

# **Department of Computer Science and Engineering**

## **Program of Computer Science and Technology for International Students (2024)**

### **I. Introduction**

Computer Science and Technology is an area with great market demand and potential, in an acute shortage of fully developed talents. With the rapid development of data, information, and AI technologies, which boost modern enterprises, the shortage will grow exponentially. Predictably, those high-quality, innovative, interdisciplinary IT talents will be highly appreciated by the market as the up-to-date computer technology grows intensive, ubiquitous, interdisciplinary, and competitive.

Academic subject areas: Computer

Program code: 080901

### **II. Objectives and Learning Outcomes**

#### 1. Objectives

This major will cultivate high-quality computer science and technology talents with solid theoretical foundations, modern system design principles, effective research and exploration methods, and useful English and computer application skills, who are competent to the positions from the design of computer systems to the development of computer applications.

#### 2. Learning Outcomes

The graduates can continue the study in pursue of higher degrees or work in IT related education, management, scientific research and industrial applications in universities, research institutes, administrations, public sectors and industries.

### **III. Study Length, Degree, and Graduation Requirements**

1. Study length: 4 years.

2. Degree conferred: Students who complete and meet the degree requirements of the

undergraduate program will be awarded a bachelor's degree in Engineering

3. The minimum credit requirement for graduation: 148 credits. The specific requirements are as follows.

<b>Module</b>		<b>Category</b>	<b>Minimum Credit Requirement</b>
General Education Courses	Chinese Language and Culture Module	Chinese Language and Culture	16
	Arts and Physical Education Module	Physical Education	4
		Arts	2
	Competence Development Module	Computer Programming	3
		Writing	2
		Foreign Languages	14
	Humanities and Social Sciences Module	Humanities	6
		Social Sciences	
		Chinese Studies	2
	Mathematics and Natural Sciences Module	Mathematics	12
		Physics	10
Chemistry		3	
Geoscience + Life Science		3	
GE to Majors Bridging Module	Introduction to Majors	2	
Major Courses	Major Required Courses	Major Foundational Courses	21
		Major Core Courses	18
		Practice-based Learning (Undergraduate Thesis, Internships)	14
	Major Elective Courses	Major Elective Courses	16
Total			148
Note: please see the General Education Requirement for more details on Chinese Language and Culture Module, Arts and Physical Education Module, Competence Development Module (Foreign Languages & Writing) , Humanities and Social Sciences Module, and GE to Majors Bridging Module.			

**IV. Course Requirements for the Mathematics and Natural Sciences Module and Computer Programming**

Course Category	Course Code	Course Name	Credits	Terms	Prerequisite	Dept.
Mathematics	MA117	Calculus I	4	1 Fall	NA	MATH
	MA127	Calculus II	4	1Spr	Calculus I	
	MA113	Linear Algebra	4	1 Spr/Fall	NA	
Physics	PHY105	College Physics I	4	1 Fall	NA	PHY
	PHY106	College Physics II	4	1Spr	College Physics I	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spr/Fall	NA	
Chemistry	CH105	Chemistry: the Central Science	3	1-2 Spr/Fall	NA	CHM
Geoscience + Life Science	BIO102B	Introduction to Life Science	3	1-2 Spr/Fall	NA	BIO
	EOE100	Introduction to Earth Sciences	3	1-2 Spr/Fall	NA	ESS, OCE, ESE
Computer Programming	CS109	Introduction to Computer Programming	3	1-2 Spr/Fall	NA	CSE

**Note:**

1. Students can take Mathematical Analysis I II as an alternative to Calculus I II.
2. Students can take Advanced Linear Algebra I as an alternative to Linear Algebra.
3. Students can take General Physics I II as an alternative to College Physics I II.
4. Students can take General Chemistry as an alternative to Chemistry: the Central Science.
5. Students can take Introduction to Life Science or Introduction to Earth Sciences.
6. Students can take Principles of Biology as an alternative to Introduction to Life Science.
7. The above alternatives are also applicable to "Prerequisites for Major Declaration."

## V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA117	Calculus I	NA
	MA127	Calculus II	Calculus I
	MA113	Linear Algebra	NA
	PHY105	College Physics I	NA
	PHY106	College Physics II	College Physics I
	PHY104B	Experiments of Fundamental Physics	NA
	CH105	Chemistry: the Central Science	NA
	BIO102B/ EOE100	Introduction to Life Science/Introduction to Earth Sciences	NA
	CS109	Introduction to Computer Programming	NA
Declare major at the end of the second academic year	MA117	Calculus I	NA
	MA127	Calculus II	Calculus I
	MA113	Linear Algebra	NA
	PHY105	College Physics I	NA
	PHY106	College Physics II	College Physics I
	PHY104B	Experiments of Fundamental Physics	NA
	CH105	Chemistry: the Central Science	NA
	BIO102B/ EOE100	Introduction to Life Science/Introduction to Earth Sciences	NA
	CS109	Introduction to Computer Programming	NA
Note:			
<ol style="list-style-type: none"> <li>1. If the number of students entering a major at the end of the first academic year in the department is greater than or equal to the total number of the teaching-research faculty (PI)*2*60%, all majors in the department may implement the prerequisites for major declaration at the end of the second academic year.</li> <li>2. If the number of students entering a major at the end of the first academic year in the department is less than the total number of the teaching-research faculty (PI)*2*60%, all majors in the department do not implement the prerequisites for major declaration at the end of the second academic year.</li> <li>3. Suppose the number of students applying for a major at the end of the first academic year exceeds four times the total number of the teaching-research faculty (PI), then the department may select students according to predetermined rules. In principle, the rules set by the department shall examine the students' suitability for the major and not based on weighted GPA (Specific rules shall be set by the department and announced in advance).</li> <li>4. For departments that do not implement prerequisites for major declaration at end of the second academic year, if the cumulative number of students applying for a major at the end of the second academic year and the number of students who have entered a major at the end of the first academic year exceeds four times the total number of the teaching-research faculty (PI), the department may select students according to predetermined rules. In principle, the rules set by the department shall examine the students' suitability for the major and not based on weighted GPA (Specific rules shall be set by the department and announced in advance).</li> </ol>			

## VI: Major Course Arrangement

**Table 1: Major Required Courses**

### Program of Computer Science and Technology

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	CS203	Data Structures and Algorithm Analysis	3	1	2/Fall	CS109	CSE
	CS207	Digital Logic	3	1	2/Fall	NA	CSE
	STA219	Probability and Statistics for Engineering	3		2/Fall	MA127, MA113	STA
	CS307	Principles of Database Systems	3	1	2/Fall	CS109	CSE
	CS201	Discrete Mathematics	3		2/Spr	MA127, MA113	CSE
	CS202	Computer Organization	3	1	2/Spr	CS207	CSE
	CS208	Algorithm Design and Analysis	3	1	2/Spr	CS203	CSE
	<b>Total</b>			21	5		
1. Students can take Probability and Statistics as an alternative to Probability and Statistics for Engineering.							
2. Students can take Mathematical Statistics and Probability Theory as an alternative to Probability and Statistics for Engineering.							
Major Core Courses	CS323	Compilers	3	1	3 / Fall	CS219, CS202	CSE
	CS305	Computer Networks	3	1	3 / Fall	CS109	CSE
	CS321	Group Projects I	2	2	3 / Fall	NA	CSE
	CS302	Operating Systems	3	1	3 / Spr	CS203, CS202	CSE
	CS304	Software Engineering	3	1	3 / Spr	CS203	CSE
	CS326	Group Projects II	2	2	3 / Spr	NA	CSE
	CS413	Group Projects III	2	2	4 / Fall	NA	CSE
	<b>Total</b>			18	10		
Practice-based Courses	CS470	Industrial Practice	2	2			
	CS491	Undergraduate Thesis/Projects	12	12			
	<b>Total</b>			14	14		
<b>Total</b>			53	29			

**Table 2: Major Elective Courses**

**Program of Computer Science and Technology**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CS101A	Introduction to Computer Science A	2		1 / Fall	NA	CSE
CS106	Introduction to Cognitive Science	2		1 / Fall	NA	CSE
CS105	Lab of Introduction to Cognitive Science	1	1	1 / Fall	NA	CSE
CS104	Introduction to Mathematical Logic	2		1 / Spr	NA	CSE
CS209A	Computer System Design and Applications A	3	1	1 / Spr	CS109 or CS110	CSE
EE205	Signals and Systems	3	1	2 / Fall	MA117	EE
CS219	Advanced Programming	3	1	2 / Fall	CS109	CSE
MA305	Numerical Analysis	3		3 / Fall	MA203a or MA213-16	MATH
MA309	Time Series Analysis	3		3 / Fall	MA212 or MA204	STAT
EE323	Digital Signal Processing	3	1	3 / Fall	EE205	EE
CS303	Artificial Intelligence	3	1	3 / Fall	CS203, STA219	CSE
CS315	Computer Security	3	1	3 / Fall	CS109	CSE
CS325	Multi-Agent Systems	3	1	3 / Fall	CS203	CSE
CS327	The Theory of Computation	2		3 / Fall	CS101A, CS104	CSE
CS301	Embedded System and Microcomputer Principle	3	1	3 / Fall	CS207	CSE
CS309	Object-oriented Analysis and Design	3	1	3 / Fall	CS203	CSE
MA234	Introduction to Theoretical and Practical Data Science	4	1	3 / Spr	MA212	MATH
EE326	Digital Image Processing	3	1	3 / Spr	EE205	EE
CS308	Computer Vision	3	1	3 / Spr	CS203, MA127, MA113	CSE
CS306	Data Mining	3	1	3 / Spr	CS203 or CS203B	CSE
CS324	Deep Learning	3	1	3 / Spr	CS303	CSE
CS312	Computer Graphics	3	1	3 / Spr	NA	CSE
CS314	Internet of Things	3	1	3 / Spr	CS305	CSE
CS310	Natural Language Processing	3	1	3 / Spr	CS303	CSE
CS330	Multimedia Information Processing	3	1	3 / Spr	NA	CSE
CS332	Information Retrieval	3	1	3 / Spr	CS203	CSE
CS328	Distributed and Cloud Computing	3	1	3 / Spr	CS305	CSE
CS338	Introduction to Theory of Computation	3	1	3 / Spr	CS203	CSE
CS342	Optimization Methods	3	1	3 / Spr	NA	CSE
CS340	Computational Ethics	3	1	3 / Spr	CS303	CSE
CS401	Intelligent Robotics	3	1	3 / Spr	CS203, STA219	CSE
EE411	Information Theory and Coding	2		4 / Fall	MA212	EE
CS405	Machine Learning	3	1	4 / Fall	STA219	CSE

CS409	Software Testing	3	1	4 / Fall	CS304	CSE
CSE5005	Advanced Computer Networks and Big Data	3	1	4 / Fall	CS305	CSE
CSE5001	Advanced Artificial Intelligence	3	1	4 / Fall	CS303	CSE
CSE5019	Reinforcement Learning	3	1	4 / Fall	CS303	CSE
CSE5010	Wireless Network and Mobile Computing	3	1	4 / Fall	NA	CSE
CSE5003	Advanced Algorithms	3	1	4 / Fall	CS342	CSE
CSE5012	Evolutionary Computation and Its Applications	3	1	4 / Spr	CS303	CSE
CSE5022	Advanced Multi Agent Systems	3	1	4 / Spr	CS203, STA219	CSE
CSE5014	Cryptography and Network Security	2		4 / Spr	CS201, STA219, CS203	CSE
CS402	Frontier Seminars in Computer Science and Technology IV	1		4 / Spr	NA	CSE
<b>Total</b>		120	34			

**Table 3: Overview of Practice-based Learning**

**Program of Computer Science and Technology**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CS105	Lab of Introduction to Cognitive Science	1	1	1 / Fall	NA	CSE
CS209A	Computer System Design and Applications A	3	1	1 / Spr	CS109 or CS110	CSE
EE205	Signals and Systems	3	1	2 / Fall	MA117	EE
CS219	Advanced Programming	3	1	2 / Fall	CS109	CSE
CS203	Data Structures and Algorithm Analysis	3	1	2 / Fall	CS109	CSE
CS207	Digital Logic	3	1	2 / Fall	NA	CSE
CS307	Principles of Database Systems	3	1	2 / Fall	CS109	CSE
CS202	Computer Organization	3	1	2/ Spr	CS207	CSE
CS208	Algorithm Design and Analysis	3	1	2/ Spr	CS203	CSE
EE323	Digital Signal Processing	3	1	3 / Fall	EE205	EE
CS323	Compilers	3	1	3 / Fall	CS219, CS202	CSE
CS315	Computer Security	3	1	3 / Fall	CS109	CSE
CS325	Multi-Agent Systems	3	1	3 / Fall	CS203	CSE
CS301	Embedded System and Microcomputer Principle	3	1	3 / Fall	CS207	CSE
CS303	Artificial Intelligence	3	1	3 / Fall	CCS203, STA219	CSE
CS305	Computer Networks	3	1	3 / Fall	CS109	CSE
CS309	Object-oriented Analysis and Design	3	1	3 / Fall	CS203	CSE
CS321	Group Projects I	2	2	3 / Fall	NA	CSE
MA234	Introduction to Theoretical and Practical Data Science	4	1	3 / Spr	MA212	MATH

CS302	Operating Systems	3	1	3/ Spr	CS203, CS202	CSE
CS304	Software Engineering	3	1	3/ Spr	CS203	CSE
CS326	Group Projects II	2	2	3/ Spr	NA	CSE
CS308	Computer Vision	3	1	3/ Spr	CS203,MA127,MA113	CSE
CS306	Data Mining	3	1	3/ Spr	CS203 or CS203B	CSE
CS324	Deep Learning	3	1	3 / Spr	CS303	CSE
CS312	Computer Graphics	3	1	3/ Spr	NA	CSE
CS314	Internet of Things	3	1	3/ Spr	CS305	CSE
CS310	Natural Language Processing	3	1	3 / Spr	CS303	CSE
CS330	Multimedia Information Processing	3	1	3 / Spr	NA	CSE
CS332	Information Retrieval	3	1	3 / Spr	CS203	CSE
CS328	Distributed and Cloud Computing	3	1	3 / Spr	CS305	CSE
CS338	Introduction to Theory of Computation	3	1	3 / Spr	CS203	CSE
CS342	Optimization Methods	3	1	3 / Spr	NA	CSE
CS340	Computational Ethics	3	1	3 / Spr	CS303	CSE
CS401	Intelligent Robotics	3	1	3/ Spr	CS203, STA219	CSE
EE326	Digital Image Processing	3	1	3/ Spr	EE205	EE
CS413	Group Projects III	2	2	4 / Fall	NA	CSE
CS405	Machine Learning	3	1	4 / Fall	STA219	CSE
CS409	Software Testing	3	1	4 / Fall	CS304	CSE
CSE5005	Advanced Computer Networks and Big Data	3	1	4 / Fall	CS305	CSE
CSE5001	Advanced Artificial Intelligence	3	1	4 / Fall	CS303	CSE
CSE5019	Reinforcement Learning	3	1	4 / Fall	CS303	CSE
CSE5010	Wireless Network and Mobile Computing	3	1	4 / Fall	NA	CSE
CSE5003	Advanced Algorithms	3	1	4 / Fall	CS342	CSE
CSE5012	Evolutionary Computation and Its Applications	3	1	4 / Spr	CS303	CSE
CSE5022	Advanced Multi Agent Systems	3	1	4 / Spr	CS203, STA219	CSE
CS470	Industrial Practice	2	2			
CS491	Undergraduate Thesis/Projects	12	12			
Total		148	63			



## Curriculum Structure of Computer Science and Technology

