

SYLLABUS  
MECHATRONICS - FALL 2014

Instructor: Youngshik Kim, 6-407, youngshik@hanbat.ac.kr, 821-1163.  
Office Hours: T 1:00pm-2:00pm, or by appointment.  
Lecture Time: TBA  
Lecture Location: N7-TBA

Course Objectives: Modeling and control of static and dynamic characteristics of manipulation and mobility are mainly discussed. Cases studies highlight classical approaches and students will independently explore contemporary topics in a course project.

Prerequisites: Upper divisions, Linea Algebra

Text: Introduction to Robotics (2<sup>nd</sup> Ed.), Saeed B. Niku, Wiley

Introduction to Robotics (3<sup>rd</sup> Ed.), John J. Craig, Prentice Hall(Optional)  
Control System Engineering, 5th Ed., Norman S. Nise, Wiley, 2008(Optional)

Class Website: <http://cyber.hanbat.ac.kr> or  
<http://robot.hanbat.ac.kr> -> Teaching -> Introduction to Robotics  
visit the site for class handouts and additional information

Quiz/homework Policies:

1. Quizzes will be given out infrequently at the beginning of class (~15 minutes). These will be based entirely on the reading material covered in previous classes.
2. No cheating in quizzes (no cheating papers, no text books, no talking, no lecture notes)
3. Grading: each homework problem will be evaluated on a 3-point scale: 3 = good effort, results, and technique; 2 = modest effort with some incorrect technique or results; 1 = poor effort or technique; and 0 = no attempt.
4. Homework must be submitted in class on the date due.
5. Late homework will be marked down 10% per business day unless prior arrangements exist.
6. Discussion of homework and teamwork is encouraged, but each student must complete each assignment individually. Figures and computer programs CANNOT be shared.
7. Homework may be discussed in class, but it is the students' responsibility to compare their results to homework solutions to resolve errors in their work.

Exam Policies:

1. Examinations must be taken at the scheduled time unless prior arrangements are made at least two weeks before the exam.
2. Any students cheating on an exam will receive a failing grade for the class.
3. No smartphone or devices except for a calculator (계산기 외 스마트폰 등 기기 금지)



## Term Project

### Description:

In this project, you are asked to pick up an object at a known position and deliver to a desired new position. Thus, you should understand homogeneous transformation and trajectory planning, which will be covered in the class. You should also understand trajectory tracking control techniques for DC motors and robot dynamics. A manipulator robot or Lego Mindstorm kit will be available for each team. Each team may also use additional parts under some constraints (size, volume, or mass) which can be made using the 3D printer in Control and Robotics (ICRS) Lab if allowed. You will also have an opportunity to demonstrate your robot in class. You should submit the final report at the end of this semester. If the robot, materials, or other devices used in the class are damaged, a student team is required to replace them with new identical products or parts at their expenses.

### 한글요약:

로봇팔 경로제어 및 제어 프로젝트임. 정해진 위치에 있는 물건을 집어서 새로운 원하는 위치로 이동함. 이 과제를 수행하기 위해서는 수업시간에 배운 로봇 운동학과 경로계획 지식을 필요로 함. 그리고 모터제어 및 동역학 지식을 활용할 필요가 있음. 매니플레이터 로봇 또는 레고 마인트스톰 키트를 활용할 계획임. 만약 환경이 허락하면, 제어로봇실험실의 3D 프린터로 추가 부품을 만들 수도 있음. 단, 필라멘트 재료의 양과 만들 수 있는 부품의 크기, 부피, 무게 등에 제약이 있을 것 임. 수험시간에 프로젝트 수행 관련 진행 사항 및 결과물을 발표 및 구동 시현을 할 예정임. 그리고 기말 고사 전까지 보고서와 발표 자료를 제출해야 함. 추가로 실험장비 및 기기에 손상을 입혔을 경우는 동일한 제품/부품으로 교체하여 변상하는 것을 원칙으로 함.

