Robotics 1
Material and Textbook Cross-references

http://www.diag.uniroma1.it/~deluca/rob1_en.php

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This document describes the relationships between topics in the course program, content of PowerPoint slides of the lectures (available as PDF files in the course website), and associated parts (chapters/sections) in the course textbook in English.

The name of the files with lecture slides are in the format "NN_filename.pdf", with the number of pages in parentheses.

Textbook:

B. Siciliano, L. Sciavicco, G. Villani, G. Oriolo: "Robotics: Modelling, Planning and Control", Springer, 2009 (3rd Edition)

Note:

The above is the translated version of the book:

B. Siciliano, L. Sciavicco, G. Villani, G. Oriolo: "Robotica: Modellistica, pianificazione e controllo", McGraw-Hill, 2008 (3a Edizione)

Organization of chapters and sections is the same in the English and Italian versions.

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Topic in the course program	Textbook cross-references	Slides (with number of pages) and other course material
Introduction		
Course program and information	---	00_Information.pdf (17)
Industrial robot manipulators	Chap. 1	01_IndustrialRobots.pdf (53) 2014_WorldRobotics_ExecSummary.pdf 2013_WorldRobotics_ExecSummary.pdf 2012_WorldRobotics_ExecSummary.pdf 2011_WorldRobotics_ExecSummary.pdf 2010_WorldRobotics_ExecSummary.pdf 2009_WorldRobotics_ExecSummary.pdf 2008_WorldRobotics_PressCharts.pdf 2007_WorldRobotics_ExecSummary.pdf
Service applications		02_ServiceRobots.pdf (66)
Components		
Mechanics and Actuators	Chap. 5	03_CompsActuators.pdf (21)
Proprioceptive sensors		04_CompsSensorsProprio.pdf (26)
Exteroceptive sensors		05_CompsSensorsExtero.pdf (55)
Robot programming Supervision and control architectures	Chap. 6	06_ProgrammingArchitectures.pdf (47)
Kinematic models of manipulators		
Representations for position/orientation Homogeneous transformations	Chap. 2: Par. 2.1-2.3, 2.5-2.6	07_PositionOrientation.pdf (20)
	Chap. 2: Par. 2.4, 2.7	08_EulerRPYHomogeneous.pdf (13)
Direct kinematics	Chap. 2: Par. 2.8 (except 2.8.3), 2.10	09_DirectKinematics.pdf (31) *Matlab symbolic code:* dirkin_SCARA.m

Examples of direct kinematics	Chap. 2: Par. 2.9 (except 2.9.2)	Data_ABB-IRB6400.pdf Data_COMAU-SmartS2.pdf Data_Fanuc-2000i.pdf Product_ABB-IRB6400PE.pdf Product_Bosch-SR6SR8.pdf
Inverse Kinematics (including numerical methods)	Chap. 2: Par. 2.12 Chap. 3: Par. 3.7.1-3.7.2, only begin of 3.7.3	10_InverseKinematics.pdf (34) Article_KinInvPuma600.pdf
Differential kinematics (including singularities)	Chap. 3: Par. 3.1-3.4, 3.6	11_DifferentialKinematics.pdf (31)
Inverse differential kinematics	Chap. 3: Par. 3.5, 3.7.4	12_InverseDiffKinStatics.pdf (36)
Statics and force transformations	Chap. 3: Par. 3.8 (except 3.8.3)	
Manipulability	Chap. 3: Par. 3.9	
Planning of motion trajectories		
Joint space trajectories	Chap. 4: Par. 4.1-4.2	13_TrajectoryPlanningJoints.pdf (24)
Operational space trajectories	Chap. 4: Par. 4.3	14_TrajectoryPlanningCartesian.pdf (21)
Motion control		
Joint- and Cartesian-level kinematic control	Chap. 8: Par. 8.1 Chap. 3: Par. 3.7.5	15_KinematicControl.pdf (29)
Independent joint control (dynamic, single axis)	Chap. 8: Par. 8.3-8.4	16_DynamicControlSingleAxis.pdf (17)