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: __资料通訊__
- 2. English Course Name: <u>Data Communication</u>
- 3. Course start date: <u>Fall</u> semester of <u>2024</u>
- **4.** Course review submission record(■ if applicable):

 \Box (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 <u>Spring</u> semester of <u>2020</u>

 \Box (2.1) The 5-year validity period has expired; a new application is required.

 \Box (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	Chao Wang, Assistant Professor
(2)	Instructor Sources	Appointed by Departments Appointed by General Education Center
		Both of Above Others:
(3)	College/Department/Center	College of Science, Department of Computer Science and Information Engineering
		Undergraduate Program Master's Program
(4)	School System	BA/MA Joint Course MA/PhD Joint Course
		PhD Program Continuing Education Master's Program
(5)	Program Type	Full-time Program Part-time Program Others:
(6)	Course Type	Common Courses General Courses School Required Courses
		Professional Courses Educational Courses Other:
(7)	Required Courses	University-required College-required Graduate Institute-required
		Department-required Others: elective in the field specified in the departmental policy
(8)	Course Duration	One Semester (half year) Two Semesters (one year) Others:
(9)	Required/Elective Course	Required Elective Others:
(10)	Course Credits	3

(11)	Average of Face-to-Face Teaching Hours Per Week	_1.25_ 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	40				
(14)	EMI Courses	Yes No				
(15)	Type of Cooperation with Domestic/Foreign Universities (omit if inapplicable)	 Cooperative University:; Department/Institute: Instructor Name:; Course Name:; Number of Students: Partner University Dual-Degree Program Global Virtual Classroom Course Others: 				
(16)	Course Platform Website (asynchronous teaching is required)	NTNU online learning platform: <u>https://moodle.ntnu.edu.tw/</u>				
(17)	Syllabus Website	http://courseap.itc.ntnu.edu.tw/acadmOpenCourse/index.jsp				

6. Course Teaching Design and Implementation Method

(1)	Course Goals	e Goals The objectives of this course are for students to learn design principles in data communication, to get some ideas of networking systems analysis, and to have some hands-on experience in systems development.						
(2)	Target Stude Group	nt This course is d	This course is designed for third-/fourth-year undergraduate students and graduate students.					
(3)	Prerequisite(s) The students sh	ould have some workir	ng knowledge in both	C and Linux.			
	Course Conte	nt Outline: The foll	owings take 16 weeks	per semester for example	nple:			
	Ease to Ease Teach			Distance learning				
	Гасе-и	0-Pace Teaching	Synchron		Asynchronous			
	at least 2 weeks		at least 3 w	at least 3 weeks at				
	Note: If the online course is offered with cooperative universities, it is not subject to the above teaching hours allocation.							
(4)								
		Topics (If there are multiple instructors, please	Learning Objectives (From the perspective of students)		Testing/Evaluation	Teaching	Method and	Hours
				Teaching Interactive Design (Multiple choices allowed)	Activities (Multiple choices allowed. Choose "None" if not designed for the week.)	(fill-in the number of hours, omit if		omit if
	Weelt					none)		
	week					Face-to-	Distance lea	arning
		names in each week)				Face	Synchro A	Asynchr
						Teaching	nous	onous

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1	Course Introduction	To learn an overview of this course	 Topic discussion Group discussion Peer review Instructor feedback Others: 	□Tests □Assignments □exam □report □ Others: ■ None	2.5			
2	Broker-Based Data Communication (1) Model and Design	To learn a contemporary data communication model, design, and implementation	Topic discussion Group discussion Peer review Instructor feedback Others:	Tests Assignments		2.5		
3	Broker-Based Data Communication (2) Implementation	To learn a contemporary data communication model, design, and implementation	Topic discussion Group discussion Peer review Instructor feedback Others:	Tests Assignments			2.5	
4	Broker-Based Data Communication (3) Evaluation	To learn a contemporary data communication model, design, and implementation	Topic discussion Group discussion Peer review Instructor feedback Others:	□Tests ■Assignments □ exam □ report □Others: □None			2.5	
5	The Queueing Model	To have an initial look at the basics of queueing theory	Topic discussion Group discussion Peer review Instructor feedback Others:	□Tests ■Assignments □ exam □ report □ Others: □ None		2.5		
6	Poisson Process and Markov Chain	To explore the fundamental mathematical tools for queueing analysis	Topic discussion Group discussion Peer review Instructor feedback Others:	□Tests ■Assignments □ exam □ report □ Others: □ None			2.5	

7	Queueing Systems (1)	To see how to apply the queueing analysis to examine data communication system performance	Topic discussion Group discussion Peer review Instructor feedback Others:	□Tests ■Assignments □ exam □ report □Others: □None		2.5
8	Queueing Systems (2)	To develop analytical skills in studying data communication system performance	Topic discussion Group discussion Peer review Instructor feedback Others:	Tests Assignments		2.5
9	Case Study: The Aloha System	To be able to evaluate a classic data communication system design	Topic discussion Group discussion Peer review Instructor feedback Others:	□Tests ■Assignments □ exam □ report □Others: □None		2.5
10	Remote Procedure Calls and gRPC	To grasp the fundamental idea in RPC and its modern incarnation	Topic discussion Group discussion Peer review Instructor feedback Others:	□Tests ■Assignments □ exam □ report □Others: □None	2.5	
11	Data Communication Bus	To learn industrial standard protocols for data communication	Topic discussion Group discussion Peer review Instructor feedback Others:	□Tests ■Assignments □ exam □ report □Others: □None	2.5	
12	Wireless Data Communication	To gain insights into a typical design for wireless data communication	Topic discussion Group discussion Peer review Instructor feedback Others:	□Tests ■Assignments □ exam □ report □ Others: □ None	2.5	

	13	Time Synchronization	To see the standard approaches to synchronize computers over the network	Topic discussion Group discussion Peer review Instructor feedback Others:	Tests Assignments			2.5
	14	Communication Error Handling	To learn some fault- tolerant data communication strategies and to see the trade-offs in the design	Topic discussion Group discussion Peer review Instructor feedback Others:	Tests Assignments exam report Others: None		2.5	
	15	Case Study: LoRa and LoRaWAN	To learn a recent data communication specification in the era of Internet-of-Things	Topic discussion Group discussion Peer review Instructor feedback Others:	Tests Assignments exam report Others: None			2.5
	16	Final Exam		Topic discussion Group discussion Peer review Instructor feedback Others:	Tests Assignments	2.5		
(5)	Teaching Methods	 (if include 1. Provid 2. Provid 3. Provid 4. Provid 5. Provid 6. Provid 7. Mutua 8. Others 	d; multiple choices allow e primary and suppleme e face-to-face teaching, e synchronous teaching e asynchronous teaching e topic discussion activi e cooperative learning a l learning through studer : (please specify)	wed) entary materials for o number:2 time number:6 time g, number:8 tin ties ctivities between stu nts' works	nline courses (s), total hour(s):5 e(s), total hour(s): ne(s), total hour(s): _ dents	5 hour(s) 15 hour(s) _20 hour(s	3)	

	Learning	Which moodle functions are used in this course? (if included; multiple choices allowed)
	Management System (moodle)	 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 1. Personal data 2. Course information 3. Letert Nerry relates % herema
(6)		 3. Latest News release & browse 4. Course materials viewing & download 5. Grade system management & inquiry (omit if inapplicable) 6. Perform online testing (omit if inapplicable) 7. Learning information 8. Interactive learning design (chat room or discussion area) 9. Other related functions: (please specify)
	Public	Instructor Profile and Published Works (webpage link instructions can be attached):
	Information about Interactive Teaching	https://web.ntnu.edu.tw/~cw/authors/cw/
		Instructor E-mail: <u>cw@ntnu.edu.tw</u>
(7)		Online Office Hours (at least 1 hour per week): Wednesdays 2-3PM (by appointment)
		Teaching Assistant's Name/E-mail (omit if inapplicable): TBD
		Others(omit if inapplicable):
	Course Material	 if included; multiple choices allowed) 1. Provide appropriate reminders of key points
	Production	 2. Provide teaching-related examples 3. Provide teaching related examples and reflective activities
(8)		A Provide supplementary teaching materials or online resources
		5 Provide instructions for self-directed learning
		6 Learning objectives are consistent with course goals
		\square 7. Others:
	Assignment	(if included; multiple choices allowed)
(9)	Submission	1. Provide online assignment content description
	Method	2. Assignment file upload and download

		□ 3. Others:	
	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:	
		1. The course can provide evaluation results and feedback for each learning evaluation	
		2. The evaluation has taken the students online learning history and participation level into account	
(10)		■ 3. The percentage of each score is explained in detail below:	
		(Evaluation methods, and their total score percentage)	
		(1) Moodle Homework Assignments 60%	
		(2) Final Exam 30% (in-class written exam)	
		(3) Online/Offline Participation 10% (including Moodle platform interactions such as the forum discussion)	
	Precautions	This course is designed for third-/fourth-year undergraduate students and graduate students. Students taking this course	
(11)	for Class:	are assumed to have learned what has been covered in the first two years of study in our department (data structures,	
		algorithms, probability, etc.). We will not repeat those materials in this course.	
	Observe intelle	ctual property rights in the creation of course content.	
(12)	※ Pay attention to any infringement of copyright or other rights in the creation of relevant teaching content.		
(12)	X If the copyright for any part of the teaching content is owned by others and authorization has been obtained from the rights holder,		
	please indica	te the source of the material.	