

## 99-1 大葉大學 選課版課綱

### 基本資訊

|           |                          |            |                |
|-----------|--------------------------|------------|----------------|
| 課程名稱      | 高等動力學                    | 科目序號 / 代號  | 1571 / MUR5003 |
| 開課系所      | 機械與自動化工程學系碩士班            | 學制 / 班級    | 研究所碩士班1年1班     |
| 任課教師      | 鄭鴻儀                      | 專兼任別       | 專任             |
| 必選修 / 學分數 | 選修 / 3                   | 畢業班 / 非畢業班 | 非畢業班           |
| 上課時段 / 地點 | (一)A / H455 (二)AB / H455 | 授課語言別      | 中文             |

### 課程簡介

Advanced dynamics is to research the Generalized Coordinates, Constraints, Virtual Displacements and Virtual Work, Generalized Forces, Principles of Virtual Work for Static Equilibrium, D ' Alembert ' s Principle, Hamilton ' s Principles, Lagrange ' s Equations. In the class basic theorem of the particles and rigid body will be researched. This course has the goal to cover

1. Provide basic principles and relative motion of particles in moving coordinates.
2. Provide a research of analytical mechanics about basic concepts and advanced concepts of particles.
3. Provide some understanding of the geometry, kinematics, and dynamics of the rigid body.
4. To be familiar with the application of dynamics of rigid bodies for advanced concepts.

### 課程大綱

1. Basic Principles  
Newtonian Particle Mechanics  
Coordinates
  - a. Rectilinear (Cartesian) Coordinates
  - b. Curvilinear Coordinates(Cylindrical, Spherical, Mixed)
 Work and Engery
2. Relative Motion
3. Analytical Mechanics: Basic Concepts  
Generalized Coordinates  
Constraints  
Virtual Displacements and Virtual Work  
Generalized Forces  
Principles of Virtual Work for Static Equilibrium  
D ' Alembert ' s Principle  
Hamilton ' s Principles  
Lagrange ' s Equations
4. Analytical Mechanics: Additional Topics
5. Rigid Body Geometry
6. Rigid Body Kinematics
7. Rigid Body Dynamics: Basic Concepts
8. Dynamics of Rigid Bodies: Advanced Concepts

## 9. Qualitative Analysis of Rigid Body Motion

基本能力或先修課程

Dynamics, Physics