

National Taiwan Normal University Online Course Curriculum Plan

Guideline: Pursuant to **Article 6 of the Implementation Regulations Regarding Distance Learning by Universities**, Departments/Programs offering distance learning courses, shall present a course plan and submit it for approval by the university-level academic affairs committee. The course plan referred to in the preceding paragraph shall set forth learning objectives, the target student group, a course outline, teaching methods, interactive student-teacher discussion, grading and course requirements. The course plan shall be posted on the Internet.

1. **Chinese Course Name:** 科技與工程理論
2. **English Course Name:** Theory in Technology and Engineering
3. **Course start date:** Fall semester of 2023 (academic year)
4. **Course review submission record:**

- (1) It is a new online course or an existing face-to-face course switching to online course in this semester
(University's Course Committee approval in the Spring semester of 2022)
- (2) It is an existing online course; the latest University's Course Committee approval was in the ___ semester of ___ (academic year)
 - (2.1) The 5-year validity period has expired; a new application is required.
 - (2.2) In case of a major change in the original approved course or if the revision ratio exceeds 30%, reapplication is required.

5. Basic Course Information (check or if applicable)

(1)	Instructor Name & Title	Dr. Wen-Chung Kao, Professor
(2)	Instructor Source	<input checked="" type="checkbox"/> Appointed by Departments <input type="checkbox"/> Appointed by General Education Center <input type="checkbox"/> Both of Above <input type="checkbox"/> Other:
(3)	College/Department/Center	International Doctoral Program in Integrative STEM Education
(4)	School System	<input type="checkbox"/> Undergraduate Program <input type="checkbox"/> Master's Program <input type="checkbox"/> Undergraduate-master Program Joint Course <input type="checkbox"/> Undergraduate-postgraduate Joint Course <input checked="" type="checkbox"/> PhD Program <input type="checkbox"/> Continuing Education Master's Program
(5)	Program Type	<input checked="" type="checkbox"/> Full-time Program <input type="checkbox"/> Part-time Program <input type="checkbox"/> Other:
(6)	Course Type	<input type="checkbox"/> Common Courses <input type="checkbox"/> General Courses <input type="checkbox"/> School Required Courses <input checked="" type="checkbox"/> Professional Courses <input type="checkbox"/> Educational Courses <input type="checkbox"/> Other:
(7)	Required Courses	<input type="checkbox"/> University-required <input type="checkbox"/> College-required <input type="checkbox"/> Graduate Institute-required <input checked="" type="checkbox"/> Department-required <input type="checkbox"/> Others:
(8)	Course Duration	<input checked="" type="checkbox"/> One Semester (half year) <input type="checkbox"/> Two Semesters (one year) <input type="checkbox"/> Other:
(9)	Required/Elective Course	<input type="checkbox"/> Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/> Other:
(10)	Course Credits	2

(11)	Average of Face-to-Face Teaching Hours Per Week	0.44 hour(s)/week (For asynchronous remote teaching, fill-in the average weekly "face-to-face" hours, which include classroom face-to-face and synchronized remote teaching hours. Divide the total "face-to-face" semester hours by the total number of course weeks.)
(12)	Number of Classes	1
(13)	Estimated Total Number of Students	3
(14)	Fully English-Taught Course	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
(15)	Cooperative Foreign University (Please fill-in the cooperative universities if applicable)	Names of foreign cooperative universities and departments/institutes: _____ <input type="checkbox"/> Domestic Broadcast <input type="checkbox"/> Domestic Sign-off <input type="checkbox"/> Overseas Special Program <input type="checkbox"/> Dual-Degree Program <input type="checkbox"/> Other:
(16)	Course Platform URL (must be filled-in for asynchronous teaching)	NTNU online learning platform: https://moodle.ntnu.edu.tw/
(17)	Curriculum Plan URL	http://courseap.itc.ntnu.edu.tw/acadmOpenCourse/index.jsp

6. Course Teaching Design and Implementation Method

(1)	Course Goals	This course introduces STEM disciplines in Technology and Engineering. The topics cover electrical engineering, computer sciences, artificial intelligence, mechanical engineering, electro-optical engineering, robotics, biomedical engineering, vehicle engineering, energy engineering, manufacturing technology, and human factors engineering.					
(2)	Target Student Group	First-year doctoral students of the International Doctoral Program in Integrative STEM Education					
(3)	Prerequisite(s)	Students should be able to manage the ability of academic literature reading and critical thinking.					
(4)	Course Content Outline: The followings take 16 weeks per semester for example:						
	Face-to-Face Teaching		Distance learning				
			Synchronous		Asynchronous		
	at least 2 weeks		at least 3 weeks		at least 8 weeks		
Note: If the online course is offered with cooperative universities, it is not subject to the above teaching hours allocation.							
	Week	Topics (If there are multiple instructors, please specify instructor names in each week)	Learning Objectives (From the perspective of students)	Teaching Interactive Design (Multiple choices allowed)	Testing/Evaluation Activities (Multiple choices allowed. Choose "None" if not designed for the week.)	Teaching Method and Hours (fill-in the number of hours, omit if none)	
					Face-to-Face Teaching	Distance learning	
						Synchr onous	Asynch ronous
	1 Sep. 4 10:20-12:10	Course Introduction & Overview of Electrical Engineering	Understand the overall concept of Technology and Engineering	Group discussion; peer review		2	
	2 Sep. 11 10:20-12:10	Topics in Electronics Engineering	Understand the overall concept of Electronics Engineering	Topic discussion; peer review	Take-home assignment		2
	3 Sep. 18 10:20-12:10	Topics in Communication Engineering	Understand the overall concept of Communicatio	Topic discussion; peer review	Take-home assignment		2

			n Engineering					
4 Sep. 25 10:20- 12:10	Overview of Computer Sciences	Understand Electrical Engineering & the overall concept of computer sciences	Topic discussion; peer review	Take-home assignment			1	1
5 Oct. 2 10:20- 12:10	Topics in Information Engineering	Understand the overall concept of Information Engineering	Topic discussion; peer review	Take-home assignment				2
6 Oct. 9 10:20- 12:10	Topics in Artificial Intelligence and Data Sciences	Understand the overall concept of Artificial Intelligence and Data Sciences	Topic discussion; peer review	Take-home assignment				2
7 Oct. 16 10:20- 12:10	Topics in Biomedical Engineering	Understand the overall concept of Biomedical Engineering	Topic discussion; peer review	Take-home assignment				2
8 Oct. 23 10:20- 12:10	Midterm Report	Oral present the midterm essay	Group discussion; peer review	Midterm essay			2	
9 Oct. 30 10:20- 12:10	Topics in Mechanical Engineering (機電系陳順同主任) chenst@ntnu.edu.tw	Understand the overall concept of Mechanical Engineering	Topic discussion; peer review	Take-home assignment				2
10 Nov. 6 10:20-	Topics in Electro-Optical Engineering (光電所楊承山老師)	Understand the overall concept of Electro-	Topic discussion; peer review	Take-home assignment 5/16 agree				2

	12:10	csyang@ntnu.edu.tw	Optical Engineering					
	11 Nov. 13 10:20-12:10	Topics in Robotics (電機系 Saeed Saeedvand 老師) saeedvand@ntnu.edu.tw	Understand the overall concept of Robotics	Topic discussion; peer review	Take-home assignment			2
	12 Nov. 20 10:20-12:10	Topics in Vehicle Engineering (洪翊軒主任) hungyh@ntnu.edu.tw	Review of the Technology & Understand the overall concept of Vehicle Engineering	Topic discussion; peer review	Take-home assignment		1	1
	13 Nov. 27 10:20-12:10	Topics in Energy Engineering (洪翊軒主任) hungyh@ntnu.edu.tw	Understand the overall concept of Energy Engineering	Topic discussion; peer review	Take-home assignment			2
	14 Dec. 4 10:20-12:10	Topics in Manufacturing Technology (科技系蔡其瑞老師) crtai@ntnu.edu.tw	Understand the overall concept of Manufacturing Technology	Topic discussion; peer review	Take-home assignment			2
	15 Dec. 11 10:20-12:10	Topics in Human Factors Engineering (科技系簡佑宏老師) roland.chien@ntnu.edu.tw	Understand the overall concept of Human Factors Engineering	Topic discussion; peer review	Take-home assignment 5/16 agree			2
	16 Dec. 18	Final essay presentation	Oral present the final essay	Group discussion; peer review	Final essay		2	
(5)	Teaching Method	<input checked="" type="checkbox"/> if included; multiple choices allowed <input checked="" type="checkbox"/> 1. Provide primary and supplementary materials for online courses <input type="checkbox"/> 2. Provide face-to-face teaching, number: ____ time(s), total hour(s): ____ hour(s) <input checked="" type="checkbox"/> 3. Provide synchronous teaching, number: <u>5</u> time(s), total hour(s): <u>8</u> hour(s)						

		<input checked="" type="checkbox"/> 4. Provide asynchronous teaching, number: <u>13</u> time(s), total hour(s): <u>24</u> hour(s) <input checked="" type="checkbox"/> 5. Provide topic discussion activities <input checked="" type="checkbox"/> 6. Provide cooperative learning activities between students <input type="checkbox"/> 7. Mutual learning through students' works <input type="checkbox"/> 8. Other: (please specify)
(6)	Learning Management System (moodle)	<p>Which moodle functions are used in this course? (<input checked="" type="checkbox"/> if included; multiple choices allowed)</p> <p>Note: For teachers and students from domestic or foreign universities who are participating in joint programs that require access to Moodle, please have the course instructor contact the platform manager at extensions 5673 or 5579. E-mail: elearn@ntnu.edu.tw</p> <input checked="" type="checkbox"/> 1. Personal data <input checked="" type="checkbox"/> 2. Course information <input checked="" type="checkbox"/> 3. Latest News release & browse <input checked="" type="checkbox"/> 4. Course materials viewing & download <input type="checkbox"/> 5. Grade system management & inquiry (omit if inapplicable) <input checked="" type="checkbox"/> 6. Perform online testing (omit if inapplicable) <input checked="" type="checkbox"/> 7. Learning information <input checked="" type="checkbox"/> 8. Interactive learning design (chat room or discussion area) <input checked="" type="checkbox"/> 9. Other related functions: (please specify)
(7)	Public Information about Interactive Teaching	<p>Instructor Profile and Published Works (webpage link instructions can be attached):</p> <p>Prof. Wen-Chung Kao (https://drive.google.com/file/d/1Q4BU3ss_q_tSKaBxT21BqBJmsYUoU4W/view) Prof. Shun-Tong Chen (http://mfl.mt.ntnu.edu.tw/) Prof. Chan-Shan Yang (https://sites.google.com/view/units-lab/Home) Prof. Saeed Saeedvand (https://www.ee.ntnu.edu.tw/index.php/en/faculty_en/) Prof. Yi-Hsuan Hung (https://en.vee.ntnu.edu.tw/index.php/faculty-2-2/full-time/) Prof. Chi-Ruei Tsai (https://www.tahrd.ntnu.edu.tw/index.php/en/faculty-2/) Prof. Yu-Hong Chien (https://www.tahrd.ntnu.edu.tw/index.php/en/faculty-2/)</p> <hr/> <p>Instructor E-mail:</p> <p>Prof. Wen-Chung Kao (jungkao@ntnu.edu.tw) Prof. Shun-Tong Chen (chenst@ntnu.edu.tw) Prof. Chan-Shan Yang (csyang@ntnu.edu.tw) Prof. Saeed Saeedvand (saeedvand@ntnu.edu.tw) Prof. Yi-Hsuan Hung (hungyh@ntnu.edu.tw) Prof. Chi-Ruei Tsai (crtasai@ntnu.edu.tw)</p>

		Prof. Yu-Hong Chien (roland.chien@ntnu.edu.tw) Online Office Hours (at least 1 hour per week): all by appointments Prof. Wen-Chung Kao (Monday 9-12AM) Prof. Shun-Tong Chen (Thursday 9-10AM) Prof. Chan-Shan Yang (Wednesday 8-10AM) Prof. Yi-Hsuan Hung (Wednesday 8-10AM) Teaching Assistant's Name/E-mail (omit if inapplicable): Other(omit if inapplicable):
(8)	Course Material Production	(<input checked="" type="checkbox"/> if included; multiple choices allowed) <input checked="" type="checkbox"/> 1. Provides appropriate reminders of key points <input checked="" type="checkbox"/> 2. Provides teaching-related examples <input checked="" type="checkbox"/> 3. Provides teaching-related exercises and reflective activities <input checked="" type="checkbox"/> 4. Provides supplementary teaching materials or online resources <input checked="" type="checkbox"/> 5. Provides instructions for self-directed learning <input checked="" type="checkbox"/> 6. Unit goals are consistent with course goals <input type="checkbox"/> 7. Other:
(9)	Assignment Submission Method	(<input checked="" type="checkbox"/> if included; multiple choices allowed) <input checked="" type="checkbox"/> 1. Provides online assignment content description <input checked="" type="checkbox"/> 2. Assignment file upload and download <input type="checkbox"/> 3. Other: Online testing
(10)	Assessment	※ To comply with the spirit of online course design, please understand and agree to the contents of the following 3 items, and provide detailed description: <input checked="" type="checkbox"/> 1. The course can provide evaluation results and feedback for each learning evaluation <input checked="" type="checkbox"/> 2. The evaluation has taken the students online learning history and participation level into account <input checked="" type="checkbox"/> 3. The percentage of each score is explained in detail below: (Evaluation methods, and their total score percentage) (1) Assignment 60% (2) Case study reports 40%
(11)	Precautions for Class:	1. Students should regularly check the course website for updates. 2. Students should complete and submit the online discussion, assignments, and exams on time. 3. Students are encouraged to use the online discussion forum for other questions.

(12)	<p><u>Observe intellectual property rights in the creation of course content.</u></p> <ul style="list-style-type: none">※ Pay attention to any infringement of copyright or other rights in the creation of relevant teaching content.※ If the copyright for any part of the teaching content is owned by others and authorization has been obtained from the rights holder, please indicate the source of the material.
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