

# National Taiwan Normal University Online Course Teaching Plan

Instructions: According 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:** 科學－科技－工程－數學教育研究法
2. **English Course Name:** Research on STEM Education
3. **Course start date:** Spring (Fall, Spring, or Summer) semester of 2023 (yyyy)
4. **Course review submission record**( if applicable):

- (1) It is a new online course or an existing face-to-face course switching to online course in this semester
- (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** ( if applicable)

(1)	Instructor Name & Title	Dr. Yi-Fang Lee, Professor Dr. Hsun-Yu Chan, Assistant Professor
(2)	Instructor Sources	<input checked="" type="checkbox"/> Appointed by Departments <input type="checkbox"/> Appointed by General Education Center <input type="checkbox"/> Both of Above <input type="checkbox"/> Others:
(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"/> BA/MA Joint Course <input type="checkbox"/> MA/PhD 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"/> Others:
(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"/> Others:
(9)	Required/Elective Course	<input type="checkbox"/> Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/> Others:
(10)	Course Credits	3

(11)	Average of Face-to-Face Teaching Hours Per Week	<u>0.56</u> hour(s)/week (Divide the total "face-to-face teaching" hours, including the hours of face-to-face teaching and synchronous teaching, by the total number of course weeks.)
(12)	Number of Classes	1
(13)	Estimated Total Number of Students	3
(14)	EMI Courses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
(15)	Type of Cooperation with Domestic/Foreign Universities (omit if inapplicable)	1. Cooperative University: _____; Department/Institute: _____ Instructor Name: _____; Course Name: _____; Number of Students: _____ 2. <input type="checkbox"/> Partner University <input type="checkbox"/> Dual-Degree Program <input type="checkbox"/> Global Virtual Classroom Course <input type="checkbox"/> Others: _____
(16)	Course Platform Website (asynchronous teaching is required)	NTNU online learning platform: <a href="https://moodle.ntnu.edu.tw/">https://moodle.ntnu.edu.tw/</a>
(17)	Syllabus Website	<a href="http://courseap.itc.ntnu.edu.tw/acadmOpenCourse/index.jsp">http://courseap.itc.ntnu.edu.tw/acadmOpenCourse/index.jsp</a>

## 6. Course Teaching Design and Implementation Method

(1)	Course Goals	This course introduces the methodologies and data analysis techniques often used in studying the teaching/learning processes within the context of STEM disciplines. Students will probe into the similarities, distinctions and overlaps among questions posed, research designs, investigations into best practices, and generate an academic essay with respect to improving teaching and learning among STEM disciplines.															
(2)	Target Student Group	First-year doctoral students of the International Doctoral Program in Integrative STEM Education															
(3)	Prerequisite(s)	1. Basic knowledge and skills of literature critiquing 2. Basic knowledge and skills of data analysis 3. Basic knowledge and skills of academic writing															
(4)	Course Content Outline: The followings take 16 weeks per semester for example:																
	<table border="1" style="width: 100%; text-align: center;"> <tr> <td rowspan="2">Face-to-Face Teaching</td> <td colspan="2">Distance learning</td> </tr> <tr> <td>Synchronous</td> <td>Asynchronous</td> </tr> <tr> <td><b>at least 2 weeks</b></td> <td><b>at least 3 weeks</b></td> <td><b>at least 8 weeks</b></td> </tr> </table>		Face-to-Face Teaching	Distance learning		Synchronous	Asynchronous	<b>at least 2 weeks</b>	<b>at least 3 weeks</b>	<b>at least 8 weeks</b>							
Face-to-Face Teaching	Distance learning																
	Synchronous	Asynchronous															
<b>at least 2 weeks</b>	<b>at least 3 weeks</b>	<b>at least 8 weeks</b>															
Note: If the online course is offered with cooperative universities, it is not subject to the above teaching hours allocation.																	
<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Week</th> <th>Topics (If there are multiple instructors, please</th> <th>Learning Objectives (From the perspective of students)</th> <th>Teaching Interactive Design</th> <th>Testing/Evaluation Activities</th> <th>Teaching Method and Hours (fill-in the number of hours, omit if none)</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>						Week	Topics (If there are multiple instructors, please	Learning Objectives (From the perspective of students)	Teaching Interactive Design	Testing/Evaluation Activities	Teaching Method and Hours (fill-in the number of hours, omit if none)						
Week	Topics (If there are multiple instructors, please	Learning Objectives (From the perspective of students)	Teaching Interactive Design	Testing/Evaluation Activities	Teaching Method and Hours (fill-in the number of hours, omit if none)												

	specify instructor names in each week)		(Multiple choices allowed)	(Multiple choices allowed. Choose "None" if not designed for the week.)	Face-to-Face Teaching	Distance learning	
						Synchro nous	Asynchr onous
1	Course Introduction & Overview of Methodology in STEM Education	Understand the overall concept of methodology in STEM Education	<input type="checkbox"/> Topic discussion <input checked="" type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> Tests <input type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report <input type="checkbox"/> Others: _____ <input checked="" type="checkbox"/> None		3	
2	Topics in Quantitative methodology: Experimental design	Understand the concept and application of experimental design	<input checked="" type="checkbox"/> Topic discussion <input type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> Tests <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report <input type="checkbox"/> Others: _____ <input type="checkbox"/> None			3
3	Topics in Quantitative methodology: Quasi-Experimental design	Understand the concept and application of quasi-experimental design	<input checked="" type="checkbox"/> Topic discussion <input type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> Tests <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report <input type="checkbox"/> Others: _____ <input type="checkbox"/> None			3
4	Topics in Quantitative methodology: Survey methodology	Understand the concept and application of survey methods	<input checked="" type="checkbox"/> Topic discussion <input checked="" type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> Tests <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report <input type="checkbox"/> Others: _____ <input type="checkbox"/> None		1	2
5	Qualitative methodology	Understand the concept and application of qualitative methodology	<input checked="" type="checkbox"/> Topic discussion <input type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> Tests <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report <input type="checkbox"/> Others: _____ <input type="checkbox"/> None			3
6	Mixed method research	Understand the concept and application of mixed method research	<input checked="" type="checkbox"/> Topic discussion <input type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review	<input type="checkbox"/> Tests <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> _____ exam			3

			<input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> _____ report <input type="checkbox"/> Others: _____ <input type="checkbox"/> None			
7	Data analyses: Foundation Statistical	Understand the concept and application of basic statistics	<input checked="" type="checkbox"/> Topic discussion <input checked="" type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> Tests <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report <input type="checkbox"/> Others: _____ <input type="checkbox"/> None		1	2
8	Data analyses: Mean Difference/ANO VA	Understand the concept and application of mean difference and ANOVA	<input checked="" type="checkbox"/> Topic discussion <input type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> Tests <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report <input type="checkbox"/> Others: _____ <input type="checkbox"/> None			3
9	Data analyses: ANCOVA	Understand the concept and application of ANCOVA	<input checked="" type="checkbox"/> Topic discussion <input type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> Tests <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report <input type="checkbox"/> Others: _____ <input type="checkbox"/> None			3
10	Data analyses: Multiple Regression	Understand the concept and application of multiple regression	<input checked="" type="checkbox"/> Topic discussion <input checked="" type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> Tests <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report <input type="checkbox"/> Others: _____ <input type="checkbox"/> None		1	2
11	Data analyses: SEM	Understand the concept and application of SEM	<input checked="" type="checkbox"/> Topic discussion <input type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> Tests <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report <input type="checkbox"/> Others: _____ <input type="checkbox"/> None			3
12	Academic Writing: Structure and Wording of Empirical	Possess skills of structure and wording of empirical research articles	<input checked="" type="checkbox"/> Topic discussion <input type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback	<input type="checkbox"/> Tests <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report			3

		Research Articles		<input type="checkbox"/> Others: _____	<input type="checkbox"/> Others: _____ <input type="checkbox"/> None			
	13	Academic Writing: Introduction and Literature Review	Possess skills of writing introduction and literature review	<input checked="" type="checkbox"/> Topic discussion <input checked="" type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> Tests <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report <input type="checkbox"/> Others: _____ <input type="checkbox"/> None		1	2
	14	Academic Writing: Methods, Results, and Discussion	Possess skills of constructing the methods, results, and discussion	<input checked="" type="checkbox"/> Topic discussion <input type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> Tests <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report <input type="checkbox"/> Others: _____ <input type="checkbox"/> None			3
	15	Academic Writing: APA Style; Final Words	Possess skills of correctly using APA style and academic words	<input checked="" type="checkbox"/> Topic discussion <input type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> Tests <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report <input type="checkbox"/> Others: _____ <input type="checkbox"/> None			3
	16	Final essay presentation	Oral present the final essay	<input type="checkbox"/> Topic discussion <input checked="" type="checkbox"/> Group discussion <input checked="" type="checkbox"/> Peer review <input type="checkbox"/> Instructor feedback <input type="checkbox"/> Others: _____	<input type="checkbox"/> Tests <input type="checkbox"/> Assignments <input type="checkbox"/> _____ exam <input type="checkbox"/> _____ report <input checked="" type="checkbox"/> Others: <u>Final essay (draft)</u> <input type="checkbox"/> None		3	
(5)	Teaching Methods	<p>(<input checked="" type="checkbox"/> if included; multiple choices allowed)</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> 1. Provide primary and supplementary materials for online courses</li> <li><input type="checkbox"/> 2. Provide face-to-face teaching, number: _____ time(s), total hour(s): _____ hour(s)</li> <li><input checked="" type="checkbox"/> 3. Provide synchronous teaching, number: <u>6</u> time(s), total hour(s): <u>10</u> hour(s)</li> <li><input checked="" type="checkbox"/> 4. Provide asynchronous teaching, number: <u>14</u> time(s), total hour(s): <u>38</u> hour(s)</li> <li><input checked="" type="checkbox"/> 5. Provide topic discussion activities</li> <li><input checked="" type="checkbox"/> 6. Provide cooperative learning activities between students</li> <li><input type="checkbox"/> 7. Mutual learning through students' works</li> <li><input type="checkbox"/> 8. Others: (please specify)</li> </ul>						

(6)	Learning Management System (moodle)	<p>Which moodle functions are used in this course? (■ 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: <a href="mailto:ellearn@ntnu.edu.tw">ellearn@ntnu.edu.tw</a></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> 1. Personal data</li> <li><input checked="" type="checkbox"/> 2. Course information</li> <li><input checked="" type="checkbox"/> 3. Latest News release &amp; browse</li> <li><input checked="" type="checkbox"/> 4. Course materials viewing &amp; download</li> <li><input type="checkbox"/> 5. Grade system management &amp; inquiry (omit if inapplicable)</li> <li><input checked="" type="checkbox"/> 6. Perform online testing (omit if inapplicable)</li> <li><input checked="" type="checkbox"/> 7. Learning information</li> <li><input checked="" type="checkbox"/> 8. Interactive learning design (chat room or discussion area)</li> <li><input type="checkbox"/> 9. Other related functions: (please specify)</li> </ul>
(7)	Public Information about Interactive Teaching	<p>Instructor Profile and Published Works (webpage link instructions can be attached):</p> <p>Dr. Yi-Fang Lee (<a href="https://www.ie.ntnu.edu.tw/index.php/en/faculty-ivana-en/">https://www.ie.ntnu.edu.tw/index.php/en/faculty-ivana-en/</a>)</p> <p>Dr. Kuen-Yi Lin (<a href="https://www.researchgate.net/profile/Kuen-Yi-Lin">https://www.researchgate.net/profile/Kuen-Yi-Lin</a>)</p> <p>Dr. Ying-Shao Hsu (<a href="http://tile.gise.ntnu.edu.tw/Hsu.html">http://tile.gise.ntnu.edu.tw/Hsu.html</a>)</p> <p>Dr. Hsin-Kai Wu (<a href="http://tile.gise.ntnu.edu.tw/Hsu.html">http://tile.gise.ntnu.edu.tw/Hsu.html</a>)</p> <p>Dr. Hsun-Yu Chan (<a href="https://www.ie.ntnu.edu.tw/index.php/faculty-full-time/">https://www.ie.ntnu.edu.tw/index.php/faculty-full-time/</a>)</p> <hr/> <p>Instructor E-mail:</p> <p>Dr. Yi-Fang Lee (<a href="mailto:ivana@ntnu.edu.tw">ivana@ntnu.edu.tw</a>)</p> <p>Dr. Hsun-Yu Chan (<a href="mailto:hsunyuchan@ntnu.edu.tw">hsunyuchan@ntnu.edu.tw</a>)</p> <hr/> <p>Online Office Hours (at least 1 hour per week):</p> <p>Dr. Yi-Fang Lee (Thursday 6-7 PM)</p> <p>Dr. Hsun-Yu Chan (Wednesday 1-2 PM)</p> <hr/> <p>Teaching Assistant's Name/E-mail (omit if inapplicable):</p> <hr/> <p>Others(omit if inapplicable):</p>
(8)	Course Material Production	<p>(■ if included; multiple choices allowed)</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> 1. Provide appropriate reminders of key points</li> <li><input checked="" type="checkbox"/> 2. Provide teaching-related examples</li> <li><input checked="" type="checkbox"/> 3. Provide teaching-related exercises and reflective activities</li> <li><input checked="" type="checkbox"/> 4. Provide supplementary teaching materials or online resources</li> </ul>

		<input checked="" type="checkbox"/> 5. Provide instructions for self-directed learning <input checked="" type="checkbox"/> 6. Learning objectives are consistent with course goals <input type="checkbox"/> 7. Others:
(9)	Assignment Submission Method	<input checked="" type="checkbox"/> if included; multiple choices allowed <input checked="" type="checkbox"/> 1. Provide online assignment content description <input checked="" type="checkbox"/> 2. Assignment file upload and download <input type="checkbox"/> 3. Others:
(10)	Assessment	<p>※ <b>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:</b></p> <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) Assignments (30%): Students are asked to complete and submit the assignment before deadline to demonstrate their mastery of the content knowledge. (2) Class discussion (20%): Students are expected to participate in online discussion and in synchronous sessions. (3) Attendance (10%): Students are required to attend synchronous lectures. (4) Presentation (15%): Students will give a presentation to showcase their essay. (5) Final essay (25%): Students will submit a final essay at the end of the semester to demonstrate their proficiency in the course content.
(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. The instructor's and TA's office hour are scheduled on Thursday 6-7 pm and by appointment. Students can attend office hour to discuss academic matter. 4. Students are encouraged to use the online discussion forum for other questions.
(12)	<p><b><u>Observe intellectual property rights in the creation of course content.</u></b></p> ※ 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.	