Mechatronics Engineering Lectures

Subject: Robotics Class: 4th

Lecture Contents:	**Name:**	**Dr. Saad Zaghlul**	**Lecture Number:**	**1**
	Topics: **1-Introduction to robotics**			
	Contents: **1-Syllabus** **2-General structure of robots** **3-Area of applications of robots**			

Mechatronics Engineering Lectures

Subject: Robotics Class: 4th

Lecture Contents:	Name:	Dr.Saad Zaghlul	Lecture Number:	2
	Topics: **1-Special Description and Transformation**			
	Contents: **1-Kinematics** **2-Dynamics** **3-Rotation matrix** **4-Description of a Frame**			

Mechatronics Engineering Lectures

Subject: Robotics Class: 4th

Lecture Contents:	Name:	Dr. Saad Zaghlul	Lecture Number:	3
	Topics: **1-General Frames**			
	Contents: **1-Mappings involving general frames** **2-Applications**			

Mechatronics Engineering Lectures

Subject: Robotics Class: 4th

Lecture Contents:	**Name:**	**Dr. Saad Zaghlul**	**Lecture Number:**	**4**
	Topics: **1-Operators** **-**			
	Contents: **1-Translation** **2-Rotation** **3-General** **4- Compound transformation.** **5- Inverse transformation**			

اسم التدريسي رقم الهاتف عنوان البريد الاليكتروني

Mechatronics Engineering Lectures

Subject: Robotics Class: 4th

Lecture Contents:	**Name:**	**Dr. Saad Zaghlul**	**Lecture Number:**	**5**
	Topics: **1-Link Description**			
	Contents: **1-Link connection description** **2-Link – frame attachment** **3-Example**			

Mechatronics Engineering Lectures

Subject: Robotics Class: 4th

Lecture Contents:	Name:	Dr. Saad Zaghlul	Lecture Number:	6
	Topics: **1-Derivation of link transformation**			
	Contents: **1-D-H matrix** **2-Examples** **3-The PUMA 560 Kinematic equations**			

Mechatronics Engineering Lectures

Subject: Robotics Class: 4th

Lecture Contents:	Name:	Dr. Saad Zaghlul	Lecture Number:	7
	Topics: **1-Inverse Manipulator Kinematics**			
	Contents: **1- Multiple solution** **2- Algebraic solution** **3- Geometric equation** **4- The standard frames** **5- PUMA 560**			

Mechatronics Engineering Lectures

Subject: Robotics Class: 4th

	Name:	**Dr. Saad Zaghlul**	**Lecture Number:**	**8**
	Topics: **1-Jacobians: Velocity and Static Forces**			
Lecture Contents:	**Contents:** **1-Differentiation of position vectors** **2-MOTION OF THE LINKS OF A ROBOT** **3-Velocity propagation from link to link**			

Mechatronics Engineering Lectures

Subject: Robotics Class: 4th

Lecture Contents:	**Name:**	**Dr. Saad Zaghlul**	**Lecture Number:**	**9**
	Topics: **1-JACOBIANS**			
	Contents: **1-Jacobian Matrix** **2-Singularities** **3-Static forces**			

Mechatronics Engineering Lectures

Subject: Robotics Class: 4th

Lecture Contents:	**Name:**	**Dr. Saad Zaghlul**	**Lecture Number:**	**10**
	Topics: **1-Manipulator dynamics**			
	Contents: 1-NEWTON'S EQUATION, EULER'S EQUATION 2-Iterative Newton-Euler dynamic formulation 3-Outward iterations to compute velocities and accelerations 4-Inclusion of gravity forces in the dynamics algorithm			