35Course Specification of Construction Methods and Equipment

1- **Course Identification and General Information:**							
1	**Course Title:**	***Construction Methods and Equipment***					
2	**Course Code & Number:**	CE207					
3	**Credit hours:**	C.H					**Credit Hours**
		Th.	**Tu.**	**Pr.**	**Tr.**		
		2					2
4	**Study level/ semester at which this course is offered:**	3rd Level / 1st semester					
5	**Pre –requisite (if any):**	Soil Mechanics 1, Surveying 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:**	Classroom					
11	**Prepared By:**	Dr. Tarek A. Barakat					
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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2- Course Description:

This course introduces students to construction equipment and selected construction methods. This includes economy, selection, and productivity of common construction equipment and construction procedures for industrial and heavy civil construction. This would enable graduating students to plan the efficient use of equipment and methods in various construction projects.

3- Course Intended learning outcomes (CILOs) of the course		Referenced PILOs
a.1	Define the construction process and the various types of construction contracts and parties to it.	**A2**
a.2	Define the main types of construction equipment and their use and capabilities in construction projects.	**A2**
a.3	Define principle of cycle times, production rates and power requirements of equipment for specific applications in construction.	**A3**
b.1	Integrate the cycle times and production rates in project planning related to construction equipment and methods.	**B2, B4**
b.2	Choose the equipment and methods suitable for specific construction activities.	**B1**
c.1	analyze data for calculation of equipment cycle times and production rates to meet the needs of construction activities safely and productively.	**C2**
c.2	Calculate the construction equipment cycle times and production rates.	**C2, C3**
d.1	Value responsibilities of project professionals and the ethical standards required of individuals and the project management team.	**D4**

(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- Define the construction process and the various types of construction contracts and parties to it.	Lecture Presentations Reading	Written exam Written assignment
a2- Define the main types of construction equipment and their use and capabilities in construction projects.	Lecture Presentations	Written exam Written assignment
a3- Define principle of cycle times, production rates and power requirements of equipment for specific applications in construction.	Lecture Presentations Reading	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- Integrate the cycle times and production rates in project planning related to construction equipment and methods.	Lecture Presentations Reading	Participation Written exam Written assignment
b2- Choose the equipment and methods suitable for specific construction activities.	Lecture Presentations Reading	Participation 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- Collect and analyze data for calculation of equipment cycle times and production rates to meet the needs of construction activities safely and productively.	Lecture Presentations Reading	Participation Written exam Written assignment
c2- Calculate the construction equipment cycle times and production rates.	Lecture Presentations Reading	Participation Written exam Written assignment

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(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1- Value responsibilities of project professionals and the ethical standards required of individuals and the project management team.	Lecture Presentations Reading	Participation Written exam Written assignment

4- Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Introduction. The construction project cycle and process. Stages in construction projects.	a1	Introduction. The construction project cycle and process. Stages in construction projects.	1	2
2	Construction equipment divisions and types. Overview of main construction equipment.	a2, b2	Construction equipment divisions and types. Overview of main construction equipment.	2	4
3	Introduction to soil mechanics and its application to construction equipment.	a1, b2, c1, c2	Introduction to soil mechanics and its application to construction equipment.	1	2
4	Compaction specification and control. Introduction to various types of compaction.	a2, a3, b1, c2	Compaction specification and control. Introduction to various types of compaction.	1	2
5	Introduction to machine power and resistance and how it affects the choice of construction equipment.	a2, a3, b2, c2	Introduction to machine power and resistance and how it affects the choice of construction equipment.	1	2
6	Introduction to the basics of machinery. Usable versus available power and its effect in choosing equipment. Learn	a2, a3, b1, b2, c1, c2	Introduction to the basics of machinery. Usable versus available power and its effect in choosing equipment. Learn	1	2

	to use performance charts in power and performance calculations.		to use performance charts in power and performance calculations.		
7	Dozers and calculation of cycle time and productivity and factors affecting them.	a3, b1, c1, c2	Dozers and calculation of cycle time and productivity and factors affecting them.	1	2
8	Excavators and calculation of cycle time and productivity and factors affecting them.	a3, b1, c1, c2	Excavators and calculation of cycle time and productivity and factors affecting them.	1	2
9	Graders and calculation of cycle time and productivity and factors affecting them.	a3, b1, c1, c2	Graders and calculation of cycle time and productivity and factors affecting them.	1	2
10	Trucks and hauling equipment and calculation of cycle time and productivity and factors affecting them. Matching loader to trucks and hauling equipment.	a3, b1, c1, c2	Trucks and hauling equipment and calculation of cycle time and productivity and factors affecting them. Matching loader to trucks and hauling equipment.	2	4
11	Overview of various types of cranes and calculation of ability of crane for the type of need.	a3, b1, c1, c2	Overview of various types of cranes and calculation of ability of crane for the type of need.	1	2
12	The role of the management team in the construction project. Safety, health and environmental issues relating to construction equipment and methods.	a1, c1, d1	The role of the management team in the construction project. Safety, health and environmental issues relating to construction equipment and methods.	1	2
Number of Weeks /and Units Per Semester				**14**	**28**

5- Teaching strategies of the course:

Lecture
Presentations
Participation

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Reading

6- **Assignments:**				
No	**Assignments**	**Aligned CILOs(symbols)**	**Week Due**	**Mark**
1	Construction basics	a1- a2 - b2	3	1
2	Soil mechanics and compaction	a1- a2 – a3 –b1 - b2 - c1 - c2	3	2
3	Machine power and performance	a2- a3 – b1 - b2 – c1 - c2	5	2
4	Dozers and excavators	a3 - b1- c1- c2	6	2
5	Graders, trucks and cranes	a3 - b1- c1- c2	8	2
6	HSE and management	a1- c1 – d1	10	1

7- **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- 7 -9 - 11-14	10	10	a1, a2, a3, b1, b2, c1, c2
2	Quizzes.	Two time	10	10	b1, b2, c1, c2
3	Mid-term exam.	7th	10	10	b1, b2, c1, c2
4	Final-exam.	15	70	70	b1, b2, c1, c2

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8- **Learning Resources:**	
• Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).	
1- Required Textbook(s) (maximum two).	
	• Peurifoy, R. and Schexnayder, C. – 2002 – Construction Planning, Equipment and Methods – 2nd Edition - McGraw Hill
2- Essential References.	
	1- Caterpillar performance handbook – 29th edition
3- Electronic Materials and Web Sites *etc*.	

9-	**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 enquiries.
6	**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.
7	**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.

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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Course Plan (Syllabus) of Construction Methods and Equipment

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

II. Course Identification and General Information:						
1-	**Course Title:**	***Construction Methods and Equipment***				
2-	**Course Number & Code:**	CE207				
3-	**Credit hours:**	**C.H**				**Credit Hours**
		Th.	**Tu.**	**Pr.**	**Tr.**	
		2				2
4-	**Study level/year at which this course is offered:**	3rd Level/ 1st semester				
5-	**Pre –requisite (if any):**	Soil Mechanics 1, Surveying 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:**	Classroom				

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III. Course Description:

This course introduces students to construction equipment and selected construction methods. This includes economy, selection, and productivity of common construction equipment and construction procedures for industrial and heavy civil construction. This would enable graduating students to plan the efficient use of equipment and methods in various construction projects.

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

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

a1- Define the construction process and the various types of construction contracts and parties to it.

a2- Define the main types of construction equipment and their use and capabilities in construction projects.

a3- Define principle of cycle times, production rates and power requirements of equipment for specific applications in construction.

b1- Integrate the cycle times and production rates in project planning related to construction equipment and methods.

b2- Choose the equipment and methods suitable for specific construction activities.

c1- analyze data for calculation of equipment cycle times and production rates to meet the needs of construction activities safely and productively.

c2- Calculate the construction equipment cycle times and production rates.

d1- Value responsibilities of project professionals and the ethical standards required of individuals and the project management team.

V. Course Content:

I. 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	Introduction. The construction project cycle and process. Stages in construction projects.	Introduction. The construction project cycle and process. Stages in construction projects.	1	2
2	Construction equipment divisions and types. Overview of main construction equipment.	Construction equipment divisions and types. Overview of main construction equipment.	2,3	4
3	Introduction to soil mechanics and its application to construction equipment.	Introduction to soil mechanics and its application to construction equipment.	4	2
4	Compaction specification and control. Introduction to various types of compaction.	Compaction specification and control. Introduction to various types of compaction.	5	2
5	Introduction to machine power and resistance and how it affects the choice of construction equipment.	Introduction to machine power and resistance and how it affects the choice of construction equipment.	6	2
6	Introduction to the basics of machinery. Usable versus available power and its effect in choosing equipment. Learn to use performance charts in power and performance calculations.	Introduction to the basics of machinery. Usable versus available power and its effect in choosing equipment. Learn to use performance charts in power and performance calculations.	7	2
7	Midterm Exam		8	2
8	Dozers and calculation of cycle time and productivity and factors affecting them.	Dozers and calculation of cycle time and productivity and factors affecting them.	9	2

9	Excavators and calculation of cycle time and productivity and factors affecting them.	Excavators and calculation of cycle time and productivity and factors affecting them.	10	2
10	Graders and calculation of cycle time and productivity and factors affecting them.	Graders and calculation of cycle time and productivity and factors affecting them.	11	2
11	Trucks and hauling equipment and calculation of cycle time and productivity and factors affecting them. Matching loader to trucks and hauling equipment.	Trucks and hauling equipment and calculation of cycle time and productivity and factors affecting them. Matching loader to trucks and hauling equipment.	12,13	4
12	Overview of various types of cranes and calculation of ability of crane for the type of need.	Overview of various types of cranes and calculation of ability of crane for the type of need.	14	2
13	The role of the management team in the construction project. Safety, health and environmental issues relating to construction	The role of the management team in the construction project. Safety, health and environmental issues relating to construction equipment and methods.	15	2
14	Final Exam		16	2
Number of Weeks /and Units Per Semester			**16**	**32**

VI. Teaching strategies of the course:

Lecture
Presentations
Participation
Reading

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VII. Assignments:				
No	**Assignments**	**Aligned CILOs(symbols)**	**Week Due**	**Mark**
1	Construction basics	a1, a2, b2	3	1
2	Soil mechanics and compaction	a1, a2, a3, b1, b2, c1, c2	3	2
3	Machine power and performance	a2, a3, b1, b2, c1, c2	5	2
4	Dozers and excavators	a3, b1, c1, c2	6	2
5	Graders, trucks and cranes	a3, b1, c1, c2	8	2
6	HSE and management	a1, c1, d1	10	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- 7 -9 - 11-14	10	10
2	Quizzes.	Two time	10	10
3	Mid-term exam.	7th	10	10
4	Final-exam.	15	70	70

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- Peurifoy, R. and Schexnayder, C. – 2002 – Construction Planning, Equipment and Methods – 2nd Edition - McGraw Hill

2- Essential References.

1- Caterpillar performance handbook – 29th edition

3- Electronic Materials and Web Sites *etc*.

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X. Course Policies:	
Unless otherwise stated, the normal course administration policies and rules of the Faculty of ----- 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.
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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.
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7	**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.