



## 37 Course Specification of Structural Analysis II

I. Course Identification and General Information:						
1	Course Title:	<i>Structural Analysis II</i>				
2	Course Code & Number:	CE208				
3	Credit hours:	C.H				Credit Hours
		Th.	Tu.	Pr.	Tr.	
		2	2			3
4	Study level/ semester at which this course is offered:	3 <sup>rd</sup> Level / 2 <sup>nd</sup> semester				
5	Pre –requisite (if any):	Structural Analysis I(CE201)				
6	Co –requisite (if any):	non				
8	Program (s) in which the course is offered:	Civil <b>Engineering</b>				
9	Language of teaching the course:	English+ Arabic				
10	Location of teaching the course:	Class room				
11	Prepared By:	Dr. Abubaker A. Al-Sakkaf				
12	Date of Approval					

II. Course Description:
<p>This course aims to develop an understanding of structural analysis of different types of classical methods (Slope deflection, moment distribution, and stiffness method) to analyze statically indeterminate structures (beams, frames, trusses). Also, <b>it is intended to identify</b> the proper Analysis method for the problem under consideration. Furthermore, it <b>aims</b> to enable students to carry out new methods to solve indeterminate structures that can be programmed on computers.</p>

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III. Course Intended learning outcomes (CILOs) of the course		Referenc d PILOs
a.1	Recognize the theory of slope deflection, moment distribution, and stiffness methods	A1
a.2	Describe the procedure of analysis of statically indeterminate structures by deferment methods	A3
b.1	Compare between different methods to analyzing indeterminate structures	B1
b.2	Choosing appropriate method to analyze indeterminate structures.	B2
b.3	Demonstrate competence for drawing axil, shear force, and bending moment diagrams for indeterminate structures using appropriate method.	B3
c.1	Analyze different indeterminate structures (beams, frames, and trusses) using slope deflection, moment distribution and stiffness matrix to calculate the internal forces.	C2
c.2	Draw graphs of axial force, shear force, and bending moment diagrams for indeterminate beams and frames	C3

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1- Recognize the theory of slope deflection, moment distribution, and stiffness methods.	Lecture Multimedia Presentations Exercises Reading	Problem set- Written exam- Written assignment
a2- Describe the procedure of analysis of statically indeterminate structures by deferment methods	Lecture Multimedia Presentations Exercises Reading	Problem set- Written exam- Written assignment

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<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> Compare between different methods to analyzing indeterminate structures	Lecture Lecture Multimedia Presentations Exercises Reading	Problem set- Written exam- Written assignment
<b>b2-</b> Choosing appropriate method to analyze indeterminate structures.	Lecture Multimedia Presentations Exercises Reading	Problem set- Written exam- Written assignment
<b>b3-</b> Demonstrate competence for drawing axial, shear force, and bending moment diagrams for indeterminate structures using appropriate method..	Lecture Multimedia Presentations Exercises Reading	Problem set- Written exam- Written assignment

<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> Analyze different indeterminate structures (beams, frames, and trusses) using slope deflection, moment distribution and stiffness matrix to calculate the internal forces.	Lecture Multimedia Presentations Exercises Reading	Problem set- Written exam- Written assignment
<b>c2-</b> Draw graphs of axial force, shear force, and bending moment diagrams for indeterminate beams and frames	Lecture Multimedia Presentations Exercises Reading	Problem set- Written exam- Written assignment

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<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	The slope deflection method for analyzing indeterminate structures.	a1, a2	Displacement methods Slope-deflection equations	2	4
2	Applications of the slope deflection method to analyze indeterminate structures.	a1, a2, b1, b2, b3, c1, c2	Beams, frames	2	4
3	The moment distribution method to analyze indeterminate structures	a1, a2	Principals, Fixed-end moments, Stiffness factor Moment distribution for beams, Stiffness factor modifications	1	2
4	Applications of the moment distribution to analyze indeterminate structures.	a1, a2, b1, b2, b3, c1, c2	Beams, frames	2	4
5	The method of the equation of three moments to analyze indeterminate structures.	a1, a2	Introduction, derivation of equations, settlement of supports	1	2
6	Applications of the method of the equation of three moments to analyze indeterminate structures.	a1, a2, b1, b2, b3, c1, c2	Beams	2	4
7	direct Stiffness method to analyze structures.	a1, a2	Member and node identification	2	4

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			Global and member coordinate, member stiffness matrix, transformation matrix, global and member matrix		
8	Application of direct Stiffness method to analyze structures.	a1, a2, b1, b2, b3, c1, c2	Application of direct Stiffness method to analyze structures.	1	2
9	Review	a1, a2, b1, b2, b3, c1, c2	Review	1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>14</b>	<b>28</b>

<b>B - Tutorial Aspect:</b>				
<b>Order</b>	<b>Tasks/ Experiments</b>	<b>Number of Weeks</b>	<b>contact hours</b>	<b>Learning Outcomes</b>
1	Applications of the slope deflection to analyze indeterminate structures.	4	8	a1, a2, b1, b2, b3, c1, c2
2	Applications of the moment distribution to analyze indeterminate structures.	3	6	a1, a2, b1, b2, b3, c1, c2
3	Applications of the method of the equation of three moments to analyze indeterminate structures.	3	6	a1, a2, b1, b2, b3, c1, c2
4	Application of direct Stiffness method to analyze structures.	3	6	a1, a2, b1, b2, b3, c1, c2
5	Review	1	2	
<b>Number of Weeks /and Units Per Semester</b>		<b>14</b>	<b>28</b>	

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<b>V. Teaching strategies of the course:</b>	
Lecture	
Multimedia Presentations	
Exercises	
Reading	

<b>VI. Assignments:</b>				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Applications of the slope deflection method to analyze indeterminate structures.	a1, a2, b1, b2, b3, c1, c2	3	2.5
2	Applications of the moment distribution method to analyze indeterminate structures.	a1, a2, b1, b2, b3, c1, c2	6	2.5
3	Applications of the method of the equation of three moments to analyze indeterminate structures.	a1, a2, b1, b2, b3, c1, c2	9	2.5
4	Application of direct Stiffness method to analyze structures.	a1, a2, b1, b2, b3, c1, c2	12	3

<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	3,6,9,12	10.5	7	a1,a2,b1,b2,b3,c1,c2
2	Participate	All week	4.5	3	b1,b2
3	Mid-term exam.	7th	30	20	a1,a2,b1,b2,b3,c1,c2
4	Final-exam.	14	105	70	a1,a2,b1,b2,b3,c1,c2
	<b>Sum</b>		<b>150</b>	<b>100%</b>	

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<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- R.C. Hibbeler, , Structural Analysis, 8 <sup>th</sup> Edition, 2012,
<b>2- Essential References.</b>	
	W.M.C. McKenzie, Examples in Structural Analysis, 2006
<b>3- Electronic Materials and Web Sites etc.</b>	

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IX. Course Policies:	
1	<p><b>Class Attendance:</b> The students should have more than 75 % of attendance according to rules and regulations of the engineering faculty.</p>
2	<p><b>Tardy:</b> The students should respect the timing of attending the lectures. They should attend within 1 minutes from starting of the lecture.</p>
3	<p><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.</p>
4	<p><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.</p>
5	<p><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>.</p>
6	<p><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.</p>
7	<p><b>Other policies:</b></p> <ul style="list-style-type: none"> <li>- All the teaching materials should be kept out of the examination hall.</li> <li>- Cellular phone or alike devices are not allowed into the examination hall.</li> <li>- There should be a respect between the student and his teacher.</li> </ul>

<b>Reviewed By</b>	<p><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></p>
	<p><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></p>

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## Template for Course Plan (Syllabus) of Structural Analysis II

I. Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Abubaker A. Al-Sakkaf	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>	Faculty, 777455428	SAT	SUN	MON	TUE	WED	THU
<b>E-mail</b>					10-12		

II. Course Identification and General Information:						
1	<b>Course Title:</b>	<i>Structural Analysis II</i>				
2-	<b>Course Number &amp; Code:</b>	CE208				
3-	<b>Credit hours:</b>	<b>C.H</b>				<b>Credit Hours</b>
		Th.	Tu.	Pr.	Tr.	
		2	2			3
4-	<b>Study level/year at which this course is offered:</b>	3 <sup>rd</sup> Level/ 2 <sup>nd</sup> semester				
5-	<b>Pre –requisite (if any):</b>	Structural Analysis (CE201)				
6-	<b>Co –requisite (if any):</b>	Non				
7-	<b>Program (s) in which the course is offered</b>	Civil Engineering				
8-	<b>Language of teaching the course:</b>	English+ Arabic				
9-	<b>System of Study:</b>	Regular				
10-	<b>Mode of delivery:</b>	Lecture				
11-	<b>Location of teaching the course:</b>	Class				

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### III. Course Description:

This course aims to develop an understanding of structural analysis of different types of classical methods (Slope deflection, moment distribution, and stiffness method) to analyze statically indeterminate structures (beams, frames, trusses). Also, **it is intended to identify** the proper Analysis method for the problem under consideration. Furthermore, it **aims** to enable students to carry out new methods to solve indeterminate structures that can be programmed on computers.

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

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

**a1-** Recognize the theory of slope deflection, moment distribution, and stiffness methods. A1

**a2-** Describe the procedure of analysis of statically indeterminate structures by deferment methods. A3

**b1-** Compare between different methods to analyzing indeterminate structures. B1

**b2-** **Choose** appropriate method to analyze indeterminate structures. B2

**b3-** Demonstrate competence for drawing axil, shear force, and bending moment diagrams for indeterminate structures using appropriate method. B3

**c1-** Analyze different indeterminate structures (beams, frames, and trusses) using slope deflection, moment distribution and stiffness matrix to calculate the internal forces. C 2

**c2-** Draw graphs of axial force, shear force, and bending moment diagrams for indeterminate beams and frames. C3

### V. Course Content:

• **Distribution of Semester Weekly Plan Of course Topics/Items and Activities.**

#### A – Theoretical Aspect:

Order	Topics List	Sub Topics List	Week Due	Contact Hours
1	The slope deflection method to analyze indeterminate structures	Displacement methods Slope-deflection equations	1,2	4
2	Applications of the slope deflection method to	Beams, frames	3,4	4

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	analyze indeterminate structures.			
3	The moment distribution method to analyze indeterminate structures.	Principals, Fixed-end moments, Stiffness factor Moment distribution for beams, Stiffness factor modifications	5	2
4	Applications of the moment distribution to analyze indeterminate structures.	Beams, frames	6,7	4
5	Midterm Exam		8	2
6	The method of the equation of three moments to analyze indeterminate structures.	Introduction, derivation of equations, settlement of supports	9	2
7	Applications of the method of the equation of three moments to analyze indeterminate structures.	Beams	10,11	4
8	The direct Stiffness method to analyze structures.	Member and node identification Global and member coordinate, member stiffness matrix, transformation matrix, global and member matrix	12,13	4
9	Application of direct Stiffness method to analyze structures.	Application of direct Stiffness method to analyze structures.	14	2
10	Review	Review	15	2
11	Final Exam		16	2

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<b>Number of Weeks /and Units Per Semester</b>	<b>16</b>	<b>32</b>
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<b>B - Tutorial Aspect:</b>			
Order	Topics List	Week Due	Contact Hours
1	Applications of the slope deflection method to analyze indeterminate structures.	1,2,3,4	8
2	Applications of the moment distribution to analyze indeterminate structures.	5,6,7	6
3	Applications of the method of the equation of three moments to analyze indeterminate structures.	8,9,10	6
4	Application of direct Stiffness method to analyze structures.	11,12,13	6
5	Review	14	2
<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 Exercises Reading

<b>VII. Assignments:</b>				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mar k
1	Applications of the slope deflection to analyze indeterminate structures.	a1,a2,b1,b2,b3,c1,c 2	3	2.5
2	Applications of the moment distribution to analyze indeterminate structures.	a1,a2,b1,b2,b3,c1,c 2	6	2.5

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3	Applications of the method of the equation of three moments to analyze indeterminate structures.	a1,a2,b1,b2,b3,c1,c 2	9	2.5
4	Application of direct Stiffness method to analyze structures.	a1,a2,b1,b2,b3,c1,c 2	12	3

### VIII. Schedule of Assessment Tasks for Students During the Semester:

Assessment	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	Written assignment	3,6,9,12	10.5	7
2	Participate	All week	4.5	3
3	Mid-term exam.	7th	30	20
4	Final-exam.	----	105	70
	<b>Sum</b>		<b>150</b>	<b>100%</b>

### IX. Learning Resources:

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

#### 1- Required Textbook(s) ( maximum two ).

1- R.C. Hibbeler, , Structural Analysis, 8<sup>th</sup> Edition, 2012,

#### 2- Essential References.

W.M.C. McKenzie, Examples in Structural Analysis, 2006

#### 3- Electronic Materials and Web Sites *etc.*

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<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 engineering 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 the rules and regulations of the engineering 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 he/she attends the exam on another student behalf according to the policy, rules and regulations of the university.
7	<b>Other policies:</b> - All the teaching materials should be kept out of the examination hall. - Cellular phone or alike devices are not allowed into the examination hall. - There should be a respect between the student and his teacher.

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