

**Course Structure for Ph. D Program**  
**Department of Computer Science and Information Engineering**  
**National Taiwan Normal University**

Adaptive to Class of	Required Credit(s)	Elective Credit(s)	Free Elective Credit(s)	Minimum Total Credits for Graduation
112	0.0	22.0	0.0	22.0

Note: The first alphabet "E" on the course name refers to the course in English as a medium of instruction

**I. Required Courses: 0.0 credit is required**

**II. Elective Courses: 22.0 credits are required**

Course Code	Course Name	Credit(s)	Credit Unit		Note
			Lecture Hour	Lab/Practice Hour	
<b>1 Seminar 4.0 credits are required,</b>					
CSC0057	1-1 Seminar on Communication Networks (I)	1.0	0.0	2.0	This course can be retaken
CSC0058	1-2 Seminar on Communication Networks (II)	1.0	0.0	2.0	This course can be retaken
CSC0059	1-3 Seminar on Information Systems (I)	1.0	0.0	2.0	This course can be retaken
CSC0060	1-4 Seminar on Information Systems (II)	1.0	0.0	2.0	This course can be retaken
CSC0061	1-5 Seminar on Multimedia Engineering (I)	1.0	0.0	2.0	This course can be retaken
CSC0062	1-6 Seminar on Multimedia Engineering (II)	1.0	0.0	2.0	This course can be retaken
<b>2 Elective Courses 18.0 credits are required</b> <small>To register the courses provided in other schools or other departments, the student have to follow the related requirements of course registration in CSIE NTNU and NTNU. Besides, the course registration has to be agreed by the research advisor of the student.</small>					
<b>2-1 Communication Networks</b>					
CSC0036	2-1-1 E Advanced Computer Networks	3.0	3.0	0.0	
CSC0020	2-1-2 Distributed Processing Systems	3.0	3.0	0.0	
CSC0052	2-1-3 Queueing Theory	3.0	3.0	0.0	
<b>2-2 Information Systems</b>					
CSC0016	2-2-1 Advanced Operating Systems	3.0	3.0	0.0	
CSC0017	2-2-2 Advanced Algorithms	3.0	3.0	0.0	
CSC0015	2-2-3 Advanced Computer Architectures	3.0	3.0	0.0	
<b>2-3 Multimedia Engineering</b>					
CSC0051	2-3-1 Advanced Image Processing	3.0	3.0	0.0	
CSC0049	2-3-2 Advanced Computer Graphics	3.0	3.0	0.0	
CSC0039	2-3-3 Machine Learning	3.0	3.0	0.0	
<b>2-4 Other</b>					
CSC0065	2-4-1 Special Topic: Information Systems (I)	3.0	3.0	0.0	
CSC0067	2-4-2 Special Topic: Communication Networks (I)	3.0	3.0	0.0	
CSC0002	2-4-3 Data Compression	3.0	3.0	0.0	
CSC0008	2-4-4 Digital Signal Processing	3.0	3.0	0.0	
CSC0013	2-4-5 Stochastic Processes	3.0	3.0	0.0	
CSC0014	2-4-6 Information Retrieval and Extraction	3.0	3.0	0.0	
CSC0018	2-4-7 Theory of Computation	3.0	3.0	0.0	
CSC0023	2-4-8 Natural Language Processing	3.0	3.0	0.0	
CSC0027	2-4-9 Embedded System Design	3.0	3.0	0.0	
CSC0029	2-4-10 E Computer Vision	3.0	3.0	0.0	
CSC0030	2-4-11 Pattern Recognition	3.0	3.0	0.0	
CSC0031	2-4-12 Fuzzy Theory	3.0	3.0	0.0	
CSC0032	2-4-13 E Artificial Neural Network	3.0	3.0	0.0	
CSC0037	2-4-14 E Bioinformatics	3.0	3.0	0.0	
CSC0040	2-4-15 Advanced Database Systems	3.0	3.0	0.0	
CSC8001	2-4-16 Concrete Mathematics	3.0	3.0	0.0	

**III. Free Elective Credits: 0.0 credit is required**