國立東華大學

教學計劃表 Syllabus

課程名稱(中文) Course Name in Chinese	材料機械性質			學年/學期 Academic Year/Semester	114/1
課程名稱(英文) Course Name in English	Mechanical Behaviors of Materials				
科目代碼 Course Code	MS__50300	系級 Department & Year	碩士	開課單位 Course-Offering Department	材料科學與工程學系
修別 Type	選修 Elective	學分數/時間 Credit(s)/Hour(s)	3.0/3.0		
授課教師 Instructor	/陳俊良				
先修課程 Prerequisite					

課程描述 Course Description

Courses in the mechanical behavior of materials are standard in both mechanical engineering and materials science/engineering curricula. These courses are taught, usually, at the junior or senior level. This course provides an introductory treatment of the mechanical behavior of materials with a balanced mechanics--materials approach, which makes it suitable for both mechanical and materials engineering students. It covers metals, polymers, ceramics, and composites and contains more than sufficient information for a one-semester course. It therefore enables the instructor to choose the path most appropriate to the class level (junior- or senior-level undergraduate) and background (mechanical or materials engineering).

課程目標 Course Objectives

This course equips students with a comprehensive understanding of the mechanical properties of materials, preparing them for future careers and research.

	系專業能力 Basic Learning Outcomes	課程目標與系專業能力相關性 Correlation between Course Objectives and Dept.'s Education Objectives
A	具備材料科學所需的進階物理、化學及數學的知識。Acquire required advanced physical, chemical, and mathematic knowledge for materials science and engineering.	○
B	具備材料科學的進階專業知識，並能應用於解決工程上之問題。Acquire required advanced professional knowledge for materials science and engineering, applicable in solving engineering problems.	●
C	具備獨立研究之能力。Equipped with capabilities of independent research.	
D	具備專業道德及責任感，與良好的溝通及團隊合作的能力。Acquire professional morality and responsibility, and capability of quality communication and team cooperation.	○
E	具備進階的英文能力，應用於學習與交流。Acquire English capability used for learning and interaction.	○

圖示說明Illustration ：● 高度相關 Highly correlated ○中度相關 Moderately correlated

授 課 進 度 表 Teaching Schedule & Content

週次Week	內容 Subject/Topics	備註Remarks
1	Introduction	
2	Materials: Structure, Properties, and Performance	
3	Elasticity and Viscoelasticity	

4	Plasticity	
5	Imperfections: Interfacial and Volumetric Defects	
6	Stress–Strain Relationships and Behavior	
7	Geometry of Deformation and Work-Hardening	
8	High-Temperature Deformation of Crystalline Materials	
9	期中考試週 Midterm Exam	
10	Mechanical Testing: Tension Test and Other Basic Tests	
11	Fracture: Macroscopic Aspects	
12	Fracture: Microscopic Aspects	
13	Solid Solution, Precipitation, and Dispersion Strengthening	
14	Creep and Superplasticity (I)	
15	Creep and Superplasticity (II)	
16	Fatigue	
17	Special Materials: Intermetallics and Foams	
18	期末考試週 Final Exam	

教 學 策 略 Teaching Strategies

☑ 課堂講授 Lecture ☐ 分組討論Group Discussion ☐ 參觀實習 Field Trip

☐ 其他Miscellaneous:

教 學 創 新 自 評 Teaching Self-Evaluation

創新教學(Innovative Teaching)

☐ 問題導向學習(PBL) ☐ 團體合作學習(TBL) ☐ 解決導向學習(SBL)

☐ 翻轉教室 Flipped Classroom ☐ 磨課師 Moocs

社會責任(Social Responsibility)

☐ 在地實踐Community Practice ☐ 產學合作 Industy-Academia Cooperation

跨域合作(Transdisciplinary Projects)

☐ 跨界教學Transdisciplinary Teaching ☐ 跨院系教學Inter-collegiate Teaching

☐ 業師合授 Courses Co-taught with Industry Practitioners

其它 other:

學期成績計算及多元評量方式 Grading & Assessments									
配分項目 Items	配分比例 Percentage	多元評量方式 Assessments							
		測驗 會考	實作 觀察	口頭 發表	專題 研究	創作 展演	卷宗 評量	證照 檢定	其他
平時成績(含出缺席) General Performance (Attendance Record)	20%		✓						
期中考成績 Midterm Exam	30%	✓							
期末考成績 Final Exam	30%	✓							
作業成績 Homework and/or Assignments	20%			✓					
其他 Miscellaneous (_____)									

評量方式補充說明
Grading & Assessments Supplemental instructions

教科書與參考書目（書名、作者、書局、代理商、說明）
Textbook & Other References (Title, Author, Publisher, Agents, Remarks, etc.)

1. Marc Andre Meyers, Krishan Kumar Chawla: “Mechanical Behavior of Materials”, Cambridge University Press; 2nd edition, 2009.
2. Thomas H. Courtney: “Mechanical Behavior of Materials”, Waveland Pr Inc; 2 edition, 2005. (reference)

課程教材網址(含線上教學資訊,教師個人網址請列位於本校內之網址)
Teaching Aids & Teacher's Website(Including online teaching information. Personal website can be listed here.)

其他補充說明 (Supplemental instructions)