Course Information	
Course title	Additive Manufacturing
Semester	114-2
Designated for	COLLEGE OF ENGINEERING GRADUATE INSTITUTE OF APPLIED MECHANICS
Instructor	Yuan-Hui Chueh
Curriculum Number	AM7201
Curriculum Identity Number	543EM8170
Class	
Credits	3.0
Full/Half Yr.	Half
Required/ Elective	Elective
Time	Friday 2,3,4(9:10~12:10)
Remarks	Restriction: MA students and beyond The upper limit of the number of students: 60.
Course introduction video	
Table of Core Capabilities and Curriculum Planning	Table of Core Capabilities and Curriculum Planning
Course Syllabus	
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Course Description	The objective of this course is to guide students in developing both fundamental and advanced knowledge of additive manufacturing (3D printing) technologies. The course covers the design principles of major 3D printing systems, the layer-by-layer fabrication mechanisms, and the control of key process parameters. By integrating interdisciplinary perspectives from materials science, heat transfer, fluid mechanics, and solid-state physics, students will learn to understand the physical essence of additive manufacturing through the lens of energy–material interactions. The course further explores the forming behavior, interfacial bonding, phase transformation, and microstructural evolution of various material systems, including metals, polymers, and ceramics, while examining how processing parameters influence defect formation, mechanical properties, and functional structural design. Students will be guided to integrate their undergraduate knowledge in

	materials science, mechanics, heat transfer, manufacturing processes, control engineering, and computer-aided design, enabling them to scientifically and systematically analyze the multiphysics phenomena and material evolution mechanisms occurring during additive manufacturing processes.
Course Objective	Upon completion of this course, students will be able to: 1.Understand the fundamental principles, process classifications, and system designs of additive manufacturing (3D printing). 2.Analyze the physical mechanisms of energy input and material response during additive manufacturing processes. 3.Examine the forming behavior and interfacial bonding characteristics of metals, polymers, and ceramics in additive manufacturing. 4.Evaluate the effects of processing parameters on defect formation, microstructure evolution, and mechanical performance in additive manufacturing. 5.Apply interdisciplinary knowledge in materials science, thermal–fluid science, mechanics, and control to analyze multiphysics phenomena in additive manufacturing. 6.Develop the ability to conduct research, innovation, and engineering applications through scientific and systematic approaches to additive manufacturing.
Course Requirement	Students are expected to actively participate in class discussions and literature reviews to develop independent thinking and research analysis skills. During the course, students are required to complete assigned homework and a project report. Students with prior laboratory experience or a strong interest in additive manufacturing research are encouraged to enroll in this course.
Student Workload (Expected weekly study hours before and/or after class)	
Office Hours	
Designated reading	
References	Gibson, I., Rosen, D., and Stucker, B., Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing, Springer.
Grading	1. NTU has not set an upper limit on the percentage of A+ grades. 2. NTU uses a letter grade system for assessment. The grade percentage ranges and the single-subject grade conversion table in the NATIONAL TAIWAN UNIVERSITY Regulations Governing Academic Grading are for reference only. Instructors may adjust the percentage ranges according to the grade definitions. For more information, see the Assessment for Learning Section.
Progress	

Week	Date	Topic
No data		