

Undergraduate Course Outline and Schedule
International Bachelor Degree Program on Energy
National Cheng Kung University

Course name: (Chinese) 材料力學 (English) Mechanics of Materials		Instructor: Siu-Tong Choi		Semester: <input checked="" type="checkbox"/> Spring, <input type="checkbox"/> Fall	
Course No. F020900		Credits: <u>3</u>	Course type: Lecture <u>3</u> hrs, Practice <u>0</u> hrs		
		<input checked="" type="checkbox"/> Required, <input type="checkbox"/> Elective	Prerequisites: Statics		
Course Objectives: To provide students with fundamental concepts and analytical methods on the strength and physical performance of materials and structures.		Relation between Program Outcomes/Assessment and AC2004+ of IEET Total lecture hrs: <u>50</u> , Total practice hrs: <u>36</u>			
Course Outline:		Lecture hrs	Practice hrs	IEET Accreditation Criteria 2004+	
Ch. 1: Tension, Compression, and Shear Stress and strain (normal and shear); Mechanical properties; Linear elasticity; Allowable stresses.		25	20	1. Ability to apply knowledge of mathematics, science and engineering.	
Ch. 2: Axially Loaded Members Changes in lengths of axially loaded members; Statically indeterminate structures; Thermal effects; Stresses on inclined sections; Strain energy		5	3	2. Ability to design and conduct experiments, as well as to analyze and interpret data.	
Ch. 3: Torsion Torsional deformations of circular bars; Pure shear; Statically indeterminate torsional members; Strain energy in torsion and pure shear.		5	3	3. Ability to use the techniques, skills, and engineering tools necessary for engineering practice.	
Ch. 4: Shear Forces and Bending Moments Types of beams; Shear forces and bending moments; Shear-force and bending-moment diagrams.		5	3	4. Ability to design an engineering system, component, or process.	
Ch. 5 & 6: Stresses in Beams Pure bending; Normal stresses and shear stresses in beams; Design of beams; Thin-walled open cross sections; Shear centers.		2	2	5. Ability to communicate effectively and function in a team.	
Ch. 7: Analysis of Stress and Strain Plane stress; Principal stresses; Mohr's circle; Hooke's law for plane stress; Plain strain*.		5	3	6. Ability to identify, formulate, and solve engineering problems.	
Ch. 8: Applications of Plane Stress Spherical and cylindrical pressure vessels; Maximum stresses in beams; Combined loadings.		2	2	7. Knowledge of contemporary issues, understanding of the impact of engineering solutions in a global, environmental, and societal context, and ability to engage in life-long learning.	
Ch. 9: Deflection of Beams Differential equations of deflection curve; Deflections by integration; Method of superposition; Strain energy of bending*.		1	0	8. Understanding of professional ethics and social responsibility.	
Ch. 10: Statically Indeterminate Beams Differential equations of deflection curve; Method of superposition.					
Ch. 11: Columns Buckling and stability; Columns with pinned ends; Columns with other support conditions.					
Course Component	Mathematics and Basic Science	Engineering Expertise	Design and Practice	Innovative Development	General Education
Proportion (%)	20%	60%	15%	5%	0%
Text Book(s) (Authors, Title, Publisher and Date)		Grading Policy			
James M. Gere & Barry J. Goodno, <i>Mechanics of Materials</i> , Ninth Ed., SI, Cengage Learning, 2018.		Quizzes 35% Mid-term Exam 30% Final Exam 35%			
Reference(s) (Authors, Title, Publisher and Date)					
R. C. Hibbeler, <i>Mechanics of Materials</i> , Tenth Ed., Pearson Education, 2017.		Office: Room 5873 ext. 63689 e-mail: choi@mail.ncku.edu.tw			