Class Syllabus – Fall Semester, 114 Academic Year
International Bachelor Degree Program in Mechanical Engineering,
National Chung Cheng University

Course Name:：Applied Mechanics（I）				Dept.		ME
				Course Code		4231002
Instructors	**Guo-En Chang**	Credits	2	Compulsory	Grade	First-year
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:
Equipped with basic concepts of Newtonian mechanics and vectors as well as basic calculus concepts.

Class Description：
Develop mathematical models of mechanics that can be applied to engineering and real-world mechanical problems.

Class Objective：

1. To develop the abilities to analyze the forces on an object and to draw Free-Body Diagrams of the forces on an object.
2. Learn to use coordinate systems to describe the forces and moments of an object.
3. To establish the equilibrium diagrams of forces and moments of an object, and to find the state of forces and moments of an object.
4. Understand the concept of center of gravity and center of mass and determine the moment of inertia of an object.
5. Learn to use virtual work method to analyze the forces on a system.
6. Develop students' abilities to think logically and analyze mechanical systems.
7. Develop students' abilities and independent thinking to analyze mechanical systems.

Textbooks	R.C. Hibbeler , Engineering Mechanics－Statics, 14th ed. (Pearson, 2015) **Please respect intellectual property rights and do not illegally photocopy textbooks specified by the instructor.**

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 ☐ Group discussion ☐ Oral presentation ☐ Problem-oriented learning ☐ Case studies ☐ Other
Evaluation Tools	■ Mid-term Exam ■ Final Exam ■ In-class Quiz ☐ In-class homework ☐ Homework ☐ Mid-term Report ☐ Final Report ☐ Special Report ☐ Other ☐ Scales
Teaching Resources	■ Course website ☐ Electronic files of textbooks are available for download ☐ Internship website
Instructor's Information	https://deptime.ccu.edu.tw/p/406-1102-9589,r1322.php?Lang=zh-tw

Course Outlines		Teaching Hours				Core Competence
Unit Title	Contents	Lectures	Demo	Practice	Other	
Vectors	1.Cartesian Coordinate 2.Dot product and Cross production	2				B1, B6
Force	1. Force System Resultants 2. Internal Force 3. Friction	10				B1, B5
Equilibrium	1. Equilibrium of a Particle 2. Equilibrium of a Rigid Body	8				B1, B5, B6
Structural	Structural Analysis	4				B1, B5, B6
Moment	Moment of Inertia	4				B1, B5, B6
Geometry	Center of Gravity and Centroid	4				B1, B5, B6
Energy	Virtual Work	4				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, solid mechanics, heat flow mechanics, automatic control, materials science and opto-mechanical integration engineering practical analysis
B5	Mechanical and opto-electromechanical systems, component design and process planning capabilities	Mechanical and opto-electromechanical systems, component design and process planning capabilities
B6	Ability to identify, analyse and solve professional problems	Ability to identify, analyse and solve professional problems

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 08:10-10:00	Engineering Building II Rm116	• 25% for the Quizzes • 2 Mid-term Exams and 1 Final Exam:75% (Depending on the actual teaching situation, the instructor reserves the right to adjust the final score, but the final score will not be lower than the above.)	2pm-4pm on Tuesdays Room 420, Engineering building (II) Tel:2720411ext.33324 E-mail: imegec@ccu.edu.tw (or appointments by email)	Questionnaire

Weeks	Teaching & Homework Progress	Note
1	**Introduction**	
2	**General Principles and Force Vector**	
3	**Force System Resultants** ：Force and Moment	QUIZ 1
4	**Force System Resultants** ：Force and Couple	QUIZ 2
5	**Equilibrium of a Particle**	QUIZ 3
6	**Equilibrium of a Rigid Body**：Two Dimensions and F.B.D	QUIZ 4
7	**Equilibrium of a Rigid Body**：Three Dimensions and F.B.D	QUIZ 5
8	**Structural Analysis**：the method of joints and section	QUIZ 6
9	**Structural Analysis**：analyze the force action on the members of system	Midterm Exam

10	**Internal Force**	QUIZ 7
11	**Friction**	QUIZ 8
12	**Friction**	QUIZ 9
13	**Center of Gravity and Centroid**：Center of gravity, mass and centroid	QUIZ 10
14	**Center of Gravity and Centroid**：for system, the area and volume	QUIZ 11
15	**Moment of Inertia**：To establish math module for an area	QUIZ 12
16	**Moment of Inertia**：To find extreme value and discuss the math moment of inertia	Final Exam
17	**Virtual Work**：Concept and Mathematical model	
18	**Virtual Work**：Concept and Mathematical model	
Others: Chapter 1~6 for Mid-term Exam I, and chapters 8~11 for Final Exam.		

Other remarks:

(1) Applied Mechanics（I） is a compulsory course and is an important foundation course, so please take it seriously from the beginning of the semester. We will not adjust the score for any particular student due to any factor, nor will we loosen the score because the student may be dropped from the class. Even if a student is dropped from a class for this reason, he/she has to bear the responsibility. All students are adults and must learn to face and bear the responsibility on their own.

(2) There will be no make-ups for missed quizzes and midterm/final exams (oversleeping, etc., is not a valid reason).

(3) Midterm and final exams are graded at 120%. No grade will be deducted for absence from class, but if you are absent three times or more, your final grade will be returned to 100% and no adjustment will be made to your final grade (i.e., even if you receive a final grade of 59, no adjustment will be made to your final grade).

(4) The class starts early, but it is the obligation of all students to attend class. Roll call will be taken from time to time during the course, and students who are late for more than 15 minutes will be considered absent. If you are late for more than 15 minutes, you will be considered absent. If you cheat once (e.g., come into the classroom just for roll call but not for the class, take attendance for someone else, etc.), you will be counted as absent three times. Those who leave early will also be considered absent.

(5) If there is no special emergency reason, the leave of absence must be approved by the teacher (24 hours in advance): email to the teacher and the teaching assistant, the teacher will reply whether the leave of absence is granted or denied, and a copy of the leave of absence will be given to the teaching assistant, the leave of absence will be granted in order to make up for the test, and the grade of the test will be awarded only if there is a make-up test. Any subsequent leave of absence (including official leave) will be treated

as an absence. If there is a special reason for an emergency, the student must ask the teacher to excuse him/her on the day of the class; if the student only asks the TA who help to take attendance, he/she will be regarded as absent. In addition, students are not allowed to take leave for non-business reasons such as participating in school club activities or traveling.

(6) When contacting teachers by email, please pay attention to the basic etiquette of email, provide your signature and student number, and state the reason in detail, otherwise the teacher will not reply.

(7) In order to encourage students to attend class seriously and actively participate in class discussions, if students ask questions or answer questions correctly in class, they will be given extra points (up to a maximum of 5 points) for the final grade.

(8) The use of cell phones, tablets, and laptops is strictly prohibited in class. Students' participation and attitude in class will be carefully observed by the teacher and will be taken into account in the adjustment of the final grade. If you come to class, it means that you want to listen to the content of the class, so please make sure that you take good use of your time. Playing with your cell phone, dozing off, or looking at the content of other subjects that are not related to the class is equivalent to one absence for every three times (please note that it is in units of “times”). Therefore, students who engage in excessive and frequent activities will lose the opportunity to earn extra points at the end of the semester.

(9) Examination rules: (i) Only stationery and engineering calculators can be brought, but what you bring can only be used by yourself and cannot be shared with your classmates; violation of this rule will be regarded as cheating, and the final grade will be calculated as zero, and serious cases will be punished in accordance with the university rules. (ii) The use of cell phones during examinations is strictly prohibited, and users will be considered cheating and receive a zero for the final grade. (iii) Except for teachers and teaching assistants, students are not allowed to contact anyone in any way (either intentionally or unintentionally), violators will be regarded as cheating and will receive 0 points in the final grade, and serious cases will be punished according to the university regulations.