



The Hashemite University  
Faculty of Engineering  
Civil Engineering Program  
Course Syllabus



---

**Course Title:** Construction Planning and Scheduling **Course Number:** 110401541

**Instructor:** Dr. Mohammad S. El- Mashaleh  
Office hours: 10 – 11 Sun, Tues, & Thu

**E-mail:** [mashaleh@hu.edu.jo](mailto:mashaleh@hu.edu.jo)

**Class schedule:** Section 1: 8-9:30 Mon & Wed **Room:** E1008  
Section 2: 9:30 – 11 Mon & Wed  
Section 3: 11-12 Sun, Tues, & Thu

---

**Course description:** Principles of planning, monitoring, and controlling construction projects. Developing schedules using bar charts, precedence diagrams, program evaluation and review techniques (PERT), and linear schedules. Resource histograms and s-curves. Resource allocation and resource leveling. Schedule constraints. Earned value concept.

**Textbook(s):** Weber, Sandra. *Scheduling Construction Projects Principles and Practices*, Prentice Hall, Columbus, Ohio. Latest edition.

**Course objectives:** At the conclusion of this course, students are expected to:

- Describe construction projects and processes using network models
- Understand how to develop construction schedules
- Become aware of the different scheduling techniques like bar charts, precedence diagrams, program evaluation and review techniques
- Calculate activities early start, early finish, late start, late finish, total float, and free float
- Calculate project duration and locate the critical path
- Determine the probabilities of project completion dates
- Recommend an appropriate course of action when the schedule must be crashed based on the time-cost tradeoff
- Allocate and level resources using the minimum moment algorithm approach
- Understand the earned value concept and report project status (i.e., ahead/behind schedule, under/over budget)
- Using planning and scheduling software to conduct the following:
  - Input activities, create relationships, and generate schedule reports
  - Conduct time analysis for construction schedules
  - Perform resource leveling and prepare resource histograms and s-curves
  - Update schedules
  - Create target schedules
  - Making comparisons between targets, leveled, and updated schedules as applicable
  - Generate and customize different types of reports



**The Hashemite University  
Faculty of Engineering  
Civil Engineering Program  
Course Syllabus**



**Topics covered:**

- Introduction to planning and scheduling
- Developing a network model
- Bar charts
- Precedence networks (Activity On Node – AON)
- ES, EF, LS, LF, TF, FF, project duration, critical path
- Time-cost tradeoff
- Resource histograms and S-curves
- Resource leveling and resource allocation
- Resource leveling using the minimum moment algorithm approach
- Program Evaluation and Preview Technique (PERT)
- Earned value
- Planning and scheduling software

**Grading Plan:**

Firstexam	25Pts	Mon 29/2/2016 @ 8:00 am
Second exam	25Pts	Mon 4/4/2016 @ 8:00 am
Assignments, quizzes, and attendance	10 pts	
Final exam	40 Pts	Mon 25/4/2016 @ 8:00 am

**Course Material:** Class material will be posted on **HU Moodle**

**Course contribution:** State the contribution of the course to meeting the professional component

Professional Component	Course Contribution
General Education	None
Basic Science and Mathematics	Applying numerical and statistical methods to perform network calculations and to allocate and level resources
Engineering Science	Applying methods and techniques of planning and scheduling
Engineering Design	None

**Relationship to program outcomes:** state the relationship of course to program outcomes

ABET a-k		CE Program Outcomes
a	H	An ability to apply knowledge and principles of mathematics, science, and engineering to solve engineering problems
b		An ability to design and conduct experiments, as well as to analyze and interpret data.
c		An ability to design a system, component or process to meet desired needs.
d		An ability to function on multi-disciplinary teams



The Hashemite University  
Faculty of Engineering  
Civil Engineering Program  
Course Syllabus



e		An ability to identify, formulate, and solve engineering problems.
f		An understanding of professional and ethical responsibility
g		An ability to communicate effectively developed through report writing and in class presentations.
h		The broad education necessary to understand the impact of engineering solutions in a regional and local context
i		A recognition of the need for, and ability to engage in life-long learning
J		Knowledge of contemporary issues
k	H	An ability to use the techniques, skills, and, modern engineering tools necessary for engineering practice.

**ABET Program Criteria for Civil Engineering Achieved:**  
**CIVIL ENGINEERING PROGRAM CRITERIA**

	Programs must demonstrate that graduates have:
	A. Knowledge of chemistry and <b>calculus-based physics</b> with depth in at least one
	B. The ability to apply advanced mathematics through multivariate calculus and differential equations;
	C. Familiarity with statistics and linear algebra;
	D. An ability to identify, formulate, and solve engineering problems
<b>x</b>	E. The criterion of understanding and ability to use the techniques, skills to include engineering economics skills, and modern engineering tools necessary for professional civil engineering practice.

**Prepared by:** Dr. Mohammad El-Mashaleh

**Date:** 10/2016



The Hashemite University  
Faculty of Engineering  
Civil Engineering Program  
Course Syllabus



---

<b>Course Title:</b>	<b>Construction Methods</b>	<b>Course Number: 110401542</b>
<b>Designation:</b>	Elective	<b>Prerequisite(s): 110401346</b>
<b>Instructor:</b>	Prof. Khaled Hyari	<b>Instructor's Email:</b> hyari@hu.edu.
<b>Office Hours:</b>	9:00 – 10:00: Sun., Tue. & Thurs., 8:30 – 9:30: Mon. & Wed.	

---

**Course Description:** Study of construction operations as dynamic production processes. The course covers a wide range of equipment utilization in various construction operations such as; earthmoving operations, excavating and lifting, loading and hauling, compaction and finishing, tunneling, and asphalt paving and surface treatment operations. Also it covers estimating and measuring equipment productivity, work improvement techniques, construction equipment economics, maintenance management of equipment, and nighttime construction operations.

**Textbook(s):**

Nunnally, S. W. (2008) "Construction Methods and Management." 8th Edition, Pearson Prentice Hall.

**Other supplemental materials**

- Gransberg, D., Popescu, C., and Ryan, R., "Construction Equipment Management for Engineers, Estimators, and Owners", 2006, (ISBN -10: 0-8493-4037-3). Taylor and Francis
- Purifoy, R.; Schexnayder, C., and Aviad, S., Construction Planning, Equipment, and Methods, seventh edition, 2006. McGraw Hill.

**Course objectives:** The primary objective of this course is to provide students with advanced knowledge and skills to be able to effectively manage construction projects through an understanding of basic theories and advanced techniques for project management planning, optimization, and control in addition to basic knowledge and skills in human resources management and construction disputes resolution

**Major Topics Covered:**

Topics	No. of Weeks	Contact hours*
Introduction to construction equipment	1	3
Earthmoving Materials and Operation	1.5	4.5
Excavating and Lifting Operations	2	6
Trenchless Technology and Cranes	1	3
Loading and Hauling Operations (Equipment Travel Time , Resistance to Movement)	1	3
Loading and Hauling Operations (Dozers, Scrapers, Loaders, Hauling equipment and operations)	2	6
Compacting and Finishing	2	6
Paving and Surface Treatment	2.5	7.5
Improving Productivity and Performance	2	6
<b>Total</b>	<b>15</b>	<b>45</b>

\*Contact hours include lectures and exams

**Specific Outcomes of Instruction (Course Learning Outcomes):**

**After completing the course, the student will be able to:**

- 4) To study and become familiar with the types and functions of common construction equipment. (k)
- 5) To understand how to estimate production rates of various types of construction equipment.(a,k)
- 6) To study and become familiar with the ownership and operating costs for construction equipment. (a)