ul style="list-style-type: none"> • Stephen Asbury, 'Health and Safety, Environment and Quality Audits - A Risk-based Approach', 3rd Edition, Routledge-Taylor & Francis Group, 2018. • Iñaki Heras-Saizarbitoria (Editor), 'ISO 9001, ISO 14001, and New Management Standards', Springer, 2018.
3- Electronic Materials and Websites etc.
<ul style="list-style-type: none"> • Course Power Point. • Video clips. • Links to information resources.
Educational and research Facilities and Equipment Required
Technology Resources (AV, data show, Smart Board, software, etc.)
Data Show, Internet Access
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)
-

• الضوابط والسياسات المتبعة في المقرر Course Policies

بعد الرجوع للوائح الجامعة يتم كتابة السياسة العامة للمقرر فيما يتعلق بالآتي:

1	سياسة حضور الفعاليات التعليمية Class Attendance: - يلتزم الطالب بحضور 75% من المحاضرات ويحرم في حال عدم الوفاء بذلك. - يقدم أستاذ المقرر تقريراً بحضور وغياب الطلاب للقسم ويحرم الطالب من دخول الامتحان في حال تجاوز الغياب 25% ويتم اقرار الحرمان من مجلس القسم.
2	الحضور المتأخر Tardy: - يسمح للطالب حضور المحاضرة إذا تأخر لمدة ربع ساعة لثلاث مرات في الفصل الدراسي، وإذا تأخر زيادة عن ثلاث مرات يحذر شفويًا من أستاذ المقرر، وعند عدم الالتزام يمنع من دخول المحاضرة.
3	ضوابط الامتحان Exam Attendance/Punctuality: - لا يسمح للطالب دخول الامتحان النهائي إذا تأخر مقدار (20) دقيقة من بدء الامتحان - إذا تغيب الطالب عن الامتحان النهائي تطبق اللوائح الخاصة بنظام الامتحان في الكلية.
4	التعيينات والمشاريع Assignments & Projects: - يحدد أستاذ المقرر نوع التعيينات في بداية الفصل ويحدد مواعيد تسليمها وضوابط تنفيذ التكاليف وتسليمها. - إذا تأخر الطالب في تسليم التكاليف عن الموعد المحدد يحرم من درجة التكليف الذي تأخر في تسليمه.
5	الغش Cheating: - في حال ثبوت قيام الطالب بالغش في الامتحان النصفى أو النهائي تطبق عليه لائحة شؤون الطلاب. - في حال ثبوت قيام الطالب بالغش أو النقل في التكاليف والمشاريع يحرم من الدرجة المخصصة للتكليف.
6	الانتحال Plagiarism: - في حالة وجود شخص ينتحل شخصية طالب لأداء الامتحان نيابة عنه تطبق اللائحة الخاصة بذلك
7	سياسات أخرى Other policies: - أي سياسات أخرى مثل استخدام الموبايل أو مواعيد تسليم التكاليف الخ