30Course Specification of Structural Analysis I

I. Course Identification and General Information:						
1	**Course Title:**	***Structural Analysis I***				
2	**Course Code & Number:**	CE201				
3	**Credit hours:**	C.H				**Credit Hours**
		Th.	**Tu.**	**Pr.**	**Tr.**	
		2	2			3
4	**Study level/ semester at which this course is offered:**	3rd Level 1st semester				
5	**Pre –requisite (if any):**	Strength of Materials (CE108)				
6	**Co –requisite (if any):**	Non				
8	**Program (s) in which the course is offered:**	Civil Engineering				
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**					

Prepared by	Head of Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
	Dr. Abdulkareem Yahya Al khattabi	Ass. Prof. Dr. Mohammad Algorafi	Prof. Dr. Mohammed AL-Bukhaiti	Ass. Prof. Dr. Huda Al-Emad

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II. Course Description:

This course aims to develop an understanding of how structural elements behave under different type of loadings and how they deform. Also, it explains the classical methods of calculating the deformations of real structures. Furthermore, it is to prepare students to handle more advanced structural analysis methods.

III. Course Intended learning outcomes (CILOs) of the course		Reference PILOs
a.1	Recognize classical and virtual work methods for computing structural deflections.	**A1**
a.2	Show deflections procedure of different type of structures	**A3**
b.1	Demonstrate competence how to select the classical and virtual work methods to determine structural deflections	**B1**
b.2	Demonstrate competence calculating structural deflections using classical and virtual work methods	**B2**
c.3	Calculate deflections of determine structural using classical and virtual work methods	**C2**
c.1	Draw the influence lines for simple and continuous beam	**C2**
c.2	Draw graphs of moment and shear force continuous beam	**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 classical and virtual work methods for computing structural deflections.	Lecture Multimedia Presentations Exercises Reading	Problem set- Written exam- Written assignment
a2- Show deflections procedure of different type of structures	Lecture Multimedia Presentations Exercises Reading	Problem set- Written exam- Written assignment

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1- Demonstrate competence how to select the classical and virtual work methods to determine structural deflections	Lecture Multimedia Presentations Exercises Reading	Problem set- Written exam- Written assignment
b2- Demonstrate competence calculating structural deflections using classical and virtual work methods	Lecture Multimedia Presentations Exercises Reading	Problem set- Written exam- Written assignment

C Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1- Draw the influence lines for simple and continuous beam	Lecture Multimedia Presentations Exercises Reading	Problem set- Written exam- Written assignment
c2- Draw graphs of moment and shear force continuous beam	Lecture Multimedia Presentations Exercises Reading	Problem set- Written exam- Written assignment
c3- Calculate deflections of determine structural using classical and virtual work methods	Lecture Multimedia Presentations Exercises	Problem set- Written exam- Written assignment

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	Reading	

IV. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	The double integration method	a1, a2	Elastic –Beam theory	1	2
2	Applications to the double integration method.	b2, c3, c1, c2	Cantilevers and simple beams	1	2
3	The moment-area theorems	a1, a2	The moment-area theorems	1	2
4	Applications to the moment-area theorems.	b1, b2, c3, c1, c2	Cantilever beams	1	2
5	The conjugate beam method.	a1, a2	Theorem1, 2	1	2
6	Applications to conjugate beam method.	b1, b2, c3, c1, c2	Beams	1	2
7	The method of virtual work	a1, a2	External work and strain energy Principal of virtual work for truss, beams, and frames	1	2
8	The method of virtual work	a1, a2	External work and strain energy Principal of virtual work for truss, beams, and frames	1	2
9	Application of virtual work to trusses, beams, and frames.	b1, b2, c3, c1, c2	Trusses, beams, frames	2	4
10	Maxwell's theorem of reciprocal deflections	b1, b2	Background and applications	1	2
11	Construct influence lines for simple and continuous beam	a1, a2	Moving load	1	2
12	Application of construct influence lines for simple and continuous beam	a1, b1, b2, c3, c1, c2	Simple beams, continuous beams	2	4
Number of Weeks /and Units Per Semester				**14**	**28**

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B - Tutorial Aspect:				
Order	**Tasks/ Experiments**	**Number of Weeks**	**contact hours**	**Learning Outcomes**
1	Applications to the double integration method.	2	4	b1, b2, c3, c1, c2
2	Applications to moment-area theorems	2	4	b1, b2, c3, c1, c2
3	Applications to conjugate beam method.	2	4	a1, a2, b1, b2, c3, c1, c2
4	Application of virtual work to trusses, beams, and frames.	4	8	b1, b2, c3, c1, c2
5	Applications of Maxwell's theorem of reciprocal deflections	1	2	b1, b2, c3, c1, c2
6	Construct influence lines for simple and continuous beam	2	4	b1, b2, c3, c1, c2
7	Review	1	2	
Number of Weeks /and Units Per Semester		**14**	**28**	

V. Teaching strategies of the course:

Lecture
Multimedia Presentations
Exercises
Reading

VI. Assignments:

No	**Assignments**	**Aligned CILOs(symbols)**	**Week Due**	**Mark**
1	Applications to the double integration method.	b1,b2,c3,c1,c2	2	1.75
2	Applications to the moment-area theorems	b1,b2,c3,c1,c2	4	1.75
3	Applications to conjugate beam method.	b1,b2,c3,c1,c2	6	1.75
4	Application of virtual work to trusses, beams, and frames.	a1,a2,b1,b2,c3	8	1.75

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

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5	Applications of Maxwell's theorem of reciprocal deflections	a1,a2,b1,b2,c3	10	1.75
6	Construct influence lines for simple and continuous beam.	b1,b2,c3,c1,c2	13	1.75

VII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Written assignment	2,3,5,7,9,11,13	10.5	7	a1,a2,b1,b2,c3,c1,c2
2	Participate		4.5	3	b1,b2
3	Mid-term exam.	8th	30	20	c1,c2
4	Final-exam.	--	105	70	c1,c2
	Sum		**150**	**100%**	

VIII. 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, 8th Edition, 2012,

2- Essential References.

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

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IX. Course Policies:	
1	**Class Attendance:** The students should have more than 75 % of attendance according to rules and regulations of the engineering faculty.
2	**Tardy:** The students should respect the timing of attending the lectures. They should attend within 1 minutes from starting of the lecture.
3	**Exam Attendance/Punctuality:** 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	**Assignments & Projects**: The assignment is given to the students after each chapter, the student has to submit all the assignments for checking on time.
5	**Cheating:** If any cheating occurred during the examination, the student is not allowed to continue and he/she has to face the examination committee for enquiries.
6	**Plagiarism:** 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	**Other policies**: - 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.

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

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Template for Course Plan (Syllabus) of Structural Analysis I

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

II. Course Identification and General Information:						
1	**Course Title:**	***Structural Analysis I***				
2-	**Course Number & Code:**	CE201				
3-	**Credit hours:**	**C.H**				**Credit Hours**
		Th.	**Tu.**	**Pr.**	**Tr.**	
		2	2			3
4-	**Study level/year at which this course is offered:**	3rd Level 1st semester				
5-	**Pre –requisite (if any):**	Strength of Materials (CE108)				
6-	**Co –requisite (if any):**	Non				
7-	**Program (s) in which the course is offered**	Civil Engineering				
8-	**Language of teaching the course:**	English+ Arabic				
9-	**System of Study:**	Regular				
10-	**Mode of delivery:**	Lecture				
11-	**Location of teaching the course:**	Class				

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III. Course Description:

This course aims to develop an understanding of how structural elements behave
r different type of loadings and how they deform. Also, it explains the classical methods
lculating the deformations of real structures. Furthermore, it is to prepare students to
le more advanced structural analysis methods.

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

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

a.1- Recognize classical and virtual work methods for computing structural deflections. A1
a.2- Show deflections procedure of different type of structures. A3
b.1- Demonstrate competence how to select the classical and virtual work methods to determine
structural deflections. B1
b.2- Demonstrate competence calculating structural deflections using classical and virtual work
methods. B2
c.3- Calculate deflections of determine structural using classical and virtual work methods. C2
c.1- Draw the influence lines for simple and continuous beam. C 2
c.2- Draw graphs of moment and shear force continuous beam. C3

V. Course Content:

- Distribution of Semester Weekly Plan of Course Topics/Items and Activities.

A – Theoretical Aspect:

Order	Topics List		Week Due	Contact Hours
1	The double integration method	Elastic –Beam theory	1	2
2	Applications to the double integration method.	Cantilevers and simple beams	2	2
3	The moment-area theorems	The moment-area theorems	3	2

V. Course Content:

- Distribution of Semester Weekly Plan of Course Topics/Items and Activities.

A – Theoretical Aspect:

Order	Topics List		Week Due	Contact Hours
4	Applications to the moment-area theorems.	Cantilever beams	4	2
5	The conjugate beam method.	Theorem1, 2	5	2
6	Applications to conjugate beam method.	Beams	6	2
7	The method of virtual work	External work and strain energy Principal of virtual work for truss, beams, and frames	7	2
8	Midterm test		8	2
9	Application of virtual work to trusses, beams, and frames	External work and strain energy Principal of virtual work for truss, beams, and frames	9,10	4
10	Maxwell's theorem of reciprocal deflections	Trusses, beams, frames	11	2
11	Construct influence lines for simple and continuous beam	Background and applications	12	2
12	Application of Construct influence lines for simple and continuous beam	Moving load	13,14	4
13	Review	Simple beams, continuous beams	15	2
14	Final Exam.		16	2
Number of Weeks /and Units Per Semester			**16**	**32**

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B - Tutorial Aspect:			
Order	**Topics List**	**Week Due**	**Contact Hours**
1	Applications to the double integration method.	1,2	4
2	Applications to the moment-area theorems.	3,4	4
3	Applications to conjugate beam method.	5,6	4
4	Application of virtual work to trusses, beams, and frames.	7,9	6
5	Applications of Maxwell's theorem of reciprocal deflections	10	2
6	Construct influence lines for simple and continuous beam	11,13	6
7	Review	14	2
Number of Weeks /and Units Per Semester		**14**	**28**

VI. Teaching strategies of the course:

Lecture
Multimedia Presentations
Exercises
Reading

VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Applications to the double integration method.	b1,b2,c3,c1,c2	2	1.75
2	Applications to the moment-area theorems.	b1,b2,c3,c1,c2	4	1.75
3	Applications to conjugate beam method.	b1,b2,c3,c1,c2	6	1.75
4	Application of virtual work to trusses, beams, and frames.	a1,a2,b1,b2,c3	8	1.75
5	Applications of Maxwell's theorem of reciprocal deflections	a1,a2,b1,b2,c3	10	1.75
6	Construct influence lines for simple and continuous beam.	b1,b2,c3,c1,c2	13	15%

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	2,3,5,7,9,11,13	10.5	7
2	Participate		4.5	3
3	Mid-term exam.	8	30	20
4	Final-exam.	--	105	70
	Total		**150**	**100%**

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, 8th Edition, 2012,

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X. Course Policies:	
Unless otherwise stated, the normal course administration policies and rules of the Faculty of Engineering apply. For the policy, see: ----------	
1	**Class Attendance:** The students should have more than 75 % of attendance according to rules and regulations of the engineering faculty.
2	**Tardy:** The students should respect the timing of attending the lectures. They should attend within 1 minutes from starting of the lecture.
3	**Exam Attendance/Punctuality:** 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.
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