

**DEPARTMENT OF INDUSTRIAL ENGINEERING  
COURSE SYLLABUS**

<i>COURSE TITLE</i>	<i>ENGLISH CODE/NO</i>	<i>ARABIC CODE/NO.</i>	<i>CREDITS</i>			
			<i>Th.</i>	<i>Pr.</i>	<i>Tr.</i>	<i>Total</i>
<b>Industrial Systems Simulation</b>	<b>IE 422</b>	هـ ص ٤٢٢	3	2	-	3
<i>Pre-requisites:</i>	IE 322 and IE 332					
<i>Course Role in Curriculum</i>	<i>Required or Elective:</i>		Required Core Course			
<i>Catalogue Description:</i> Basic theory of industrial simulation. Building simulation models. Organization of simulation studies. Simulation modeling and application to medium and large-scale production and service system problems. Output analysis. Variance reduction and optimization. Use of software such as ARENA for discrete and continuous system simulation.						

**Textbooks:**

Simulation with Arena, W. David Kelton, Randall P. Sadowski, and David T. Sturrock, 3rd Ed., 2004, McGraw-Hill.

**Supplemental Materials:**

Simulation Modeling and Analysis 3rd Edition, A. L. Law, David Kelton, 3rd Ed, 2000, McGraw-Hill

**Course Learning Outcomes:**

*By the completion of the course the student should be able to:*

1. Provide a comprehensive understanding of fundamental simulation concepts and ideas in general and the Arena simulation software in particular.
2. Ability to study and analyze systems under investigations, and define the statement of the problem under consideration.
3. Develop a skill to build basic, intermediate, and detailed operation models, analyze input data, verify, validate, well-animate and run these models using Arena simulation software.
4. Develop an ability to design experiments, analyze and interrupt the simulation results, and to present the findings effectively.
5. Demonstrate effective communication by working in teams and through writing proficiency at the level expected for a senior engineering student.

<b><u>Topics to be Covered:</u></b>		<b><u>Duration in Weeks</u></b>
1	What is Simulation?	1
2	Fundamental Simulation Concepts	1
3	A Guided Tour through Arena	2
4	Modeling Basic Operations and Input	2
5	Modeling detailed Operations	1
6	Statistical Analysis of Output from Terminating Simulations	1
7	Intermediate Modeling and Steady-State Statistical Analysis	1
8	Entity Transfer	1
9	Further Statistical Issues	1
10	Conducting Simulation Studies	1

**Student Outcomes addressed by the course:** (Put a  $\checkmark$  sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	
(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 within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	$\checkmark$
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	$\checkmark$
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

**Key Student Outcomes assessed in the course:** (c ) and (e )

***Instructor or course coordinator:*** Dr. Seraj Yousef Abed

***Last updated:*** February 2015