# 98-1 大葉大學 完整版課綱

| 基本資訊 | | | |
|---|---|---|---|
| 課程名稱 | 高等動力學 | 科目序號 / 代號 | 1961 / ADR5038 |
| 開課系所 | 機械與自動化工程學系博士班 | 學制 / 班級 | 研究所博士班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 | (二)A　/ H467 (四)BC　/ H467 | 授課語言別 | 英文 |

## 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

## 課程與系所基本素養及核心能力之關連

具備宏觀的國際觀能力

## 成績稽核

### 教科書(尊重智慧財產權，請用正版教科書，勿非法影印他人著作)

| 書名 | 作者 | 譯者 | 出版社 | 出版年 |
|---|---|---|---|---|
| 無參考教科書 | | | | |

### 參考教材及專業期刊導讀(尊重智慧財產權，請用正版教科書，勿非法影印他人著作)

| 書名 | 作者 | 譯者 | 出版社 | 出版年 |
|---|---|---|---|---|
| 無參考教材及專業期刊導讀 | | | | |

| 上課進度 | | 分配時數(%) | | | | |
|---|---|---|---|---|---|---|
| 週次 | 教學內容 | 講授 | 示範 | 習作 | 實驗 | 其他 |
| 1 | Introduction | 100 | | | | |
| 2 | Basic Principles | 100 | | | | |
| 3 | Relative Motion | 100 | | | | |
| 4 | Relative Motion | 100 | | | | |
| 5 | Analytical Mechanics: Basic Concepts | 50 | | 50 | | |
| 6 | Analytical Mechanics: Basic Concepts | 100 | | | | |
| 7 | Analytical Mechanics: Additional Topics | 100 | | | | |
| 8 | Analytical Mechanics: Additional Topics | 100 | | | | |
| 9 | Rigid Body Geometry | 100 | | | | |
| 10 | Rigid Body Geometry | 50 | | 50 | | |
| 11 | Rigid Body Kinematics | 100 | | | | |
| 12 | Rigid Body Kinematics | 100 | | | | |
| 13 | Rigid Body Dynamics: Basic Concepts | 100 | | | | |
| 14 | Rigid Body Dynamics: Basic Concepts | 50 | | 50 | | |
| 15 | Rigid Body Dynamics: Basic Concepts | 100 | | | | |
| 16 | Dynamics of Rigid Bodies: Advanced Concepts | 100 | | | | |
| 17 | Dynamics of Rigid Bodies: Advanced Concepts | 100 | | | | |
| 18 | Dynamics of Rigid Bodies: Advanced Concepts | 50 | | 50 | | |