



Module Title Robotics	Module Code MSDE 462	Semester (Sem 1 / Sem 2) Sem 2
Credits 10	Level 6	Professor and email Hyuk-Dong KWON atom@seoultech.ac.kr
Delivery Method Lecture / Project / Exam	Delivery Location SeoulTech, Mugung Hall	
Module Synopsis This unit covers analysis and design of robot system. Main subjects are (1) robot kinematics, (2) Jacobian, (3) trajectory planning, (4) sensor and actuators, (5) robot vision. As a tool, MATLAB is used for analysis of robot kinematics. In the final stage, experiments using the motor-sensor control kit are performed.		
Outline Syllabus Coordinates and transformation matrix of manipulators Coordinates set and its transformation by rotation and translation. Transformation matrix generation for multiple manipulators using D-H notations 4 parameters constituting each link and joint. Overall transformation matrix linking reference frame to final frame Robot sensors and actuators Principle of sensors and appropriate usage. Motor control schemes and selection of IC chips Integration of sensors and motors Sensor employment to robot body. Sensor data process to robot main processor. Motor driving input signal generation, and motor output signal transfer Robot vision Vision process. Geometry identification. Feature recognition and image enhancement Experiments Unit of DC motor and various sensors for control and measurement. A sensor-motor control kit practice for the set up and system behaviours.		
Indicative Reading Saeed B. Niku, Introduction to Robotics, Analysis, Systems, Applications, Wiley, 2011 S.K. Saha, Introduction to Robotics, 4 th ed., , McGraw-Hill, 2011		



NOTIONAL STUDENT WORKLOAD	Hours
MODE OF DELIVERY (FT / PT / DL)	FT
Lectures	50
Seminars	20
Tutorials	20
Laboratories/studios/practical	
Directed learning	
Independent Learning	10
Work experience/fieldwork	
Other: eg formal presentation	
Total Workload 100 hours for a 10 credit module 200 hours for a 20 credit module	100

Module Learning Outcomes	
KU 1,2	KU1. Evaluate and apply complex knowledge of the scientific and mathematical principles of engineering to solve Real-World problems. KU2. Perform advanced analysis of unfamiliar engineering systems.
IPSA 1,2,3	IPSA1. Apply advanced approaches to solving unfamiliar real world engineering problems. IPSA2. Professionally communicate a broad range of engineering concepts to expert and non-expert audiences using a variety of advanced formats and media. IPSA3. Derive solutions to complex health and safety, sustainability and environmental issues in the engineering sector.
PVA 2	PVA2. Critically analyse advanced solutions to complex engineering problems.



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MSDE Module Descriptor

Assessments	Assessment Type	Weighting %	Midterm/interim/final
Coursework			
Project	Workshops, Assignment	20	Interim
Quiz			
Test	Written	20	Midterm
Laboratory			
Exam	Written	60	Final exam
Presentation			