2025.07.17 Revised

The Teaching Plan for Distance Learning Courses of National Yang Ming Chiao Tung University

Instructions:

- **Definition of Distance Learning Courses at the University:** (1) Courses in which all enrolled students participate entirely through online distance learning. (2) The total hours of distance instruction (including both synchronous and asynchronous teaching) exceed half of the total instructional hours.
- **Synchronous Distance Teaching:** The instructor uses online transmission media or video conferencing systems to conduct teaching activities in real time, enabling live interactive learning.
- **Asynchronous Distance Teaching Method:** Instructors create digital teaching materials and upload them on the digital learning platform, allowing students to learn online at their own pace.
- **Instructors must submit their proposed distance course for review by the Digital Course Review Committee at the Digital Learning Center one semester before the course begins to confirm the eligible instructional hours. Only after this confirmation can the course be submitted to the departmental and college-level curriculum committees for professional review, and finally to the university curriculum committee for approval. The approved teaching plan and syllabus will then be uploaded to the Ministry of Education's University Course Website.**

I. Basic Course Information (Please check the box ☐ if applicable / Each section must be completed.)

Semester	_114_ Academic year ■First semester ☐Second semester ☐Summer vacation ☐Winter vacation (Select one)		
Department	Main department: 材料系 Assisting department:		
Program type	☐Undergraduate Program ■Post-bachelor Professional Program ■Master's Program ☐In-service Master's Program ☐Doctoral Program ☐Degree Program (☐4-Year ☐Master's ☐Doctoral) ☐Credit-based Program ☐Other Teaching Unit _____		
Course category	☐General Education Course ■Specialized Course ☐Education Course ☐ Other: _____		
Course title	Chinese:先進半導體技術與全球產業策略 English: Advanced Semiconductor Technologies and Global Industry Strategies		
Instructor and title	Yuan-Chieh (YC) Tseng (曾院介), Distinguished Professor, Dept. Materials Science & Engineering ※For MOE certification, a maximum of four instructors are allowed.		
Permanent Course Code	新課程	Current Course Code	
Number of credits	3	Course Type	☐Required ☐Selective ☐Other
Number of classes offered	1	Expected number of students enrolled	
Subtitles	■Yes ☐No	English-taught course	■Yes ☐No
Course Platform URL (Preferably use E3 platform)	☐E3 platform ■Other: ewant platform https://www.ewant.org/	Broadcasted to other universities (if applicable)	Receiving university: _____ Receiving department:_____
Collaboration with foreign institutions (if applicable)	Name of foreign partner institution and department: _____ ☐Domestic hosting institution ☐Overseas special program ☐Dual degree program ☐Other		
Type of Review Requested	■ Internal Distance Learning Course Review ☐Application for MOE Digital Learning Course Certification (Please complete the		

MOE Preliminary Evaluation Form.)

II. Course Teaching Plan (Please check the box ☐ if applicable / Each section must be completed.)

Course Objectives

The course aims to provide students with comprehensive knowledge and practical skills across various aspects of semiconductor technology. Students will explore characterization techniques and their applications in analyzing material properties, learn statistical tools to evaluate device reliability, and address critical challenges such as dielectric breakdown and bias instability. The course also covers radiation effects on semiconductors, 2D materials' unique properties and applications, and the design and operation of optoelectronic devices. Additionally, students will delve into advanced topics such as spintronics, ferroic materials, and their device applications. The curriculum emphasizes the semiconductor industry's evolution, including R&D management, global supply chain dynamics, and business models. Finally, the course fosters creative problem-solving skills, equipping students to address complex challenges in the high-tech industry and innovate within a rapidly evolving technological landscape.

Teaching Methods

Total: __16__weeks

Teaching method		Weeks	Total hours
Distance learning	Asynchronous	14	52
	Synchronous		
In-person instruction		2	5
Other: _____			

※Note:
① The total hours of distance learning (Sync. + Async. hours) exceed half of the total instructional hours..
② For MOE certification: Async. ≥ half of the weeks; Sync. ≥ one-sixth (e.g., Async. ≥ 8 weeks, Sync. ≥ 3 weeks for a 16-week course).

Course Syllabus

※Note: For asynchronous distance learning weeks, please provide MP4 video files. If you are applying for the internal distance learning course review and the total video duration is shorter than the planned asynchronous teaching hours, please provide additional information, including teaching activities, time allocation, and supporting documents.

Week	Instruction Content	Instructional hours			Additional Information
		In-person	Distance learning		
			Async.	Sync.	
1	**Course Introduction** 1. Course Unit Overview 2. Tutorial on Operating the ewant Online Course System Platform 3. Explanation of Course Grading	2	1		
2	**Characterization Techniques for Semiconductor Materials** Instructor: Prof. Yu-Sheng Su (蘇育陞)		4.8		Course videos, online quizzes, course activities
3	**Reliability and Failure Physics of Semiconductor Devices: From Silicon to More-than-Moore technologies** Instructor: Prof. Tian-Li Wu (吳添立)		5.8		Course videos, online quizzes, and course activities
4	**Radiation Effects in Semiconductor Devices** Instructor: Prof. Chin-Han Chung (鍾錦翰)		3.9		Course videos, online quizzes, and course activities
5	**Synthesis and Devices of 2D Materials**		3.5		Course videos, online quizzes, and course

		Instructor: Prof. Yu-Chuan Lin (林御專)				activities
	6	**Introduction to Light Emitting Diodes** Instructor: Prof. Niall Tumilty (唐奈歐)		4.2		Course videos, online quizzes, and course activities
	7	**Spintronics Technology** Instructor: Prof. Chao-Yao Yang (楊朝堯)		3.9		Course videos, online quizzes, and course activities
	8	**Midterm Exam**		3		
	9	**Ferroelectric materials and devices** Instructor: Prof. Yen-Lin Huang (黃彥霖)		2.6		Course videos, online quizzes, and course activities
	10	**Introduction to 2D semiconductors** Instructor: Prof. Der-Hsien Lien (連德軒)		2.7		Course videos, online quizzes, and course activities
	11	**Management Thinking and Innovation Strategy for Semiconductor Industry** Instructor: Prof. Hsin-Ning Su (蘇信寧)		3		Course videos, online quizzes, and course activities
	12	**The Global Semiconductor Ecosystem** Instructor: Prof. Anthony Kuo (郭國泰)		4.3		Course videos, online quizzes, and course activities
	13	**The Supply Chain Challenges and Platform Leadership of the Semiconductor Industry** Instructor: Prof. Kuan-cheng Huang (黃寬丞)		4		Course videos, online quizzes, and course activities
	14	**Using Creative Problem Solving for Innovation Management in High-Tech Industry** Instructor: Prof. Sirirat Sae Lim (林士平)		3		Course videos, online quizzes, and course activities
	15	**Final Oral Presentation**	3			
	16	**Final Exam**		3		

Textbooks and reference materials	1. Textbook: Please refer to the handout for each unit. 2. Handouts: Please refer to the unit handouts on the course learning platform. 3. Reference materials: Please refer to the unit content provided on the course platform. 4. Related websites: ※Note: Teaching materials used by instructors must not be reproduced illegally and must comply with relevant copyright laws. Any infringement or violation may result in legal liability. Instructors are encouraged to refer to the official teaching copyright guidelines provided by the competent authority. (Link to the Intellectual Property Office, Ministry of Economic Affairs)
Teaching Activities	※Note: ①At least three types of teaching activities must be used throughout the course.

<table>
<tr><td>(Multiple choices allowed)</td><td>②For MOE Certification, at least five types of teaching activities are required, including at least one collaborative learning strategy (e.g., C, F, I).
■A. Lecture ■B. Learning Guidance ☐C. Group Presentation
■D. Individual Presentation ■E. Topic Discussion ☐F. Group Discussion
☐G. Demonstration ■H. Practice / Quiz ■I. Peer Evaluation
☐J. Case Study ☐K. In-class Assignments ☐L. After-class Assignments
☐M. Others：_____</td></tr>
<tr><td>Features to be used on the E3 platform
(Multiple choices allowed)</td><td>■Announcements ■Course material (upload/download)
■Grade management and check ☐Online quizzes
☐Learning progress information ☐Interactive learning design (chatroom/ forum)
☐Teaching activity display ☐Other: _____</td></tr>
<tr><td>Teacher–Student Interaction
(Multiple choices allowed)</td><td>☐Sync. discussion: _____ times ■In-person discussion: _2_ times
☐Async. discussion: _____ times ■Other: office hour _____14 times__</td></tr>
<tr><td>Assignment Submission
(Multiple choices allowed)</td><td>■Provide online explanation ☐Real-time online assignment submission
■Upload and download assignment files ■Online quizzes/tests
☐Check exam results ☐Other methods: _____</td></tr>
<tr><td>Grading and Assessment Methods</td><td>Grading is set by the instructor according to course objectives and content:
<table>
<tr><th>Category</th><th>Percentage</th><th>Description</th><th>Grading reference</th></tr>
<tr><td rowspan="3">Ongoing assessment (Learning participation / Learning progress records)
※For MOE Certification, instructors must use ≧ 5 types of learning progress records as part of the assessment.</td><td rowspan="3">25%</td><td>Course material viewing ratio: 40%</td><td>Based on backend reports, student viewing is calculated as unit videos viewed divided by total course videos.</td></tr>
<tr><td>Unit quizzes: 40%</td><td>Student completion of unit exercises is monitored through backend reports, with the average exercise score per unit used for grade calculation.</td></tr>
<tr><td>Topic Discussion: 20%</td><td>The instructor will post related topics on E3 each week based on that week's course topic for in-class discussion; students who participate in the discussion on the E3 forum will receive the corresponding portion of the score.</td></tr>
<tr><td>Final Project Presentation</td><td>25%</td><td>The student selects one topic from the course program and develops it into an extended report; in addition to the instructor, the student's presentation will also be evaluated by classmates taking the same course.</td><td>1 final project oral presentation, co-evaluated by the instructor and the presenter's peers, based on his/her performance on (i) professionalism and depth of understanding; (ii) presentation skills; (iii)</td></tr>
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				ability to address the questions.
	Midterm Exam	25%	Online Midterm Exam	
	Final Exam	25%	Online Final Exam	
	Total	100%		

Academic support measures	1. Instructor: Yuan-Chieh Tseng (曾院介), yctseng1978@nycu.edu.tw , R315, Engineering Building VI. 2. Teaching Assistant (TA): David Ho (何恆鈞), davidho1207@gmail.com , every Monday afternoon, 1:30PM~3:30PM. 3. Online office hours: Every Tuesday, 10:00AM~12:00PM. 4. Other: upon students' requests if necessary
Important Notes	

To avoid delays in the application process for distance learning courses, please make sure that all fields above have been properly checked or completed before submission. Thank you. (Please check the box below before submitting.)

■ **I confirm that all fields above have been checked or filled out. Thank you.**

Approval Process: (1) Applicant Instructor ➔(2) Digital Learning Center—Digital Course Review Committee ➔(3) Course Offering Department

2025.07.17 Revised

(1) Applicant Instructor's Signature:	(2) Digital Learning Center – Digital Course Review Committee Review: Approved Weekly Instructional Hours (Excluding any additional counted hours) : 3	(3) Department Chair's Signature:
	國立陽明交通大學 數位教學中心 (甲) 教務處	材料科學與工程學系 系主任 吳文偉