



## 46 Course Specification of Structural Steel Design1

I. Course Identification and General Information:						
1	<b>Course Title:</b>	<i>Structural Steel Design1</i>				
2	<b>Course Code &amp; Number:</b>	CE305				
3	<b>Credit hours:</b>	C.H				<b>Credit Hours</b>
		Th.	Tu.	Pr.	Tr.	
		2	2			3
4	<b>Study level/ semester at which this course is offered:</b>	4th Level/ 1st semester				
5	<b>Pre –requisite (if any):</b>	Strength of Materials, Structural Analysis II				
6	<b>Co –requisite (if any):</b>	-----				
8	<b>Program (s) in which the course is offered:</b>	Civil <b>Engineering</b>				
9	<b>Language of teaching the course:</b>	English				
10	<b>Location of teaching the course:</b>	Class room				
11	<b>Prepared By:</b>	Dr. Sulaiman Ismail Al-Safi				
12	<b>Date of Approval</b>					

II. Course Description:
<p>The course introduces the properties of structural steel as building material, main structural systems of different steel structures, type of loads affecting on steel structures, calculating the amount of loads as well as knowing their path through the structural members. The course is designed to introduce the behavior and design of steel structural members according to the both ASD and LRFD design concepts. At the end of this course, students will understand the behavior and design methods of tension members, compression members, laterally supported flexural members, base plate and bearing plates, design principles of simple bolted and welded connections. In addition, the students are expected to implement their gained knowledge to perform a full analysis and design of lattice structure and to present full details of its members and connections.</p>

Prepared by    Head of Department  
Dr. Abdulkareem  
Yahya Al khattabi

Quality Assurance Unit  
Ass. Prof. Dr. Mohammad  
Algorafi

Dean of the Faculty  
Prof. Dr. Mohammed  
AL-Bukhaiti

Academic Development  
Center & Quality Assurance  
Ass. Prof. Dr.  
Huda Al-Emad

Rector of Sana'a University  
Prof. Dr. Al-Qassim Mohammed Abbas



<b>III. Course Intended learning outcomes (CILOs) of the course</b>		<b>Referenced PILOs</b>
<b>a.1</b>	Recognize the basic concepts of design of steel structures using the latest AISC-360 Specification and utilizing both ASD and LRFD design methods.	<b>A2</b>
<b>a.2</b>	Define suitable structural system for each problem.	<b>A3</b>
<b>a.3</b>	Define the behavior of structural steel members under both ultimate and serviceably loading conditions	<b>A1</b>
<b>b.1</b>	Select a proper structural system and load-combinations for different types steel structures.	<b>B1</b>
<b>b.2</b>	Develop accurate structural modeling of steel structures to analyze all components.	<b>B2</b>
<b>b.3</b>	Demonstrate proficiency in the integration of information and processes in structural steel design	<b>B3</b>
<b>b.4</b>	Consider the economic, social, and environmental issues in structural steel design.	<b>B4</b>
<b>c.1</b>	Design steel structures and their components using latest structural steel specification and code of practice considering all design criteria.	<b>C2</b>
<b>c.2</b>	Apply structural engineering analysis and design techniques to model the load, analyze and design of structural steel members and connections.	<b>C3</b>
<b>c.3</b>	Perform feasibility studies for selecting the proper structural system for steel structures.	<b>C4</b>
<b>d.1</b>	Write project design report including calculation and drawing.	<b>D1</b>

Prepared by Head of Department  
Dr. Abdulkareem  
Yahya Al khattabi

Quality Assurance Unit  
Ass. Prof. Dr. Mohammad  
Algorafi

Dean of the Faculty  
Prof. Dr. Mohammed  
AL-Bukhaiti

Academic Development  
Center & Quality Assurance  
Ass. Prof. Dr.  
Huda Al-Emad

Rector of Sana'a University  
Prof. Dr. Al-Qassim Mohammed Abbas



<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> Recognize the basic concepts of design of steel structures using the latest AISC-360 Specification and utilizing both ASD and LRFD design methods.	Lecture Multimedia Presentations Presentations Tutorial Reading	Problem set- Written exam- Written assignment
<b>a2</b> Define suitable structural system for each problem.	Lecture Individual/group projects Presentations	Project - Written exam- Written assignment
<b>a3</b> Define the behavior of structural steel members under both ultimate and serviceably loading conditions	Lecture Individual/group projects Presentations	Project - Written exam- Written assignment

<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> Select a proper structural system and load-combinations for different types steel structures.	Lecture Multimedia Presentations Presentations Tutorial Reading	Participation- Written assignment-Project
<b>b2-</b> Develop accurate structural modeling of steel structures to analyze all components.	Case study- Tutorial Individual/group projects Presentations	Term Project- Written assignment
<b>b3-</b> Demonstrate proficiency in the integration of information and processes in structural steel design	Presentations Tutorial Case study	Written exam - Project
<b>b4-</b> Consider the economic, social, and environmental issues in structural steel design.	Presentations Tutorial Case study	Written exam - Project

Prepared by Head of Department  
Dr. Abdulkareem  
Yahya Al khattabi

Quality Assurance Unit  
Ass. Prof. Dr. Mohammad  
Algorafi

Dean of the Faculty  
Prof. Dr. Mohammed  
AL-Bukhaiti

Academic Development  
Center & Quality Assurance  
Ass. Prof. Dr.  
Huda Al-Emad

Rector of Sana'a University  
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<b>C Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>c1-</b> Design steel structures and their components using latest structural steel specification and code of practice considering all design criteria.	Lecture Presentations Tutorial Reading Solving problem	Written assignment- Written exam - Project
<b>c2-</b> Apply structural engineering analysis and design techniques to model the load, analyze and design of structural steel members and connections.	Case study- Individual/group projects Presentations Solving problem	Written assignment- Written exam - Project
<b>c3-</b> Perform feasibility studies for selecting the proper structural system for steel structures.	Lecture Presentations Tutorial	Written assignment- Group work

<b>(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1-</b> Write project design report including calculation and drawing.	Case study	d1- project

Prepared by Head of Department  
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Quality Assurance Unit  
Ass. Prof. Dr. Mohammad  
Algorafi

Dean of the Faculty  
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AL-Bukhaiti

Academic Development  
Center & Quality Assurance  
Ass. Prof. Dr.  
Huda Al-Emad

Rector of Sana'a University  
Prof. Dr. Al-Qassim Mohammed Abbas



<b>IV. Course Content:</b>					
<b>A – Theoretical Aspect:</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>
1	Introduction, Systems and Uses, Materials, Design Philosophies	a1-a2-b1-b3-b4	Introduction, Systems and Uses, Materials, Design Philosophies	1	2
2	Manufacturing Process and Classification of Steel Sections, Design Loads, and Load-Combinations	a1-a3-b1- b3-b4-	Manufacturing Process and Classification of Steel Sections, Design Loads, and Load-Combinations	1	2
3	Analysis and Design of Tension Members for All Limit States	a1- a2- b1- b2- b3-c1- c2-c3	Yielding Strength Rupture Strength (including Shear Lag) Block Shear Strength Bearing Strength	3	6
4	Design of Simple Bolted and Welded Connections	a2-b2- b3- c1	Design of Simple Bolted and Welded Connections	2	4
5	Analysis and Design of Compression Members	a1-a2- b1- b2- b3-c1- c2-c3	Analysis and Design of Compression Members	2	4
6	Beam Design for plastics zone	a2-b2- b3-c1	Introduction to Beam Design	2	4
7	Design of Axially Loaded Column Base Plate and End Bearing Plate	a2-b2- b3- c1-c3	Design of Axially Loaded Column Base Plate and End Bearing Plate	2	4
<b>Number of Weeks /and Units Per Semester</b>				<b>14</b>	<b>28</b>

Prepared by Head of Department  
Dr. Abdulkareem  
Yahya Al khattabi

Quality Assurance Unit  
Ass. Prof. Dr. Mohammad  
Algorafi

Dean of the Faculty  
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AL-Bukhaiti

Academic Development  
Center & Quality Assurance  
Ass. Prof. Dr.  
Huda Al-Emad

Rector of Sana'a University  
Prof. Dr. Al-Qassim Mohammed Abbas



<b>B - Tutorial Aspect:</b>				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
1	Loads and Load-Combinations on Steel Structures	1	2	b2- b3- c1- c2
2	Analysis and Design of Tension Members	3	6	a1- a2- b1- b2- b3-c1- c2-d1
3	Design of Simple Bolted and Welded Connections	2	4	a2- b1- b2-b3-c1- c2
4	Analysis and Design of Compression Members	1	2	a2-b2- b3-c1-d1
5	Beam Design for plastics zone	1	2	a2- b2- b3- c1
6	Design of Axially Loaded Column Base Plate and End Bearing Plate	6	12	b2- b3-s c1- c2
<b>Number of Weeks /and Units Per Semester</b>		<b>14</b>	<b>28</b>	

<b>V. Teaching strategies of the course:</b>
Lecture Multimedia Presentations Presentations Tutorial Reading Small group working Independent study Solving problem Individual/group projects Case study-

Prepared by Head of Department  
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Yahya Al khattabi

Quality Assurance Unit  
Ass. Prof. Dr. Mohammad  
Algorafi

Dean of the Faculty  
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AL-Bukhaiti

Academic Development  
Center & Quality Assurance  
Ass. Prof. Dr.  
Huda Al-Emad

Rector of Sana'a University  
Prof. Dr. Al-Qassim Mohammed Abbas



<b>VI. Assignments:</b>				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Loads and Load-Combinations on Steel Structures	a1-b1-b2-b3-c1-c2	3	0.75
2	Analysis and Design of Tension Members	a1-a2-b1-b2-b3-b4	6	1.5
3	Design of Simple Bolted and Welded Connections	a1-b1-b2-b3-c1-c2	8	1.5
4	Analysis and Design of Compression Members	a1-b1-b2-b3-c1-c2	10	1.5
5	Beam Design for plastics zone	a1-b1-b2-b3-c1-c2	11	0.75
6	Design of Axially Loaded Column Base Plate and End Bearing Plate	a2-b12-b3-c1	13	1.5

<b>VII. Schedule of Assessment Tasks for Students During the Semester:</b>					
No	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Written assignment	3-6-8-10-11-12	7.5	5	a1-a2-b1-b2-b3-c1-c3-c2
2	Quizzes.	Twice randomly	7.5	5	b3-c1
3	Mid-term exam.	8th	30	20	a1-a2-a3-b1-b2-b3-c1-c3
4	Final-exam.	During Final Exam-duration	90	60	a1-a2-b1-b2-b3-c1-c3
5	Project	12th	10	10	b1-b2-b3-b4-c1-c2-c3-d1
<b>Sum</b>			<b>100</b>	<b>100%</b>	

Prepared by Head of Department  
Dr. Abdulkareem  
Yahya Al khattabi

Quality Assurance Unit  
Ass. Prof. Dr. Mohammad  
Algorafi

Dean of the Faculty  
Prof. Dr. Mohammed  
AL-Bukhaiti

Academic Development  
Center & Quality Assurance  
Ass. Prof. Dr.  
Huda Al-Emad

Rector of Sana'a University  
Prof. Dr. Al-Qassim Mohammed Abbas



<b>VIII. Learning Resources:</b>	
<ul style="list-style-type: none"> <li>Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).</li> </ul>	
<b>1- Required Textbook(s) (maximum two ).</b>	
	1-Geschwindner L. F., 2016- Unified Design of Steel Structures, 3rd ed,-USA, Create Spa Independent Publishing Platform. 2-S. Al-Safi, 2019 -Structural Steel Design Aids including a-360-16 AISC Specification.
<b>2- Essential References.</b>	
	1- Jack C. McCormac, & Stephen F. Csernak,2012, - Structural Steel Design, 5 <sup>th</sup> edition, 2- American Institute of Steel Construction,,2017 “AISC DESIGN MANUAL OF STEEL CONSTRUCTION” 15 <sup>th</sup> edition,
<b>3- Electronic Materials and Web Sites etc.</b>	
	1-AISC website

Prepared by Head of Department  
Dr. Abdulkareem  
Yahya Al khattabi

Quality Assurance Unit  
Ass. Prof. Dr. Mohammad  
Algorafi

Dean of the Faculty  
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AL-Bukhaiti

Academic Development  
Center & Quality Assurance  
Ass. Prof. Dr.  
Huda Al-Emad

Rector of Sana'a University  
Prof. Dr. Al-Qassim Mohammed Abbas





IX. Course Policies:	
1	<b>Class Attendance:</b> The students should have more than 75 % of attendance according to rules and regulations of the faculty.
2	<b>Tardy:</b> The students should respect the timing of attending the lectures. They should attend within 1 minutes from starting of the lecture.
3	<b>Exam Attendance/Punctuality:</b> The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for midterm exam and final exam.
4	<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.
5	<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 <b>enquiries</b> .
6	<b>Plagiarism:</b> The student will be terminated from the Faculty, if one student attends the exam on another behalf according to the policy, rules and regulations of the university.
7	<b>Other policies:</b> -All the teaching materials should be kept out the examination hall. -The mobile phone is not allowed. -There should be a respect between the student and his teacher.

<b>Reviewed By</b>	<b><u>Vice Dean for Academic Affairs and Post Graduate Studies</u></b> <b><u>Dr. Tarek A. Barakat</u></b> <b><u>Dr. Mohammad Algorafi</u></b>
	<b><u>Deputy Rector for Academic Affairs Dr. Ibrahim AlMutaa</u></b> <b><u>Dr. Ahmed mujahed</u></b> <b><u>Dr. Munaser Alsubri</u></b>

Prepared by Head of Department  
Dr. Abdulkareem  
Yahya Al khattabi

Quality Assurance Unit  
Ass. Prof. Dr. Mohammad  
Algorafi

Dean of the Faculty  
Prof. Dr. Mohammed  
AL-Bukhaiti

Academic Development  
Center & Quality Assurance  
Ass. Prof. Dr.  
Huda Al-Emad

Rector of Sana'a University  
Prof. Dr. Al-Qassim Mohammed Abbas



## Template for Course Plan (Syllabus) of Bridge Engineering

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Sulaiman Al-Safi	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail	alsafi11@hotmail.com			12-2 pm		12-2 pm	

II. Course Identification and General Information:						
1-	Course Title:	<i>Structural Steel Design I</i>				
2-	Course Code & Number:	CE305				
3-	Credit hours:	C.H				Credit Hours
		Th.	Tu.	Pr.	Tr.	
		2	2			3
4-	Study level/ semester at which this course is offered:	4th Level/ 1st semester				
5-	Pre –requisite (if any):	Strength of Materials, Structural Analysis I and Structural Analysis II				
6-	Co –requisite (if any):	-----				
7-	Program (s) in which the course is offered:	Civil <b>Engineering</b>				
8-	Language of teaching the course:	English				
9-	Location of teaching the course:	Class room				
10-	Course Title:	Structural Steel Design I				
11-	Location of teaching the course:	Class				

Prepared by Head of Department  
Dr. Abdulkareem  
Yahya Al khattabi

Quality Assurance Unit  
Ass. Prof. Dr. Mohammad  
Algorafi

Dean of the Faculty  
Prof. Dr. Mohammed  
AL-Bukhaiti

Academic Development  
Center & Quality Assurance  
Ass. Prof. Dr.  
Huda Al-Emad

Rector of Sana'a University  
Prof. Dr. Al-Qassim Mohammed Abbas



### III. Course Description:

The course introduces the properties of structural steel as building material, main structural systems of different steel structures, type of loads affecting on steel structures, and calculating the amount of loads as well as knowing their path through the structural members. The course is designed to introduce the behavior and design of steel structural members according to the both ASD and LRFD design concepts. At the end of this course, students will understand the behavior and design methods of tension members, compression members, laterally supported compact section flexural members, base plate and bearing plates, design principles of simple bolted and welded connections. In addition, the students are expected to implement their gained knowledge to perform a full analysis and design of lattice structure and to present full details of its members and connections.

### IV. Intended learning outcomes (ILOs) of the course:

- Brief summary of the knowledge or skill the course is intended to develop:

- a.1 Recognize the basic concepts of design of steel structures using the latest AISC-360 Specification and utilizing both ASD and LRFD design methods. A2
- a.2 Define suitable structural system for each problem. A3
- a.3 Define the behavior of structural steel members under both ultimate and serviceably loading conditions A1
- b.1 Select a proper structural system and load-combinations for different types steel structures. B1
- b.2 Develop accurate structural modeling of steel structures to analyze all components. B2
- b.3 Demonstrate proficiency in the integration of information and processes in structural steel design B3
- b.4 Consider the economic, social, and environmental issues in structural steel design. B4
- c.1 Design steel structures and their components using latest structural steel specification and code of practice considering all design criteria. C2
- c.2 Apply structural engineering analysis and design techniques to model the load, analyze and design of structural steel members and connections. C3
- c.3 Perform feasibility studies for selecting the proper structural system for steel structures. C4
- d.1 Write project design report including calculation and drawing. D1

Prepared by Head of Department  
Dr. Abdulkareem  
Yahya Al khattabi

Quality Assurance Unit  
Ass. Prof. Dr. Mohammad  
Algorafi

Dean of the Faculty  
Prof. Dr. Mohammed  
AL-Bukhaiti

Academic Development  
Center & Quality Assurance  
Ass. Prof. Dr.  
Huda Al-Emad

Rector of Sana'a University  
Prof. Dr. Al-Qassim Mohammed Abbas



<b>V. Course Content:</b>				
<ul style="list-style-type: none"> <li>Distribution of Semester Weekly Plan Of course Topics/Items and Activities.</li> </ul>				
<b>A – Theoretical Aspect:</b>				
<b>Order</b>	<b>Topics List</b>	<b>Sub Topics List</b>	<b>Week Due</b>	<b>Contact Hours</b>
1	Introduction, Systems and Uses, Materials, Design Philosophies	Introduction, Systems and Uses, Materials, Design Philosophies	1	2
2	Manufacturing Process and Classification of Steel Sections, Design Loads, and Load-Combinations	Manufacturing Process and Classification of Steel Sections, Design Loads, and Load-Combinations	1	2
3	Analysis and Design of Tension Members for All Limit States Design of Simple Bolted and Welded Connections	Yielding Strength Rupture Strength (including Shear Lag) Block Shear Strength Bearing Strength	3	6
4	Design of Simple Bolted and Welded Connections	Design of Simple Bolted and Welded Connections	2	4
5	Midterm Exam		1	2
6	Analysis and Design of Compression Members	Analysis and Design of Compression Members	2	4
7	Beam Design for plastics zone	Beam Design for plastics zone	2	4
8	Design of Axially Loaded Column Base Plate and End Bearing Plate	Design of Axially Loaded Column Base Plate and End Bearing Plate	2	4
9	Final Exam		1	2
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>

Prepared by Head of Department  
Dr. Abdulkareem  
Yahya Al khattabi

Quality Assurance Unit  
Ass. Prof. Dr. Mohammad  
Algorafi

Dean of the Faculty  
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AL-Bukhaiti

Academic Development  
Center & Quality Assurance  
Ass. Prof. Dr.  
Huda Al-Emad

Rector of Sana'a University  
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<b>B - Tutorial Aspect:</b>			
<b>Order</b>	<b>Topics List</b>	<b>Week Due</b>	<b>Contact Hours</b>
1	Loads and Load-Combinations on Steel Structures	1	2
2	Analysis and Design of Tension Members	2,3,4	6
3	Design of Simple Bolted and Welded Connections	5,6	4
4	Analysis and Design of Compression Members	7	2
5	Beam Design for plastics zone	8	2
6	Design of Axially Loaded Column Base Plate and End Bearing Plate	9,10,11,12,13,14	12
<b>Number of Weeks /and Units Per Semester</b>		<b>14</b>	<b>28</b>

<b>VI. Teaching strategies of the course:</b>
Lecture Multimedia Presentations Presentations Tutorial Reading Small group working Independent study

Prepared by Head of Department  
Dr. Abdulkareem  
Yahya Al khattabi

Quality Assurance Unit  
Ass. Prof. Dr. Mohammad  
Algorafi

Dean of the Faculty  
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AL-Bukhaiti

Academic Development  
Center & Quality Assurance  
Ass. Prof. Dr.  
Huda Al-Emad

Rector of Sana'a University  
Prof. Dr. Al-Qassim Mohammed Abbas



<b>VII. Assignments:</b>				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Loads and Load-Combinations on Steel Structures	a1-b1-b2-b3-c1-c2	3	10%
2	Analysis and Design of Tension Members	a1-a2-b1-b2-b3-b4	6	20%
3	Design of Simple Bolted and Welded Connections	a1-b1-b2-b3-c1-c2	8	20%
4	Analysis and Design of Compression Members	a1-b1-b2-b3-c1-c2	10	20%
5	Beam Design for plastics zone	a1-b1-b2-b3-c1-c2	11	10%
6	Design of Axially Loaded Column Base Plate and End Bearing Plate	a2-b12-b3-c1	12	20%

<b>VIII. Schedule of Assessment Tasks for Students During the Semester:</b>				
Assessment	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	Written assignment	3-6-8-10-11-12	5	5
2	Quizzes.	Twice randomly	5	5
3	Mid-term exam.	8 <sup>th</sup>	20	20
4	Final-exam.	During Final Exam-duration	60	60
5	Project	12 <sup>th</sup>	10	10

Prepared by Head of Department  
Dr. Abdulkareem  
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Algorafi

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AL-Bukhaiti

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<b>IX. Learning Resources:</b>
<ul style="list-style-type: none"> <li>• Written in the following order: (Author – Year of publication – Title – Edition – Place of publication – Publisher).</li> </ul>
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AL-Bukhaiti

Academic Development  
Center & Quality Assurance  
Ass. Prof. Dr.  
Huda Al-Emad

Rector of Sana'a University  
Prof. Dr. Al-Qassim Mohammed Abbas



<b>X. Course Policies:</b>	
Unless otherwise stated, the normal course administration policies and rules of the Faculty of Engineering apply. For the policy, see: -----	
1	<b>Class Attendance:</b> The students should have more than 75 % of attendance according to rules and regulations of the faculty.
2	<b>Tardy:</b> The students should respect the timing of attending the lectures. They should attend within 1 minutes from starting of the lecture.
3	<b>Exam Attendance/Punctuality:</b> The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for midterm exam and final exam.
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Rector of Sana'a University  
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