Program of Intelligence Science and Technology for International Students (2019)

I. Introduction

Intelligence Science and Technology is emerging as a new high-tech frontier major which combines many other fields of study, such as Computer Science, Control Science, Information Science and Cognitive Science. It involves data mining, machine leaning, human-machine interactive, mathematical logic, intelligent sensing, robots, and the new era of network computing technology. This major can dramatically promote the rapid development of various kinds of intelligent systems and key technologies closely related to national economy, industrial manufacturing and people's daily life.

Intelligent science has been recognized as the key engine that drives the world's technology development since this century, and thus Intelligent Science and Technology is one of the most promising majors worldwide.

II. Objectives and Learning Outcomes

This major is aiming at cultivating talents who possess a high standard of ethics and rich cultural scientific literacy, with basic theory, knowledge and skills of computational intelligence, data intelligence, machine intelligence, and information intelligence and so on, as well as strong adaptability and modern scientific sense of innovation. After graduation, students can not only engage in research, exploitation, management, or teaching in intelligent science and technology field in corporations, scientific research institutes, universities, but also continue their postgraduate studies in Intelligence Science and Technology and related or interdisciplinary fields.

Graduates should acquire the following knowledge and abilities:

1. Solid fundamental knowledge of mathematics, physics, information processing, computer and computing technology.

2. Master the basic skills of computational intelligence, data intelligence, machine intelligence and information intelligence.

3. Strong self-study ability, hands-on ability, sense of innovation and high comprehensive quality.

4. Understanding of the frontiers, latest developments and trends in the field of computer and information systems, and intelligent science and technology.

5. Understanding of the frontier theories of artificial intelligence and intelligent system. Possess the preliminary ability to do researches, develop new systems, and technologies.

III. Study Length and Graduation Requirements

Study length: 4 years

Degree conferred: Bachelor of Engineering

The minimum credit requirement for graduation: 129 credits (not including English courses);

Category	Module	Minimum Credit Requirement
General Education (GE) Required Courses (48 creidts)	Science	28
	Physical Education	4
	Chinese Languages & Culture	16
General Education (GE) Elective Courses (12 creidts)	Humanities	4
	Social Sciences	4
	Arts	2
	Science	2
Major Course (69 creidts)	Major Foundational Courses	20
	Major Core Courses	18
	Major Elective Courses	21
	Internship and Undergraduate Thesis / Projects	10
Total (not including English courses)		129

IV. Discipline

Intelligence Science and Technology

V. Main Courses

Introduction to Mathematical Logic, Probability and Statistics, Data Structures and Algorithm Analysis, Principles of Database Systems, Signals and Systems, Discrete Mathematics, Algorithm Design and Analysis, Artificial Intelligence, Machine Learning, Operating Systems and so on.

VI. Practice-Based Courses

See the table 3 of Major Course Arrangement.

VII. Pre-requisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of First Year	MA101B	Calculus I A	
	MA102B	Calculus II A	MA101B
	MA107A	Linear Algebra A	
	PHY103B	General Physics B (I)	
	PHY105B	General Physics B (II)	PHY103B
	CS102A	Introduction to Computer Programming A	
	BIO102B	Introduction to Life Science	
	PHY104B	Experiments of Fundamental Physics	
	CS104	Introduction to Mathematical Logic	
Remarks: In addition to the above 9 courses, a written test and interview are required.			
Declare major at the end of Second Year	MA101B	Calculus I A	
	MA102B	Calculus II A	MA101B
	MA107A	Linear Algebra A	
	PHY103B	General Physics B (I)	
	PHY105B	General Physics B (II)	PHY103B
	CS102A	Introduction to Computer Programming A	
	BIO102B	Introduction to Life Science	
	PHY104B	Experiments of Fundamental Physics	
	CS104	Introduction to Mathematical Logic	
	MA212	Probability and Statistics	MA102a or MA102B
	CS203	Data Structures and Algorithm Analysis	CS102A
	CS307	Principles of Database Systems	CS102A
	EE205	Signals and Systems	MA101B
	CS201	Discrete Mathematics	MA102B, MA107A
	CS208	Algorithm Design and Analysis	CS102A, CS203

VIII. Requirements for GE Required Courses

(I) Science Module

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Language Instruction	Prerequisite	Dept
MA101B	Calculus I A	4		4	Spr/Fall	B/E	NA	MATH
MA102B	Calculus II A	4		4	Spr/Fall	B/E	MA101B	MATH
MA107A	Linear Algebra A	4		4	Spr/Fall	B/E	NA	MATH
PHY103B	General Physics B (I)	4		4	Spr/Fall	B/E	NA	PHY
PHY105B	General Physics B (II)	4		4	Spr/Fall	B/E	PHY103B	PHY
CS102A	Introduction to Computer Programming A	3		4	Spr/Fall	B/E	NA	CSE
BIO102B	Introduction to Life Science	3	1	3	Spr/Fall	B/E	NA	BIO
PHY104B	Experiments of Fundamental Physics	2	2	4	Spr/Fall	B/E	NA	PHY
	Total	28	3	31				

(II) Physical Education

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Language Instruction	Prerequisite	Dept
GE131	Physical Education I	1		2	1/Fall	C	NA	PE Center
GE132	Physical Education II	1		2	1/Spr	C	NA	
GE231	Physical Education III	1		2	2/Fall	C	NA	
GE232	Physical Education IV	1		2	2/Spr	C	NA	
	Total	4		8				

(III) Chinese Languages & Culture

Course Code	Course Name	Credit	Hours/week	Term	Language Instruction	Prerequisite	Dept
CLE008	Elementary Chinese I	2	4	1/Fall	B	NA	CLE
CLE009	Elementary Chinese II	2	4	1/Spr	B	CLE008	

CLE027	Intermediate Chinese I	2	4	2/Fall	B	CLE009	
CLE028	Intermediate Chinese II	2	4	2/Spr	B	CLE027	
CLE031	Advanced Chinese I	2	4	3/Fall	B	CLE028	
CLE032	Advanced Chinese II	2	4	3/Spr	B	CLE031	
CLE033	Chinese Culture	2	2	Spr/Fall	B/E	NA	CLE/ HUM/ SSC
CLE034	Chinese History	2	2	Spr/Fall	B/E	NA	
Total		16	28				

(IV) English Language

All students are required to undertake the English Placement Test before selecting courses, based on which students will be assigned to 3 levels to be ready for the courses with English as the instruction language.

SUSTech English III, English for Academic Purposes are required for Level A.

SUTech English II, SUSTech English III, English for Academic Purposes for Level B.

SUSTech English I, SUSTech English II, SUSTech English III, English for Academic for Level C.

Course Code	Course Name	Credit	Hours/week	Instruction Language	Prerequisite	Dept
CLE021	SUSTech English I	4	4	E	NA	CLE
CLE022	SUSTech English II	4	4	E	CLE021	
CLE023	SUSTech English III	4	4	E	CLE022	
CLE030	English for Academic Purposes	2	2	E	CLE023	

IX. Requirements for GE Elective Courses

(I) Students are required to complete 4 credits for the Humanities Module and Social Sciences Module respectively, and 2 credits for the Music and Art Module. (Information about the available courses and the instruction language will be announced before the course selection session)

(II) Students are required to complete 2 credits for Science Module.

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Language Instruction	Prerequisite	Dept
CH101B	General Chemistry B	3		3	Spr/Fall	B/E	NA	CHEM
EE104	Fundamentals of Electric Circuits	2		2	Spr	E	MA101B MA107A	EE
ME112	Introduction to Matlab	2	1	3	Spr	E	NA	MEE

ME232	Prolegomenon to Robotics	3		3	Spr	E	NA	MEE
CS103	Introduction to Artificial Intelligence	2		2	Fall	E	NA	CSE
Total		12	1	13				

X. Major Course Arrangement

Table 1: Major Required Course (Foundational and Core Courses)

Course Category	Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Advised term to take the course	Instruction language	Prerequisite	Dept.
Major Foundational Courses	CS104	Introduction to Mathematical Logic	2		2	Spr	1/Spr	E	NA	CSE
	MA212	Probability and Statistics	3		3	Fall	2/Fall	E	MA102a or MA102B	MATH
	CS203	Data Structures and Algorithm Analysis	3	1	4	Fall	2/Fall	E	CS102A	CSE
	CS307	Principles of Database Systems	3	1	4	Fall	2/Fall	E	CS102A	CSE
	EE205	Signals and Systems	3	1	4	Fall	2/Fall	E	MA101B	EE
	CS201	Discrete Mathematics	3		3	Fall /Spr	2/Spr	E	MA102B, MA107A	CSE
	CS208	Algorithm Design and Analysis	3	1	4	Spr	2/Spr	E	CS102A, CS203	CSE
		Total	20	4	24					
Major Core Courses	CS303	Artificial Intelligence	3	1	4	Fall	3/Fall	E	CS102A, CS203, MA212	CSE
	CS405	Machine Learning	3	1	4	Fall	3/Fall	E	MA107A, MA212	CSE
	CS321	Group Projects I	2	2	4	Fall	3/Fall	E	NA	CSE
	CS317	Frontier Seminars in Computer Science and Technology I	1		1	Fall	3/Fall	E	NA	CSE
	CS302	Operating Systems	3	1	4	Spr	3/Spr	E	CS102A, CS203	CSE
	CS326	Group Projects II	2	2	4	Spr	3/Spr	E	NA	CSE
	CS318	Frontier Seminars in Computer Science and Technology II	1		1	Spr	3/Spr	E	NA	CSE
	CS413	Group Projects III	2	2	4	Fall	4/Fall	E	NA	CSE

	CS415	Frontier Seminars in Computer Science and Technology III	1		1	Fall	4/Fall	E	NA	CSE
	Total		18	9	27					
Major Practice Courses	CS470	Industrial Practice	2							
	CS490	Undergraduate Thesis/Projects	8							
	Total		10							
	Remarks: Students who have completed Comprehensive Design Ⅰ & Ⅱ (COE491 & COE492) are not required to take Undergraduate Thesis/Projects (CS490)									

Table 2: Major Elective Courses

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Advised term to take the course	Instruction language	Prerequisite	Dept.
CS101A	Introduction to Computer Science A	2		2	Fall	1/ Fall	E	NA	CSE
CS106	Introduction to Cognitive Science	2		2	Fall	1/ Fall	E	NA	CSE
CS209A	Computer System Design and Applications A	3	1	4	Fall/ Spr	1/Spr	E	CS102A or CS102B	CSE
CS205	C/C++ Program Design	3	1	4	Fall/ Spr	2/ Fall	E	NA	CSE
CS207	Digital Logic	3	1	4	Fall	2/ Fall	E	NA	CSE
CS202	Computer Organization	3	1	4	Spr	2/ Spr	E	CS207	CSE
CS306	Data Mining	3	1	4	Spr	2/Spr	E	CS203 or CS203B	CSE
MA309	Time Series Analysis	3		3	Fall	3/ Fall	E	MA212 or MA204	MATH
MA305	Numerical Analysis	3		3	Fall	3/ Fall	E	MA203a or MA213	MATH
EE323	Digital Signal Processing	3	1	4	Fall	3/ Fall	E	EE205	EE
CS301	Embedded System and Microcomputer Principle	3	1	4	Fall	3/ Fall	E	CS207	CSE
CS305	Computer Networks	3	1	4	Fall	3/ Fall	E	CS102A	CSE
CS309	Object-oriented Analysis and Design	3	1	4	Fall	3/ Fall	E	CS102A, CS203	CSE
CS313	Automated Reasoning	3	1	4	Fall	3/ Fall	E	CS104	CSE
CS323	Compilers	3	1	4	Fall	3 /Fall	E	CS102A or CS205, CS202	CSE
CS308	Computer Vision	3	1	4	Fall	3/ Fall	E	CS102A CS203 MA102B MA107A	CSE
CS315	Computer Security	3	1	4	Fall	3/ Fall	E	CS205	CSE
CS325	Multi-agent Systems	3	1	4	Fall	3/ Fall	E	CS102A, CS203, MA212	CSE
CS304	Software Engineering	3	1	4	Spr	3/ Spr	E	CS102A, CS203	CSE
CS312	Computer Graphics	3	1	4	Spr	3/Spr	E	NA	CSE
CS314	Internet of Things	3	1	4	Spr	3/Spr	E	CS305	CSE
CS324	Deep Learning	3	1	4	Spr	3/Spr	E	CS303	CSE
CS401	Intelligent Robotics	3	1	4	Spr	3/Spr	E	CS102A, CS203, MA212	CSE

MA333	Introduction to Big Data Science	3		3	Spr	3/Spr	E	MA212 or MA215	MATH
CS310	Natural Language Processing	3	1	4	Spr	3/Spr	E	CS203 CS303	CSE
EE326	Digital Image Processing	3	1	4	Spr	3/Spr	E	EE205	EE
EE411	Information Theory and Coding	2		2	Fall	4/ Fall	E	MA212	EE
CS403	Cryptography and Network Security	2		2	Fall	4/ Fall	E	CS201, MA212, CS203	CSE
CS407	Advanced Computer Networks and Big Data	3	1	4	Fall	4/ Fall	E	CS305	CSE
CS409	Software Testing	3	1	4	Fall	4/ Fall	E	CS304	CSE
CS419	Advanced Algorithms	3	1	4	Fall	4/ Fall	E	CS208	CSE
CS421	Advanced Artificial Intelligence	3	1	4	Fall	4/ Fall	E	CS303	CSE
CS408	Evolutionary Computation and Its Applications	3	1	4	Spr	4/Spr	E	CS303	CSE
CS406	Advanced Optimization Algorithms	3	1	4	Spr	4/Spr	E	CS419	CSE
CS402	Frontier Seminars in Computer Science and Technology IV	1		1	Spr	4/Spr	E	NA	CSE
Total		99	27	126					

Remarks: 1. Students are required to study three courses of them (Computer Vision, Intelligent Robotics, Multi-agent Systems, Deep Learning).

2. Students are required to study one course of them (Automated Reasoning, Natural Language Processing).

3. Students are required to complete 21 credits for the Major Elective Courses.

Table 3: Overview of Practice-Based Courses

Course Code	Course Name	Credit	Lab Credits	Hours/week	Term	Advised term to take the course	Instruction language	Prerequisite	Dept.
CS209A	Computer System Design and Applications A	3	1	4	Spr	1/Spr	E	CS102A or CS102B	CSE
CS203	Data Structures and Algorithm Analysis	3	1	4	Fall	2/Fall	E	CS102A	CSE
CS307	Principles of Database Systems	3	1	4	Fall	2/Fall	E	CS102	CSE
EE205	Signals and Systems	3	1	4	Fall	2/Fall	E	MA101B	EE
CS205	C/C++ Program Design	3	1	4	Fall / Spr	2/Fall	E	NA	CSE
CS207	Digital Logic	3	1	4	Fall	2/Fall	E	NA	CSE
CS208	Algorithm Design and Analysis	3	1	4	Spr	2/Spr	E	CS102A, CS203	CSE
CS202	Computer Organization	3	1	4	Spr	2/Spr	E	CS207	CSE
CS306	Data Mining	3	1	4	Spr	2/Spr	E	CS203 or CS203B	CSE
CS303	Artificial Intelligence	3	1	4	Fall	3/Fall	E	CS102A, CS203, MA212	CSE
CS405	Machine Learning	3	1	4	Fall	3/Fall	E	MA107A, MA212	CSE
CS321	Group Projects I	2	2	4	Fall	3/Fall	E	NA	CSE
EE323	Digital Signal Processing	3	1	4	Fall	3/Fall	E	EE205	EE
CS301	Embedded System and Microcomputer Principle	3	1	4	Fall	3/Fall	E	CS207	CSE
CS305	Computer Networks	3	1	4	Fall	3/Fall	E	CS102A	CSE
CS309	Object-oriented Analysis and Design	3	1	4	Fall	3/Fall	E	CS102A, CS203	CSE
CS313	Automated Reasoning	3	1	4	Fall	3/Fall	E	CS104	CSE
CS323	Compilers	3	1	4	Fall	3/Fall	E	CS102A or CS205, CS202	CSE
CS308	Computer Vision	3	1	4	Fall	3/Fall	E	CS102A, CS203,MA102B,MA107A	CSE
CS315	Computer Security	3	1	4	Fall	3/Fall	E	CS205	CSE
CS325	Multi-agent Systems	3	1	4	Fall	3/Fall	E	CS102A, CS203, MA212	CSE
CS302	Operating Systems	3	1	4	Spr	3/Spr	E	CS102A, CS203	CSE
CS326	Group Projects II	2	2	4	Spr	3/Spr	E	NA	CSE

CS304	Software Engineering	3	1	4	Spr	3/Spr	E	CS102A, CS203	CSE
CS312	Computer Graphics	3	1	4	Spr	3/Spr	E	NA	CSE
CS314	Internet of Things	3	1	4	Spr	3/Spr	E	CS305	CSE
CS324	Deep Learning	3	1	4	Spr	3/Spr	E	CS303	CSE
CS401	Intelligent Robotics	3	1	4	Spr	3/Spr	E	CS102A, CS203, MA212	CSE
CS310	Natural Language Processing	3	1	4	Spr	3/Spr	E	CS203, CS303	CSE
EE326	Digital Image Processing	3	1	4	Spr	3/Spr	E	EE205	EE
CS413	Group Projects III	2	2	4	Fall	4/Fall	E	NA	CSE
CS407	Advanced Computer Networks and Big Data	3	1	4	Fall	4/Fall	E	CS305	CSE
CS409	Software Testing	3	1	4	Fall	4/Fall	E	CS304	CSE
CS419	Advanced Algorithms	3	1	4	Fall	4/Fall	E	CS208	CSE
CS421	Advanced Artificial Intelligence	3	1	4	Fall	4/Fall	E	CS303	CSE
CS408	Evolutionary Computation and Its Applications	3	1	4	Spr	4/Spr	E	CS303	CSE
CS406	Advanced Optimization Algorithms	3	1	4	Spr	4/Spr	E	CS419	CSE
CS470	Industrial Practice	2							
CS490	Undergraduate Thesis/Projects	8							
Total		118	40	148					

Table 4: Overview of Course Hours and Credits

Course Category	Total Course Hours	Total Credits	Credit Requirements	Percentage of the Total*
General Education (GE) Required Courses (not including English courses)			48	
General Education (GE) Elective Courses			12	
Major Foundational Courses	384	20	20	100%
Major Core Courses	432	18	18	100%
Major Elective Courses	2016	99	21	21.2%
Internship and Undergraduate Thesis/Projects		10	10	100%
Total (not including English courses)			129	

* Percentage of the total= Credit requirements of each line / Total credit requirements

Curriculum Structure of Intelligence Science and Technology Major

The first year

Fall / **Spring**

Fall	Spring
Introduction to Computer Science A	Introduction to Mathematical Logic
Introduction to Cognitive Science	Computer System Design and Applications A

The second year

Fall / **Spring**

Fall	Spring
Probability and Statistics	Discrete Mathematics
Data Structures and Algorithm Analysis	Algorithm Design and Analysis
Principles of Database Systems	Data Mining
Signals and Systems	Computer Organization
Digital Logic	C/C++ Program Design
C/C++ Program Design	
Computer System Design and Applications A	

The third year

Fall / **Spring**

Fall	Spring
Artificial Intelligence	Operating Systems
Machine Learning	Software Engineering
Automated Reasoning	Intelligent Robotics
Multi-agent Systems	Deep Learning
Object-oriented Analysis and Design	Computer Graphics
Computer Networks	Internet of Things
Embedded System and Microcomputer Principle	Natural Language Processing
Computer Vision	

The fourth year

Fall / **Spring**

Fall	Spring
Software Testing	Evolutionary Computation and Its Applications
Advanced Artificial Intelligence	Advanced Optimization Algorithms
Advanced Algorithms	Frontier Seminars in Computer Science and Technology IV
Cryptography and Network Security	
Advanced Computer Networks and Big Data	

Industrial Practice

Frontier Seminars in Computer Science and Technology I II III

Group Projects I II III

Undergraduate Thesis/Projects

Major Required Courses   Major Elective Courses   Major Practice Courses