



Course Specification of Foundation Engineering 1

I. Course Identification and General Information:						
1	Course Title:	<i>Foundation Engineering 1</i>				
2	Course Code & Number:	CE307				
3	Credit hours:	C.H				Credit Hours
		Th.	Tu.	Pr.	Tr.	
		3	2			4
4	Study level/ semester at which this course is offered:	4th Level/ 2 nd semester				
5	Pre –requisite (if any):	Soil Mechanics 2				
6	Co –requisite (if any):	-----				
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. Ziyad ALgboby &En. Saddam ALhadama				
12	Date of Approval					

II. Course Description:
<p>This course considered one of the most important courses in the major of geotechnical Engineering, special in structure related to the foundation engineering. This course provides the student with knowledge of soil exploration methods, field tests, and gives the student the ability to calculate the bearing capacity of soil and rocks by theoretical methods or directly from the results of field tests. Furthermore, calculate the expected decline of surface foundations. Also, provides the student with knowledge of the types of surface foundations and their use cases. It also enables the student skills to analyze and design all types of shallow foundations, and helps the student to acquire the skill of analysis and design for the foundations using the computer.</p> <p>This course taught through lectures, presentations, practical experiences, homework's, and discussion. The student evaluated through short exams, midterm and final exams, as well as other homework's, from research, and field visits.</p>

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III. Course Intended learning outcomes (CILOs) of the course		Referenc d PILOs
a.1	Determines the basics of analysis and design for all types of shallow foundations, explains methods for site exploration and field tests, and lists theories of calculating bearing capacity of soil.	A1
a.2	Identify how analyses, and design the different types of shallow foundations.	A3
a.3	Show the impact of environmental, and safety in determine and design the shallow foundations.	A4
b.1	Analyzes all types of shallow foundations and explain the results of the analysis.	B1
b.2	Develop appropriate mathematical equations for analyzing and design the different of shallow foundations.	B2
b.3	Demonstrate proficiency in the integration of information and processes in design all types of shallow foundations.	B3
b.4	Consider the economic, social, and environmental issues in shallow foundation design.	B4
c.1	Design the shallow foundations using code of practice considering all design criteria.	C2
c.2	Use techniques to analyze and design of shallow foundations.	C3
c.3	Perform feasibility studies for deciding shallow foundations type.	C4
d.1	Write project report including calculation and drawing.	D1

(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- Determines the basics of analysis and design for all types of shallow foundations, explains methods for site exploration and	Lecture Multimedia Presentations Presentations	Problem set- Written exam- Written assignment



field tests, and lists theories of calculating bearing capacity of soil.	Tutorial Reading	
a2- Identify how analyses, and design the different types of shallow foundations.	Lecture Individual/group projects Presentations	Project - Written exam- Written assignment
a3- Show the impact of environmental, and safety in determine and design the shallow foundations.	Lecture Individual/group projects Presentations	Project - 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- Analyzes all types of shallow foundations and explain the results of the analysis.	Lecture Multimedia Presentations Presentations Tutorial Reading	Participation- Written assignment-Project
b2- Develop appropriate mathematical equations for analyzing and design the different of shallow foundations.	Case study- Tutorial Individual/group projects Presentations	Project- Written assignment
b3- Demonstrate proficiency in the integration of information and processes in design all types of shallow foundations.	Presentations Tutorial	Written exam - Project
b4- Consider the economic, social, and environmental issues in shallow foundation design.	Presentations Tutorial Case study	Written exam - Project



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- Design the shallow foundations using code of practice considering all design criteria.	Lecture Presentations Tutorial Reading	Written assignment-Written exam -Project
c2- Use techniques to analyze and design of shallow foundations.	Case study- Individual/group projects Presentations	Written assignment-Written exam -Project
c3- Perform feasibility studies for deciding shallow foundations type.	Lecture Presentations Tutorial	Written assignment- Group work

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

IV. Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Soil exploration	a1, d1	<ul style="list-style-type: none"> •The Purpose of soil exploration • Soil exploration Program • Defining the boring. • Exploratory Borings in the Field • Number of Borings. • Depths of Borings 	2	6

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			<ul style="list-style-type: none"> • Disturbed and undisturbed samples. • Degree of disturbance. • Methods of taking. laboratory tests for each species as following: <ul style="list-style-type: none"> • Sampling tools • SPT Test • CPT Test • FVST test • BST test • DMT test • PMT Test • Rock coring. • Writing Exploration Report 		
2	Bearing Capacity	a1, a3, b1, b3, b4, c1, c3	<ul style="list-style-type: none"> • Definition of soil bearing capacity • Nature of bearing capacity failure in soil • Bearing capacity Equations. • Calculating soil bearing capacity with theories of Terzaghi', Meyerhof, Hansen, and Vesic • Bearing capacity for foundations subjected to moments. • Effect of groundwater on soil bearing capacity. • Bearing Capacity of Layered Soils. • Bearing Capacity of Foundations in slope. • Bearing Capacity from: SPT test, CPT, loading plate. • Bearing capacity of rock 	3	9
3	Stress of soil & Settlement	a1, a3, b1, b3, b4, c1, c3	<ul style="list-style-type: none"> • Calculation of vertical increase Stress (Concentrated Load, Circularly Loaded Area, and below Rectangular Area). 	2	3



			• Elastic settlement (STEINBRENNER, SCHMERTMANN)		
4	Shallow foundations.	a2, b1, b2, b3, c1, c2	<ul style="list-style-type: none"> •Types of Shallow footings and their uses. • Analysis and design of Isolated foundations. • Analysis and design of Isolated footings with eccentricities. • Analysis and design of strip footing. • Analysis and design of combined footings (Rectangular & Trapezoidal). •Analysis and Design strap beam. • Analysis and design of Mat Foundations. 	6	18
5	Mat foundation modeling	a2, b1, b2, b3, c1, c2	Analysis and design of Mat Foundations Using safe program	1	3
Number of Weeks /and Units Per Semester				14	42

B - Tutorial Aspect:				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
1	Calculation the bearing capacity	2	4	b2- b3- c1- c2
2	calculation of vertical increase Stress and settlement calculation	2	4	a1- a2- b1- b2- b3-c1- c2
3	Analysis and design of Isolated footing.	2	4	a2- b1- b2-b3-c1- c2
4	Analysis and design of combined footing.	2	4	a2- b1- b2-b3-c1- c2
5	Analysis and design of strap beam.	2	4	a2- b1- b2-b3-c1- c2

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6	Analysis and design of Mat Foundations.	4	8	a2- b1- b2-b3-c1- c2
Number of Weeks /and Units Per Semester		14	28	

V. Teaching strategies of the course:

Lecture
 Multimedia Presentations
 Presentations
 Tutorial
 Reading
 Small group working
 Independent study
 Case study

VI. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Boring sample and calculate the level of foundation.	a1-b1-b2-b3-c1-c2	2	1.5
2	Calculation of bearing capacity by different theories and make compare.	a1-a2-b1-bc2-b3-b4	4	1.5
3	Calculation of bearing capacity from SPT test.	a1-b1-b2-b3-c1-c2	6	1.5
4	design of Isolated footing	a1-b1-b2-b3-c1-c2	8	1.5
5	design of combined footing	a1-b1-b2-b3-c1-c2	9	1.5
6	design of strap beam	a1-b1-b2-b3-c1-c2	12	1.5
7	Design of mat foundation	a1-b1-b2-b3-c1-c2	13	1

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	2,4,6,8,9,12,13	10	5	a1-a2-b1-b2-b3-c1-c3



2	Quizzes.	two time randomly	10	5	b3-c1
3	Mid-term exam.	7th	40	20	a1-a2-b1-b2-b3-c1-c3
4	Final-exam.	16th	120	60	a1-a2-b1-b2-b3-c1-c3
5	Project	15th	20	10	b1-b2-b3-b4-c1-c2-c3-d1
	Sum		200	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. Joseph Bowles, (2002), Foundation Analysis and Design, Fifth edition.
2. Braja Das, (2011), Principals of Foundation Engineering, Seventh edition.

2- Essential References.

- Foundation Analysis and Design, Kumar

3- Electronic Materials and Web Sites etc.

- safe manual

IX. Course Policies:

1	Class Attendance: The students should have more than 75 % of attendance according to rules and regulations of the 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 rules and regulations of the 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 enquires.



6	<p>Plagiarism: 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.</p>
7	<p>Other policies: -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.</p>

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



Template for Course Plan (Syllabus) of Foundation Engineering 1

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Ziyad algboby	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail				8-10			

II. Course Identification and General Information:						
1-	Course Title:	<i>Foundation Engineering 1</i>				
2-	Course Number & Code:	CE 307				
3-	Credit hours:	C.H				Credit Hours
		Th.	Tu.	Pr.	Tr.	
		3	2			4
4-	Study level/year at which this course is offered:	4th Level/ 2nd semester				
5-	Pre –requisite (if any):	Soil Mechanics 2				
6-	Co –requisite (if any):	-----				
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				



III. Course Description:

This course considered one of the most important courses in the major of geotechnical Engineering, special in structure related to the foundation engineering. This course provides the student with knowledge of soil exploration methods, field tests, and gives the student the ability to calculate the bearing capacity soil and rocks by theoretical methods or directly from the results of field tests. Furthermore, calculate the expected decline of surface foundations. Also, provides the student with knowledge of the types of surface foundations and their use cases. It also enables the student skills to analyze and design all types of shallow foundations, and helps the student to acquire the skill of analysis and design for the foundations using the computer.

This course taught through lectures, presentations, practical experiences, homework's, and discussion. The student evaluated through short exams, midterm and final exams, as well as other homework's, from research, and field visits.

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

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

a.1 Determines the basics of analysis and design for all types of shallow foundations, explains methods for site exploration and field tests, and lists theories of calculating bearing capacity of soil.

A1

a.2 Identify how analyses, and design the different types of shallow foundations. A3

a.3 Show the impact of environmental, and safety in determine and design the shallow foundations.

A4

b.1 Analyzes all types of shallow foundations and explain the results of the analysis. B1

b.2 Develop appropriate mathematical equations for analyzing and design the different of shallow foundations. B2

b.3 Demonstrate proficiency in the integration of information and processes in design all types of shallow foundations. B3

b.4 Consider the economic, social, and environmental issues in shallow foundation design. B4

c.1 Design the shallow foundations using code of practice considering all design criteria. C2

c.2 Use techniques to analyze and design of shallow foundations. C3

c.3 Perform feasibility studies for deciding shallow foundations type. C4

d.1 Write project report including calculation and drawing. D1



V. Course Content:				
<ul style="list-style-type: none"> 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	Soil exploration	<ul style="list-style-type: none"> The Purpose of soil exploration Soil exploration Program defining the boring. exploratory borings in the field number of Borings. Depths of Borings Disturbed and undisturbed samples. Degree of disturbance. Methods of taking. laboratory tests for each species as following: •Sampling tools •SPT Test •CPT Test •FVST test •BST test •DMT test •PMT Test •Rock coring. •Writing Exploration Report 	1,2	6
2	Bearing Capacity	<ul style="list-style-type: none"> Definition of soil bearing capacity Nature of bearing capacity failure in soil Bearing capacity Equations. Calculating soil bearing capacity with theories of Terzaghi', Meyerhof, Hansen, and Vesic Bearing capacity for foundations subjected to moments. 	3,4,5	9

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		<ul style="list-style-type: none"> • Effect of groundwater on soil bearing capacity. • Bearing Capacity of Layered Soils. • Bearing Capacity of Foundations in slope. • Bearing Capacity from: SPT test, CPT, loading plate. • Bearing capacity of rock 		
3	Stress of soil & Settlement	<ul style="list-style-type: none"> • Calculation of vertical increase Stress (Concentrated Load, Circularly Loaded Area, and below Rectangular Area). • Elastic settlement (STEINBRENNER, SCHMERTMANN) 	6,7	6
4	Midterm Exam		8	3
5	Shallow foundations.	<ul style="list-style-type: none"> •Types of Shallow footings and their uses. • Analysis and design of Isolated foundations. • Analysis and design of Isolated footings with eccentricities. • Analysis and design of strip footing. • Analysis and design of combined footings (Rectangular & Trapezoidal). •Analysis and Design strap beam. • Analysis and design of Mat Foundations. 	9,10,11,12,13,14	18
6	Mat foundation modeling	Analysis and design of Mat Foundations Using safe program	15	3
7	Final Exam		16	3
Number of Weeks /and Units Per Semester			16	48



B - Tutorial Aspect:			
Order	Topics List	Week Due	Contact Hours
1	Calculation the bearing capacity	1,2	4
2	calculation of vertical increase Stress and settlement calculation	3,4	4
3	Analysis and design of Isolated footing.	5,6	4
4	Analysis and design of combined footing.	7,8	4
5	Analysis and design of strap beam.	9,10	4
6	Analysis and design of Mat Foundations.	11,12,13,14	8
Number of Weeks /and Units Per Semester		14	28

VI. Teaching strategies of the course:
Lecture Multimedia Presentations Presentations Tutorial Reading Small group working Independent study Case study



VII. Assignments:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Boring sample and calculate the level of foundation.	a1-b1-b2-b3-c1-c2	2	1.5
2	Calculation of bearing capacity by different theories and make compare.	a1-a2-b1-bc2-b3-b4	4	1.5
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6	design of strap beam	a1-b1-b2-b3-c1-c2	12	1.5
7	Design of mat foundation	a1-b1-b2-b3-c1-c2	13	1

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	2,4,6,8,9, 12,13	10	5
2	Quizzes.	two time randomly	10	5
3	Mid-term exam.	7th	40	20
4	Final-exam.	16th	120	60
5	Project	15th	20	10

IX. Learning Resources:
<ul style="list-style-type: none"> Written in the following order: (Author – Year of publication – Title – Edition – Place of publication – Publisher).
1- Required Textbook(s) (maximum two).
1- Joseph Bowles, (2002), Foundation Analysis and Design, Fifth edition . 2- Braja Das, (2011), Principals of Foundation Engineering, Seventh edition.
2- Essential References.

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- Foundation Analysis and Design, Kumar
3- Electronic Materials and Web Sites etc.
- safe manual

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 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 rules and regulations of the 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 enquires.
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