Class Syllabus – Spring Semester, 114 Academic Year

Department of Mechanical Engineering, National Chung Cheng University

Course Name：Applied Mechanics II - Dynamics				Dept.		IBPME
				Course Code		4231051
Instructors	Anurag Dahiya	Credits	3	Compulsory	Grade	First grade
EMI	■ Yes □ No					
Course type	□ Humanistic Care Course ■ Problem-oriented Course □ Integrate the curriculum □ Internship			□ Competition Special Course □ Topic-based courses □ Practical courses □ Other		
Prerequisites：A basic understanding of Newtonian mechanics, vector algebra, and elementary calculus.						
Class Description：This course introduces mathematical models of particle and rigid body dynamics, enabling students to analyze and design the motion of real-world mechanical systems.						
Class Objective：The objective of this course is to develop students' understanding of the fundamental principles and analytical models of particle and rigid body dynamics, to train them in applying these methods to analyze the motion of mechanical systems, and to strengthen their theoretical and practical skills through engineering case studies.						
Textbooks	Engineering Mechanics – Dynamics (R.C. Hibbeler) 14th Edition in SI units, 2017. (Global Edition)					
An overview of the main points of teaching						
Teaching Materials	■ PPT □ Self-edited textbooks ■ Self-made instructional videos			■ Course handouts □ Teaching Procedures □ Other		
Teaching Methods	■ Lectures □ Oral presentation □ Case studies			□ Group discussion □ Problem-oriented learning □ Other		
Evaluation Tools	■ Mid-term Exam ■ In-class Quiz □ Homework □ Final Report □ Other			■ Final Exam □ In-class homework □ Mid-term Report □ Special Report □ Scales		
Teaching Resources	■ Course website ■ Electronic files of textbooks are available for download □ Internship website					

Instructor's Information	anurag@ccu.edu.tw

Course Outlines		Teaching Hours				Core Competence
Unit Title	Contents	Lectures	Demo	Practice	Other	
Kinematics of a Particle	Dynamics (R.C Hibbeler) Ch. 12	8				B1, B5, B6
Kinetics of a Particle: Force and Acceleration	Dynamics (R.C Hibbeler) Ch. 13	6				B1, B5, B6
Kinetics of a Particle: Work and Energy	Dynamics (R.C Hibbeler) Ch. 14	6				B1, B5, B6
Kinetics of a Particle: Impulse and Momentum	Dynamics (R.C Hibbeler) Ch. 15	6				B1, B5, B6
Planar Kinematics of a Rigid Body	Dynamics (R.C Hibbeler) Ch. 16	8				B1, B5, B6
Planar Kinematics of a Rigid Body: Force and Acceleration	Dynamics (R.C Hibbeler) Ch. 17	8				B1, B5, B6
Planar Kinematics of a Rigid Body: work and Energy	Dynamics (R.C Hibbeler) Ch. 18	6				B1, B5, B6
Planar Kinematics of a Rigid Body: Impulse and Momentum	Dynamics (R.C Hibbeler) Ch. 19	6				B1, B5, B6

Achievable Core Competence		Achievable Objective
B1	Possess the ability of basic engineering mathematics, solid mechanics, heat flow mechanics, automatic control, materials science and opto-mechanical integration engineering practical analysis	Possess the ability of basic engineering mathematics and kinetic analysis
B5	Mechanical and opto-electromechanical systems, component design and process planning capabilities	It has the ability to design mechanical mechanism systems and power components
B6	Ability to identify, analyse and solve professional problems	The ability to discover, analyze, and solve dynamics-related problems (integration with physical phenomena, dynamic balance, energy balance, etc.)

Core competencies of the University Division

B1 Possess the ability of basic engineering mathematics, solid mechanics, heat flow mechanics, automatic control, materials science and opto-mechanical integration engineering practical analysis

B2 Ability to absorb and integrate cross-domain knowledge

B3 Ability to perform solid force experiments, heat flow experiments, mechanical project implementation, optoelectronic engineering experiments and analyze data

B4 Ability to write programming languages and computer-aided design

B5 Mechanical and opto-electromechanical systems, component design and process planning capabilities

B6 Ability to identify, analyse and solve professional problems

B7 Ability to implement and innovate

B8 Ability to engage in scientific writing and presentations

B9 Ability to work as a team, communicate effectively and manage the program

B10 Learn general knowledge and demonstrate the ability of engineering ethics, social responsibility and sustainable development

Weekly teaching plan				
Course Time	Course Location	Grading	Office hour	Teaching quality evaluation method
Wed. 4:10pm- 7:00pm	ME 214	Homework 10%(Including attendance) Mid-term Exam (I) 30% Mid-term Exam (II) 30% Final exam 30%		Questionnaire

Weeks	Teaching & Homework Progress	Note
1	Ch.12 Kinematics of a particle	
2	Ch.12 Kinematics of a particle	
3	Ch.12 Kinematics of a particle	
4	Ch. 13 Kinetics of a particle	
5	Ch. 13 Kinetics of a particle	
6	Ch. 13 Kinetics of a particle	Mid-term (I)
7	Ch.16 Kinematics of a rigid body of particle	
8	Ch.16 Kinematics of a rigid body of particle	
9	Ch.16 Kinematics of a rigid body of particle	
10	Ch. 17 Kinetics of a rigid body	
11	Ch. 17 Kinetics of a rigid body	
12	Ch. 17 Kinetics of a rigid body	Mid-term (II)
13	Ch.18 Work and energy of rigid body	
14	Ch.18 Work and energy of rigid body	
15	Ch.18 Work and energy of rigid body	
16	Ch. 19 Impulse and momentum of rigid body	
17	Ch. 19 Impulse and momentum of rigid body	
18	**Final Exam**	