



Southern University of Science and Technology

Undergraduate Programs

SUSTech Teaching Affairs Office

2024

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General Education Requirement for International Students

For international students beginning their study in 2024, six required modules must be completed in the general education (GE) section, i.e., Chinese Language and Culture Module, Arts and Physical Education Module, Competence Development Module, Humanities and Social Sciences Module, Mathematics and Natural Sciences Module, and GE to Majors Bridging Module.

General Education Curriculum

Requirements: Total ≥ 79 credits

Module	Category	Credits
Chinese Language and Culture Module 16 Credits	Chinese Language and Culture	16
Arts and Physical Education Module 6 Credits	Physical Education	4
	Arts	2
Competence Development Module 19 Credits	Computer Programming	3
	Writing	2
	Foreign Languages	14
Humanities and Social Sciences Module 8 Credits	Humanities	6
	Social Sciences	
	Chinese Studies	2
Mathematics and Natural Sciences Module ≥ 28 Credits	Mathematics	12-14
	Physics	10-12
	Chemistry	3-4
	Geoscience + Life Science	3
GE to Majors Bridging Module 2 Credits	Introduction to Majors	2
Note: A total of 10 credits in Arts, Chinese Studies, Humanities, and Social Sciences is sufficient.		

1. Chinese Language and Culture Module

Requirements: Students must complete a total of 16 credits. All courses are compulsory.

Category	Course Code	Course Name	Requirement	Credits	Terms	Prerequisite	Dept.
Chinese Language and Culture	CLE008	Elementary Chinese I	Required	2	1/Fall	None	CLE
	CLE009	Elementary Chinese II	Required	2	1/Spr.	Elementary Chinese I	
	CLE027	Intermediate Chinese I	Required	2	2/Fall	Elementary Chinese II	
	CLE028	Intermediate Chinese II	Required	2	2/Spr.	Intermediate Chinese I	
	CLE031	Advanced Chinese I	Required	2	3/Fall	Intermediate Chinese II	
	CLE032	Advanced Chinese II	Required	2	3/Spr.	Advanced Chinese I	
	CLE033	Chinese Culture	Required	2	1-4 Fall	NA	
	CLE034	Chinese History	Required	2	1-4 Spr.	NA	

2. Arts and Physical Education Module

Requirements: Students must complete a total of 6 credits, with 4 credits in Physical Education and 2 credits in Arts.

Category	Course Code	Course Name	Requirement	Credits	Terms	Prerequisite	Dept.
Physical Education	GE131	Physical Education I	Required	1	1/Fall	NA	PE Center
	GE132	Physical Education II	Required	1	1/Spr.	NA	
	GE231	Physical Education III	Required	1	2/Fall	NA	
	GE232	Physical Education IV	Required	1	2/Spr.	NA	
	GE331	Physical Education V	Required	0	3/Fall	NA	
	GE332	Physical Education VI	Required	0	3/Spr.	NA	
Arts	GEM051	Appreciation of the Chinese Vocal Music Works	Optional	2	1-4 Spr. & Fall	NA	AC
	GEM066	Appreciation of Chinese Instrumental Music Works	Optional	2	1-4 Spr. & Fall	NA	AC
	GEM062	Brief History and Appreciation of Chinese Operas	Optional	2	1-4 Spr. & Fall	NA	AC
	GEM022	Art of Elocution	Optional	2	1-4 Spr. & Fall	NA	AC
	GEM056	Introduction to Art	Optional	2	1-4 Spr. & Fall	NA	AC
	GEM044	History of Chinese Art	Optional	2	1-4 Spr. & Fall	NA	AC
	Other courses (subject to change)		Optional	2	1-4 Spr. & Fall	NA	AC

3. Competence Development Module

Requirements: Students must complete a total of 19 credits, including 3 credits in Computer Programming, 2 credits in Writing (mandatory for international students), and 14 credits in Foreign Languages. In the Foreign Languages module, students are assigned to A/B/C 3 levels: Level-A students are exempt from *SUSTech English I* and *SUSTech English II*; Level-B students are exempt from *SUSTech English I*. Students of both Level-A and Level-B are required to take at least one 2-credit CLE elective course after completing the compulsory English courses.

Level A: Starts with *SUSTech English III*

Level B: Starts with *SUSTech English II*

Level C: Starts with *SUSTech English I*

Category	Course Code	Course Name	Requirement	Credits	Terms	Prerequisite	Dept.
Computer Programming ¹	CS109	Introduction to Computer Programming	Restricted	3	1-2 Spr. & Fall	NA	CSE
	CS110	Introduction to Java Programming	Restricted	3	1-2 Spr. & Fall	NA	
	CS111	Introduction to C Programming	Restricted	3	1-2 Spr. & Fall	NA	
	CS112	Introduction to Python Programming	Restricted	3	1-2 Spr. & Fall	NA	
	CS113	Introduction to Matlab Programming	Restricted	3	1-2 Spr. & Fall	NA	
Writing	CLE026	Scientific Writing	Required	2	1-4 Spr. / Fall	EAP	CLE
Foreign Languages	CLE021	SUSTech English I	Required	4	1 Fall	NA	CLE
	CLE022	SUSTech English II	Required	4	1 Spr. / Fall	NA	CLE
	CLE023	SUSTech English III	Required	4	1-2 Spr. / Fall	NA	CLE
	CLE030	English for Academic Purposes	Required	2	1-2 Spr. / Fall	SUSTech English III	CLE
	GE2229	Public Speaking	Elective	2	1-4 Spr. / Fall	EAP	CLE
	GEL006	Communication Skills	Elective	2	1-4 Spr. / Fall	EAP	CLE
	CLE010	English for Engineering	Elective	2	1-4 Spr. / Fall	EAP	CLE
	CLE012	Scientific and Technical Translation	Elective	2	1-4 Spr. / Fall	EAP	CLE

¹ Computer programming courses in the Competence Development Module are GE Required Courses for Science and Engineering.

	CLE013	English Pronunciation	Elective	2	1-4 Spr. /Fall	EAP	CLE
	CLE019	Critical Thinking / English Debate	Elective	2	1-4 Spr. /Fall	EAP	CLE
	CLE039	English for Career Development	Elective	2	1-4 Spr. /Fall	EAP	CLE
	CLE041	English for International Academic Conference	Elective	2	1-4 Spr. /Fall	EAP	CLE
	CLE043	Cambridge Business English (Vantage)	Elective	2	1-4 Spr. /Fall	NA	CLE
	CLE044	English for Innovators	Elective	2	1-4 Spr. /Fall	NA	CLE
	CLE045	Cambridge Business English (Higher)	Elective	2	1-4 Spr. / Fall	NA	CLE
	CLE046	Advanced Grammar in Use / Writing	Elective	2	1-4 Spr. /Fall	NA	CLE
	CLE048	Elementary Spanish	Elective	2	1-4 Spr. /Fall	NA	CLE
	CLE049	Elementary German	Elective	2	1-4 Spr. /Fall	NA	CLE
	CLE050	Elementary Japanese	Elective	2	1-4 Spr. /Fall	NA	CLE
	CLE051	Elementary French	Elective	2	1-4 Spr. /Fall	NA	CLE
	CLE052	Podcasting: English Listening and Speaking Through Culture	Elective	2	1-4 Spr. /Fall	NA	CLE
	CLE053	English for Professional Engineering Skills: Language in Project Design, Management and Communication	Elective	2	1-4 Spr. /Fall	EAP	CLE
	CLE054	Upper Elementary French	Elective	2	1-4 Spr. /Fall	Elementary French	CLE
	CLE055	Upper Elementary Spanish	Elective	2	1-4 Spr. /Fall	Elementary Spanish	CLE
	CLE056	Upper Elementary Japanese	Elective	2	1-4 Spr. /Fall	Elementary Japanese	CLE
	CLE057	Upper Elementary German	Elective	2	1-4 Spr. /Fall	Elementary German	CLE
	CLE060	English for Fluency	Elective	2	1-4 Spr. /Fall	NA	CLE
	CLE061	Study Abroad Language and Culture Development	Elective	2	1-4 Spr. /Fall	NA	CLE
	CLE062	Global English / Communication Skills	Elective	2	1-4 Spr. /Fall	NA	CLE
	CLE063	Writing for Publication	Elective	2	1-4 Spr. /Fall	EAP	CLE
	CLE064	Academic English for Research Methodologies and Referencing	Elective	2	1-4 Spr. /Fall	EAP	CLE
	CLE065	Reading / Writing for Understanding Science	Elective	2	1-4 Spr. /Fall	NA	CLE
	CLE066	English for Design	Elective	2	1-4 Spr. /Fall	NA	CLE
	CLE067	European Languages and Cultures	Elective	2	1-4 Spr. /Fall	NA	CLE

	CLE068	American Culture and Language Acquisition	Elective	2	1-4 Spr. /Fall	NA	CLE
(The course list is subject to change; Please follow the placement results and take the required English courses in the designated semesters.)							

4. Humanities and Social Sciences Module

Requirements: Students must complete a total of 8 credits/4 courses.

Category	Course Code	Course Name	Requirement	Credits	Terms	Prerequisite	Dept.
Humanities	HUM012	Languages & Linguistics	Optional	2	1-4 Spr. /Fall	NA	HUM
	HUM014	Science Fiction: Fiction and Film	Optional	2	1-4 Spr. /Fall	NA	HUM
	HUM018	Science Fiction Writing	Optional	2	1-4 Spr. /Fall	NA	HUM
	HUM029	An Introduction on History of Science and Civilization	Optional	2	1-4 Spr. /Fall	NA	HUM
	HUM037	Appreciation of Science Fiction Literature	Optional	2	1-4 Spr. /Fall	NA	HUM
	HUM052	An Introduction to Western Philosophy	Optional	2	1-4 Spr. /Fall	NA	HUM
	HUM056	Films from the Perspective of Ecological Thoughts	Optional	2	1-4 Spr. /Fall	NA	HUM
	HUM069	An Introduction on Philosophy of Physics	Optional	2	1-4 Spr. /Fall	General Physics I or College Physics I	HUM
	Other relevant courses (subject to change)		Optional		1-4 Spr. /Fall	NA	
Social Sciences	SS016	Memory Study of Sino-Foreign Culture	Optional	2	1-4 Spr. /Fall	NA	SSC
	SS022	Introduction to Culture Heritage	Optional	2	1-4 Spr. /Fall	NA	SSC
	SS024	Basic Skills of Video Shooting and Editing	Optional	2	1-4 Spr. /Fall	NA	SSC
	SS058	Hebrew Literature and Culture	Optional	2	1-4 Spr. /Fall	NA	SSC
	SS082	The City and Technology	Optional	2	1-4 Spr. /Fall	NA	SSC
	SS092	Foundation of Sustainable Development	Optional	2	1-4 Spr. /Fall	NA	SSC
	SS133	Chinese Physics and Physicists in the 20th Century	Optional	2	1-4 Spr. /Fall	NA	SSC
	Other relevant courses (subject to change)		Optional		1-4 Spr. /Fall	NA	
Chinese Studies	HUM017	Poetry Metrical and Ancient Poetry Writing	Optional	2	1-4 Spr. /Fall	NA	HUM
	HUM053	An Introduction to Chinese Philosophy	Optional	2	1-4 Spr. /Fall	NA	HUM
	HUM075	An Introduction to the Classics of Chinese Literature	Optional	2	1-4 Spr. /Fall	NA	HUM
	SS033	A Chinese History in Archaeological Records	Optional	2	1-4 Spr. /Fall	NA	SSC

	SS074	The History of China in Ancient Artifacts	Optional	2	1-4 Spr. /Fall	NA	SSC
	SS143	The Preservation and Utilization of Intangible Cultural Heritage	Optional	2	1-4 Spr. /Fall	NA	SSC
	Other relevant courses (subject to change)		Optional		1-4 Spr. /Fall	NA	

5. Mathematics and Natural Sciences Module²

Requirements: Students must complete a minimum of 28 credits. For Mathematics, students must select one of the A, B, or C course categories (at least 8 credits) and complete either the *Advanced Linear Algebra I* or *Linear Algebra* for 4 credits. For Physics, students are required to choose either course category A or B (at least 8 credits) and complete the course *Experiments of Fundamental Physics* for 2 credits. For Chemistry, students must complete at least one of the listed courses to receive a minimum of 3 credits. For Biology and Life Sciences, students must select one of the listed courses to receive 3 credits.

Category	Course Code	Course Name		Requirement	Credits	Terms	Prerequisite	Dept.
Mathematics	MA101a	Mathematical Analysis I	Category A	Restricted	5	1 Fall	NA	MATH
	MA102a	Mathematical Analysis II		Restricted	5	1 Spr.	Mathematical Analysis I	
	MA117	Calculus I	Category B	Restricted	4	1 Fall	NA	
	MA127	Calculus II		Restricted	4	1 Spr.	Calculus I	
	MA118	Single-variable Calculus	Category C	Restricted	4	1 Fall	NA	
	MA128	Multivariable Calculus		Restricted	4	1 Spr.	Single-variable Calculus	
	MA107	Advanced Linear Algebra I		Restricted	4	1 Fall	NA	
	MA113	Linear Algebra		Restricted	4	1 Spr. & Fall	NA	
Physics	PHY101	General Physics I	Category A	Restricted	5	1 Fall	NA	PHY
	PHY102	General Physics II		Restricted	5	1 Spr.	General Physics I	
	PHY105	College Physics I	Category B	Restricted	4	1 Fall	NA	
	PHY106	College Physics II		Restricted	4	1 Spr.	College Physics I	
	PHY104B	Experiments of Fundamental Physics		Required	2	1-2 Spr. & Fall	NA	
Chemistry	CH103	General Chemistry		Restricted	4	1-2 Spr. & Fall	NA	CHEM
	CH105	Chemistry: The Central Science		Restricted	3	1-2 Spr. & Fall	NA	
Geoscience + Life Science	BIO103	Principles of Biology		Restricted	3	1-2 Spr. & Fall	NA	BIO
	BIO102B	Introduction to Life Science		Restricted	3	1-2 Spr. & Fall	NA	
	EOE100	Introduction to Earth Sciences		Restricted	3	1-2 Spr. & Fall	NA	ESS, OCE, ESE

² Mathematics, Physics, Chemistry, and Geoscience + Life Science courses in the Mathematics and Natural Sciences Module are GE Required Courses for Science and Engineering.

6. GE to Majors Bridging Module

Requirements: Students must complete a total of 2 credits.

Category	Course Code	Course Name	Requirement	Credits	Terms	Prerequisite	Dept.
Introduction to Majors	COE100	Introduction to Engineering	Optional	2	1-2 Spr. /Fall	NA	COE
	COE101	AI and Applications	Optional	4	1 Spr.	Mathematical Analysis I or Calculus I	COE
	OCE107	Introduction to Ocean Engineering	Optional	3	1-2 Spr.	NA	OCE
	MSE460	Orientation Program of Dept. of Materials Science and Engineering	Optional	1	1-2 Spr.	NA	MSE
	MSE102	Frontier Seminars in Materials Science and Engineering	Optional	1	1-2 Fall	NA	MSE
	MSE104	Introduction to AI for Materials Science	Optional	1	1-2 Spr.	NA	MSE
	EE101	Electronic and Information Technology for Metaverse	Optional	1	1-2 Spr. &Fall	NA	EE
	SME101	Introduction to Integrated Circuit	Optional	1	1-2 Spr. &Fall	NA	SME
	SME102	Fundamentals of Microelectronics and Integrated Circuit	Optional	2	1-2 Spr. &Fall	NA	SME
	FIN102	Finance	Optional	3	1-2 Spr. /Fall	NA	FIN
	FIN103	Principles of Economics	Optional	3	1-2 Spr. /Fall	NA	FIN
	FET205	Introduction to Accounting	Optional	3	1-2 Spr. /Fall	NA	FIN
	STA101	Fascinating Statistics	Optional	3	1 Spr.	NA	STA
	ME232	Prolegomenon to Robotics	Optional	3	1-2 Spr. /Fall	NA	MEE
	ME113	Introduction to Modern Mechanical Engineering	Optional	2	1-2 Spr. /Fall	NA	MEE
	ME171	Introduction to Carbon Neutrality and Renewable Energy	Optional	2	1-2 Spr. /Fall	NA	MEE
	BMEB131	Introduction to Biomedical Engineering	Optional	2	1-2 Spr. /Fall	NA	BME
	MAE101	Experimental DIY: Discover the beauty of mechanics	Optional	2	1-2 Spr.	NA	MAE
	MAE102	Flight Simulating Experiment	Optional	1	1-2 Spr. &Fall	NA	MAE
	MAE205	Introduction to Aeronautics and Mechanics	Optional	2	1-2 Fall	NA	MAE
	MED108	Introduction to Global Health	Optional	2	1-2 Spr. /Fall	NA	MED
	MED104	Fundamentals in Biomedical Sciences	Optional	3	1-2 Spr. /Fall	NA	MED
	MED106	Immunity and Health	Optional	2	1-2 Spr.	NA	MED
	MED303	Introduction to Anatomy	Optional	3	1-2 Spr. /Fall	NA	MED

MED110	Social Medicine	Optional	2	1-2 Spr. /Fall	NA	MED
MED115	Introduction to Drug Development	Optional	3	1-2 Spr.	NA	MED
MED117	Global Health in Big Data	Optional	2	1-2 Spr. &Fall	NA	MED
MED118	Introduction to Structural Biology	Optional	2	1 Spr.	NA	MED
SDM104	Intelligent Hardware	Optional	1	1-2 Fall	NA	SDIM
SDM114	Product Design Visualization	Optional	3	1-2 Spr.	NA	SDIM
SDM476	Foundation of AI-NOT	Optional	3	1-2 Fall	NA	SDIM
EBA106	Management	Optional	3	1-2 Spr. &Fall	NA	ISME
MIS110	Introduction to Machine Learning and Big Data Analytics	Optional	3	1-2 Spr.	NA	ISME
EBA108	Introduction to Business Intelligence and Analysis	Optional	3	1-2 Spr. /Fall	NA	ISME
CS103	Introduction to Artificial Intelligence	Optional	2	1-2 Fall	NA	CSE
HUM040	Introduction to Chinese Information Processing	Optional	2	1-2 Spr. /Fall	NA	HUM
CH104	Chemistry and Discovery	Optional	1	1-2 Spr. &Fall	NA	CHEM
CH330	Practice for Cosmetic Science	Optional	1	1-2 Spr.	General Chemistry/ Chemistry: The Central Science	CHEM
ESS208	Introduction to Natural Disaster Science	Optional	2	1-2 Spr. /Fall	NA	ESS
ESS101	Space Exploration	Optional	2	1-2 Spr. /Fall	NA	ESS
DS103	Designing for Beginners	Optional	3	1-2 Spr. &Fall	NA	DS
ESE223	City and Environment	Optional	3	1-2 Spr.	NA	ESE
BIOS201	Genome, why we are different?	Optional	2	1 Summer	NA	BIO
(The course list is subject to change)						

7. Course Introduction to the Mathematics and Natural Sciences Module and Computer Programming Courses in the Competence Development Module (Course requirements for the following categories are detailed in the major curriculum of each program.)

Mathematics

Course Code	Course Name	Credits	Course Objectives
MA101a	Mathematical Analysis I	5	This course aims at providing math majored students with solid foundation in the theory of analysis, cultivating their ability of rigorous logical reasoning and mathematical thinking.
MA102a	Mathematical Analysis II	5	
MA117	Calculus I	4	This course emphasizes the basic concepts and properties of single-variable and multivariable Calculus theories, as well as the basic techniques of calculating differentiation and integration. It develops students' ability to use the ideas of Calculus to solve problems in other scientific disciplines.
MA127	Calculus II	4	
MA118	Single-variable Calculus	4	This course emphasizes the basic concepts and properties of single-variable and multivariable Calculus theories, as well as the basic techniques of calculating differentiation and integration, providing students with the necessary mathematical foundation for further study in the subsequent major courses
MA128	Multivariable Calculus	4	
MA107	Advance Linear Algebra I	4	It aims at leading students into systematic and thorough studies of the fundamentals of modern algebra and providing a solid foundation for subsequent, more advanced courses in math major. The contents of the course and the standards of assessment will normally surpass the other courses in the same series, with the purpose to foster students with the strongest algebra knowledge and foundation.
MA113	Linear Algebra	4	The course introduces the basic concepts and theories in linear algebra, including systems of linear equations, matrix algebra, determinants, vector spaces, linear transformations, eigenvalues and eigenvectors, singular value decomposition and quadratic forms and other related theories, laying a solid foundation for further study in the advanced Linear Algebra courses.

Physics

Course Code	Course Name	Credits	Course Objectives
PHY101	General Physics I	5	The course is mainly for physics majors, focusing on the introduction to the origin and development of physics principles, as well as the connotations and interrelationships of different physical laws. It also emphasizes the use of mathematical tools to conduct qualitative and quantitative analyses of physical phenomena in order to help students build a solid foundation in mathematical physics for further research in physics.
PHY102	General Physics II	5	
PHY105	College Physics I	4	The course is intended for general science and technology and other related majors. It mainly introduces the basic principles and laws of physics and cultivates students' basic ability to flexibly apply their physics knowledge to research and analyze various physical phenomena. It allows students to form a good knowledge framework and foundation for further study in related major courses.
PHY106	College Physics II	4	

Chemistry

Course Code	Course Name	Credits	Course Objectives
CH103	General Chemistry	4	The course provides students with an understanding of the most fundamental principles of chemistry (including microscopic theory, statistical theory and macroscopic theory) and their applications in chemistry and chemical engineering, incorporating contents from inorganic chemistry, organic chemistry, analytical chemistry, physical chemistry and polymer. Introduction to cutting-edge developments in chemistry is also included.
CH105	Chemistry: the Central Science	3	The course provides students with an understanding of the most fundamental principles of chemistry (including microscopic theory, statistical theory and macroscopic theory) and their applications in chemistry and chemical engineering, which incorporates contents from inorganic chemistry, organic chemistry, analytical chemistry, physical chemistry and polymer. The course also introduces contents related to chemistry and life, chemistry and materials, chemistry and the environment, and chemistry and energy.

Geoscience + Life Science

Course Code	Course Name	Credits	Course Objectives
BIO103	Principles of Biology	3	<i>Principles of Biology</i> allows the most diversified exposure to biology at the introductory level. It is designed to provide a knowledge base in life sciences that students can use as a foundation for life-long learning in sciences (including the most basic molecules of life, organelles, cells, genes, heredity, plants, and other related fields). At the same time, the content presented in Principles of Biology also provides excellent preparation for a wide range of advanced life science courses (including biochemistry, cell biology, molecular biology, physiology, etc.).
BIO102B	Introduction to Life Science	3	<i>Introduction to Life Sciences</i> is a discovery course mainly for SUSTech freshmen, with or without prior knowledge in biology. Each module of the course begins with an exposition of some interesting biological issues that are relevant to our health, daily life and spiritual pursuit, and provides the insight into the history of modern life science, its knowledge base, great achievements, exacting research results and challenges, as well as a summary of the common ground shared by experimental sciences (curiosity, dialectic, chance, inevitability, etc.). Thanks to the extensive and profound multidisciplinary interaction and collaboration, the life science has expanded far beyond its classical scope, leading to quite a few subversion of traditional and contemporary biological perceptions in past 60 years. This course would break away from the stereotypic teaching style(s) of biology, guide students through a novel learning journey, and educate them to respect, appreciate and value the lives.
EOE100	Introduction to Earth Sciences	3	The earth is the homeland of human beings and the only planet on which human beings live. Global major issues relevant to human survival and sustainable development, such as the mitigation of global climate change (International carbon neutrality declaration), defence against natural disasters, exploration and development of deep-earth, deep ocean, and deep-space resources, environmental pollution control and etc., are all the research topics of Earth science. Understanding and protecting our blue habitable planet is every nation's and every citizen's responsibility. This course mainly introduces the origin and evolution of our universe, our galaxy and our planetary systems, the origin and evolution of life on the Earth, the interaction between the solid Earth, surface environment, atmosphere, and oceans, the origin and current status of global climate change, and the impact of human social development on the Earth system. After taking this course, students will have a basic understanding of frontier topics in earth science and the problems faced by the sustainable development of human society.

Computer Programming

Course Code	Course Name	Credits	Course Objectives
CS109	Introduction to Computer Programming	3	The course aims to cultivate students who have programming experience before their university study. In this course, we will introduce the fundamentals of object-oriented programming language and techniques. The students will be familiar with the mainstream programming language Java and be able to use the language to construct programs and solve practical problems.
CS110	Introduction to Java Programming	3	The course is designed for students who have no programming experience and aims to cultivate them on basic knowledge and techniques of programming. Students will learn basic elements and structures of programming through JAVA and use Java to solve simple programming problems.
CS111	Introduction to C Programming	3	The course introduces C language and programming design methods, aiming at helping students understand the basic structure of program design and the general workflow and logic of using programming to solve real-world problems. The students will master the basic ideas, methods and skills of C programming. They should be able to write qualified programs independently and complete simple group research and development projects. Most importantly, students will be trained for a programming mindset and have the initial ability to use programming language and development environment to solve practical problems in the field, laying a solid foundation on programming theories and practice for subsequent major studies and research.
CS112	Introduction to Python Programming	3	The basic goal of this course is to introduce the data type and related programming skills in the Python language. The course covers the Python programming environment setup, main components of Python (variables, operators, data type, etc.), flow control, functions, lists, dictionaries, tuples and sets, input and output, plotting, Numpy, SciPy, Pandas, and objected-oriented programming. At the end of the course, students are expected to master the Python language and to be able to solve relevant scientific computing problems proficiently and effectively
CS113	Introduction to Matlab Programming	3	MATLAB is a U.S. commercial mathematical software from MathWorks, Inc. targeting the high-tech computing environment of scientific computing, visualization, and interactive programming. It integrates many powerful features such as numerical analysis, matrix computation, visualization of scientific data, and modeling and simulation of nonlinear dynamic systems in an easy-to-use windowed environment, providing a comprehensive solution for scientific research, engineering design, and many scientific fields where efficient numerical computation is necessary. This course will introduce the basic concepts, methods, techniques, and common misconceptions of MATLAB and provide students with a foundation for using MATLAB in the areas of scientific computing, data analysis, simulation modeling, etc.

SUSTech Undergraduate Programs

Dept.	Majors	Degree	Major by Discipline	Contact
Department of Mathematics	Financial Mathematics	BEC	Finance	0755-88018719
	Mathematics and Applied Mathematics	BSc	Mathematics	
Department of Physics	Physics	BSc	Physics	0755-88018251
	Applied Physics (Suspension of Admissions)	BSc	Physics	
Department of Chemistry	Chemistry	BSc	Chemistry	0755-88018350
Department of Earth and Space Sciences	Geophysics	BSc	Geophysics	0755-88018804
Department of Statistics and Data Science	Statistics	BSc	Statistics	0755-88015675
	Data Science and Big Data Technology	BSc	Computer Science	
Department of Mechanics and Aerospace Engineering	Theoretical and Applied Mechanics	BSc	Mechanics	0755-88018176
	Aerospace Engineering	BEng	Aerospace	
Department of Mechanical and Energy Engineering	Mechanical Engineering	BEng	Mechanical Engineering	0755-88018173
	Robotics Engineering	BEng	Automation	
	Science and Engineering for Renewables	BEng	Energy and Power	
Department of Materials Science and Engineering	Materials Science and Engineering	BEng	Materials	0755-88015994
	Electronic and Photonic Materials and Devices	BEng	Materials	
Department of Electrical and Electronic Engineering	Communication Engineering	BEng	Electronic Information	0755-88018569
	Optoelectronic Information Science and Engineering	BEng	Electronic Information	
	Information Engineering	BEng	Electronic Information	
Department of Computer Science and Engineering	Computer Science and Technology	BEng	Computer Science	0755-88018553
	Intelligence Science and Technology	BEng	Computer Science	
Department of Ocean Science and	Oceanography	BSc	Marine Science	0755-88018759
	Offshore Engineering and	BEng	Offshore	

Engineering	Technology		Engineering	
Department of Biomedical Engineering	Biomedical Engineering	BEng	Biomedical Engineering	0755-88015001
	Intelligent Medical Engineering	BEng	Medical Technology	
School of Environmental Science and Engineering	Environmental Science and Engineering	BEng	Environmental Science and Engineering	0755-88018064
	Hydrology and Water Resources Engineering	BEng	Water Conservancy	
School of Microelectronics	Microelectronics Science and Engineering	BEng	Electronic Information	0755-88010151
School of System Design and Intelligent Manufacturing	Industrial Design	BEng	Mechanical Engineering	0755-88015339
	Automation	BEng	Automation	
School of Life Sciences	Biological Sciences	BSc	Biological Sciences	0755-88018404
	Biotechnology (Suspension of Admissions)	BSc	Biological Sciences	
	Bioinformatics	BSc	Biological Sciences	
School of Medicine	Biomedical Science	BSc	Basic Medicine	0755-88018033
	Clinical Medicine	BM	Clinical Medicine	
College of Business	Finance	BEc	Finance	0755-88018609
	Financial Engineering	BEc	Finance	
	Big Data Management and Application	BBA	Management Science and Engineering	0755-88012803
	Industrial Engineering	BBA	Industrial Engineering	0755-88012803
	Accounting	BBA	Business Administration	0755-88018616
School of Design	Industrial Design	BEng	Mechanical Engineering	0755-88012833
Southern University of Science and Technology-King's College London School of Medicine	Biomedical Science	BSc	Basic Medicine	0755-88012970
	Biomedical Engineering	BEng	Biomedical Engineering	0755-88011291

Department of Mathematics

Program of Mathematics and Applied Mathematics

for International Students (2024)

I. Introduction

Established in 2012, Southern University of Science and Technology is a young university aiming to become a top research university in the world. In recent years, the university has attracted many outstanding researchers. The Department of Mathematics currently has 44 full-time faculty members. Our faculty members' research covers a broad range of areas including Mathematics (dynamical systems, algebra and combinatorics, algebraic number theory, PDEs, mathematical physics and differential geometry, etc.), Computational and Applied Mathematics (applied mathematics, numerical analysis, computational fluid dynamics, scientific computing, inverse problems, data science, etc.), Probability and Statistics, and Financial Mathematics.

There are many jobs and opportunities for further academic development for undergraduate students in mathematics and applied mathematics. Government agencies, banks, insurance companies, securities investment companies, software developers, market survey and analysis companies, e-commerce companies and many high-tech companies all have job opportunities for undergraduate students in mathematics and applied mathematics. Students who wish to pursue graduate studies in mathematics and applied mathematics can also find many opportunities either in China or overseas.

Academic subject areas: Bachelor of Science

Program code: 070101

II. Objectives and Learning Outcomes

1. Objectives

The objective of the undergraduate programs in mathematics and applied mathematics is to produce outstanding students with a solid foundation in mathematics, a broad knowledge base in

related areas such scientific computing and other areas of science, and excellent ability of critical thinking and working independently.

2. Learning Outcomes

The department provides a wide variety of courses that will meet the needs of students interested in pure mathematics and applied mathematics. The ultimate training objective of the undergraduate programs is to enable students to excel in their future career choices, whether they choose to work in government or industries, or to become mathematical scientists.

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 Science

3. The minimum credit requirement for graduation: 145 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	16
		Major Core Courses	13

		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	14
	Major Elective Courses	Major Elective Courses	23
Total			145
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 Spr/ Fall	None	Department of Mathematics
	MA127	Calculus II	4	1 Spr/ Fall	MA117	Department of Mathematics
	MA113	Linear Algebra	4	1 Spr/ Fall	None	Department of Mathematics
Physics	PHY101/ PHY105	General Physics I / College Physics I	4	1 Spr/ Fall	None	Department of Physics
	PHY102/ PHY106	General Physics II/ College Physics II	4	1 Spr/ Fall	College Physics I	Department of Physics
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	Department of Physics
Chemistry	CH103/ CH105	General Chemistry/ Chemistry: The Central Science	3	1-2 Spring & Fall	None	Department of Chemistry
Geoscience + Life Science	BIO103/ BIO102B/ EOE100	Principles of Biology/ Introduction to Life Science/ Introduction to Earth Sciences	3	1-2 Spring & Fall	None	Department of Biology/ Department of ESS, OCE and ESE
Computer Programming	CS109/ CS110/ CS111 /CS112/ CS113	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming Python / Introduction to Matlab Programming	3	1-2 Spring & Fall	None	Dept. of Computer Science and Engineering

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	None
	MA127	Calculus II	MA117
	MA113	Linear Algebra	None
Declare major at the end of the second academic year	MA117	Calculus I	None
	MA127	Calculus II	MA117
	MA113	Linear Algebra	None
	CS109/CS110/CS111/CS112/CS113	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming Python / Introduction to Matlab Programming	None
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Mathematics and Applied Mathematics

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	MA109	Advanced Linear Algebra	4	0	1/Spring	MA113	Department of Mathematics
	MA213-16	Mathematical Analysis	5	0	2/Fall	MA127	Department of Mathematics
	MA215	Probability Theory	4	0	2/Fall	MA102a/ MA127/ MA128	Department of Mathematics
	MA209-16	Elementary Number Theory	3	0	2/Fall	MA109	Department of Mathematics
	Total		16	0			
Major Core Courses	MA214	Abstract Algebra	3	0	2/Spr	MA109	Department of Mathematics
	MA202	Complex Analysis	3	0	2/Spr	MA213-16	Department of Mathematics
	MA201a	Ordinary Differential Equations A	4	0	2/Spr	MA213-16 & MA109	Department of Mathematics
	MA301	Real Analysis	3	0	3/Fall	MA213-16	Department of Mathematics
	Total		13	0			
Practice-based Courses	MA491	Undergraduate Thesis/Project	12	12	4/Spr	NONE	Department of Mathematics
	MA480	Research Projects*	2	2	Any semester after the first school year	NONE	Department of Mathematics
	MA470	Internship*		2	Any summer after the first school year	NONE	Department of Mathematics
	Total		14	16			
Total			40	16			

Note: Students are required to choose Research Projects (including all kinds of scientific research activities, scientific and technological innovation projects, winning prizes in competitions above the provincial level, publishing papers, engaging in advanced studies both at home and abroad as well as attending a certain number of seminars or public lectures, and related credits are identified by the Department) and one course in Internship to carry out practice.

Table 2: Major Elective Courses

Program of Mathematics and Applied Mathematics

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
MA206	Mathematical Modeling	3	1	2/Spr	MA201a	Department of Mathematics
MA208	Applied Stochastic Processes	3	0	2/Spr	MA213-16 & (MA215/MA212) & MA109	Department of Mathematics
MA210	Operations Research	3	0	2/Spr	MA231/MA213-16	Department of Mathematics
MA204	Mathematical Statistics	3	0	2/Spr	MA215/MA212	Department of SDC
MA207	Mathematical Experiments	3	1	3/Fall	MA213-16	Department of Mathematics
MA216	Computational Finance	3	0	3/Fall	(MA215/MA212) & MA109	Department of Mathematics
MA323	Topology	3	0	3/Fall	MA214	Department of Mathematics
MA303	Partial Differential Equations	3	0	3/Fall	MA201b	Department of Mathematics
MA321	Representations of groups	3	0	3/Fall	MA214	Department of Mathematics
MA234	Introduction to Theoretical and Practical Data Science	4	1	3/Spr	MA212	Department of Mathematics
MA302	Functional Analysis	3	0	3/Spr	MA301&MA202&MA109	Department of Mathematics
MA327	Differential Geometry	3	0	3/Spr	MA201a	Department of Mathematics
MA401	Dynamical Systems	3	0	4/Fall	MA201a	Department of Mathematics
MAT8005	Differentiable Manifolds	3	0	4/Fall	MA327	Department of Mathematics
MAT8022	Combinatorics	3	0	4/Fall	MA214	Department of Mathematics
MAT8020	Abstract Algebra II	3	0	4/Fall	MA214	Department of Mathematics
MAT7074	Commutative Algebra	3	0	4/Spr	MA214	Department of Mathematics
MAT7087	Computational Fluid Dynamics and Deep Learning	3	0	4/Spr	MA305	Department of Mathematics
MAT7093	Stochastic Analysis	3	0	4/Spr	MA208&MA302	Department of Mathematics
MAT8021	Algebraic Topology	3	0	4/Spr	MA323	Department of Mathematics
MAT8026	Advanced Functional Analysis	3	0	4/Spr	MA302	Department of Mathematics
Total		64	3			

Notes:

1. Students are required to complete 23 credits for the Major Elective Courses.

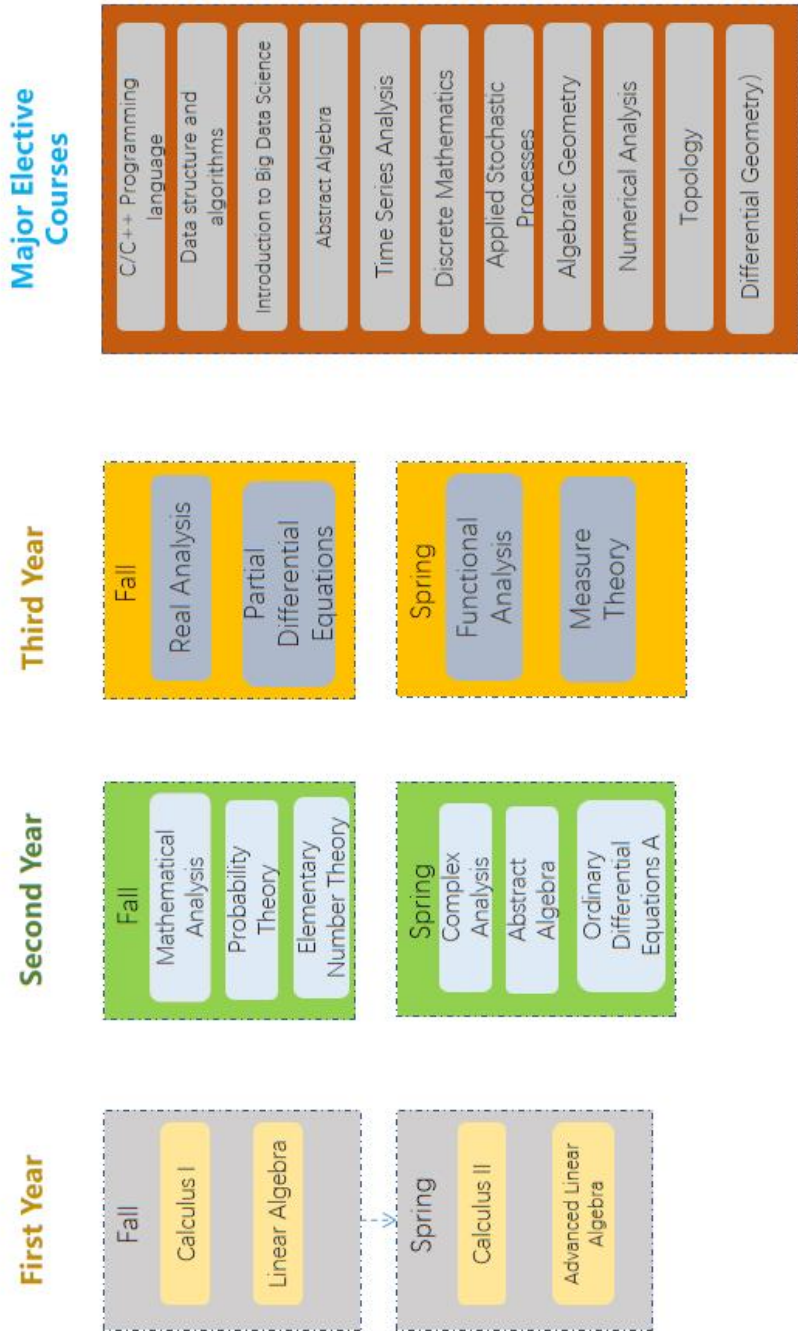
Table 3: Overview of Practice-based Learning

Program of Mathematics and Applied Mathematics

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
PHY104B	Experiments of Fundamental Physics	2	2	1-2 Spring & Fall	None	Department of Physics
CS109	Introduction to Computer Programming	3	1	1-2 Spring & Fall	None	Department of Physics
CS110	Introduction to Java Programming	3	1	1-2 Spring & Fall	None	Department of Physics
CS111	Introduction to C programming	3	1	1-2 Spring & Fall	None	Department of Physics
CS112	Introduction to Python Programming Python	3	1	1-2 Spring & Fall	None	Department of Physics
CS113	Introduction to Matlab Programming	3	1	1-2 Spring & Fall	None	Department of Physics
MA206	Mathematical Modeling	3	1	2/Spr	MA201a	Department of Mathematics
MA207	Mathematical Experiments	3	1	3/Fall	MA213-16	Department of Mathematics
MA234	Introduction to Theoretical and Practical Data Science	4	1	3/Spr	MA212	Department of Mathematics
MA470	Internship	2	2			Department of Mathematics
MA491	Undergraduate Thesis/Project	12	12			Department of Mathematics
Total		41	24			

Curriculum Structure of Mathematics and Applied Mathematics

Mathematics and Applied Mathematics



Department of Physics

Program of Physics for International Students (2024)

I. Introduction

Physics is one of the oldest disciplines of natural science based on experiments, which involves the studies of motions of objects ranging from subatomic to cosmic levels, and the exploring of interactions and transformations of substances. It keeps developing as human explores the Nature. Until the 17th century, the Newtonian mechanics had been established, and the laws of motion of various objects including celestial bodies were well understood. In the late 19th century, physics became a systematic and rigorous discipline that contains mechanics, thermodynamics, electromagnetism, optics, etc., known as classic physics nowadays. The modern physics was developed at the beginning of the 20th century with the establishment of relativity and quantum mechanics. Significant breakthroughs in exploring the fundamental structure of the universe were made that greatly facilitated the development of technology and pushed forward the frontier of human cognition. However, the exploration of nature is far from complete. Many fundamental problems were still not being solved, such as the motion law of celestial objects in cosmic level, a more fundamental structure of elementary particles, and the physics laws of complex and strongly correlated macroscopic materials.

Physics is closely related to many other natural science disciplines. It has been a driving force to various of subjects including mathematics, chemistry, biology, geology, materials science, and information science. In addition, physics also makes great contributions to the revolutions of new technology arising from the theoretical breakthroughs, including nuclear energy, semiconductor, superconductor, laser, aerospace industry, etc. In short, physics plays a very important role in our economy and daily life. Progresses in areas such as fusion energy, novel semiconductor materials, high temperature superconductivity, quantum information and quantum computation are expected in the foreseeable future, and these progresses will lead to the developments of many other new areas of science and technology.

Physics Department at Southern University of Science and Technology, was established in

2011. It is one of the five earliest departments in SUSTech. At present, its research fields include theoretical physics, mathematical physics, particle physics and cosmology, condensed matter physics, computational physics, quantum information and quantum computation, optics, atomic and molecular physics, Soft matter Physics and Biophysics, etc.

Academic subject areas: Physics

Program code: 070201

II. Objectives and Learning Outcomes

1. Objectives

The major provides systematic physics training for students, making them ready for advanced study and frontier research in physics and interdisciplinary disciplines in the future, as well as R&D, production, teaching and management in industrial departments, scientific research institutes and educational departments.

2. Learning Outcomes

Graduates should meet the requirements of the Ministry of Education on the ideological and political theory and moral education of undergraduates, have certain humanistic literacy, aesthetic literacy and social science knowledge, and establish correct labor values and attitudes, and meet the following professional training requirements:

1. Solid Mathematical Foundation
2. Systematically and comprehensively grasping the basic theories of Physics
3. Familiar with physics experiment methods and skills
4. Understanding the frontiers and developments of one or more research directions in physics or related majors
5. Abundant knowledge of physics and flexible application of physical theory in daily life and scientific research practice
6. Scientific Spirit, Innovative Awareness and Preliminary Scientific Research Ability
7. Basic knowledge background of related science and Engineering Majors
8. Basic computer programming, application and numerical computing capabilities
9. Ability to consult English documents, write papers and communicate academically
10. Good oral skills and teamwork spirit

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 Science.
3. The minimum credit requirement for graduation: 153 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	26
		Major Core Courses	19
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	14
	Major Elective Courses	Major Elective Courses	15
Total			153
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	None	Department of Mathematics
	MA127	Calculus II	4	1 Spring	Calculus I	
	MA113	Linear Algebra	4	1 Spring & Fall	None	
Physics	PHY105	College Physics I	4	1 Fall	None	Department of Physics
	PHY106	College Physics II	4	1 Spring	College Physics I	
	PHY104B	Experiments of Fundamental Physics	2	1 Spring & Fall	None	
Chemistry	CH105	Chemistry: The Central Science	3	1-2 Spring & Fall	None	Department of Chemistry
Geoscience + Life Science (Choose one from two)	BIO102B	Introduction to Life Science	3	1-2 Spring & Fall	None	Department of Biology
	EOE100	Introduction to Earth Sciences	3	1-2 Spring & Fall	None	Dept. of Earth and Space Sciences, Dept. of Ocean Science and Engineering, School of Environment
Computer Programming (Choose one from five)	CS109	Introduction to Computer Programming	3	1-2 Spring & Fall	None	Dept. of Computer Science and Engineering
	CS110	Introduction to Java Programming	3	1-2 Spring & Fall	None	
	CS111	Introduction to C programming	3	1-2 Spring & Fall	None	
	CS112	Introduction to Python Programming Python	3	1-2 Spring & Fall	None	
	CS113	Introduction to Matlab Programming	3	1-2 Spring & Fall	None	

Note:

1. Mathematics: MA101a Mathematical Analysis I, MA102a Mathematical Analysis II can replace MA117 Calculus I, MA127 Calculus II;
2. Algebra: MA107 Advanced Linear Algebra I can replace MA113 Linear Algebra;
3. Physics: PHY101 General Physics I , PHY102 General Physics II can replace PHY105 College Physics I, PHY106 College Physics II;
4. Chemistry: CH103 General Chemistry can replace CH105 Chemistry: The Central Science;
5. Geoscience + Life Science: BIO103 Principles of Biology can replace BIO102B Introduction to Life Sciences.
6. The above alternative courses 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	PHY105		College Physics I	None
	PHY106		College Physics II	College Physics I
	PHY104B		Experiments of Fundamental Physics	None
	MA117		Calculus I	None
	MA127		Calculus II	Calculus I
	MA113		Linear Algebra	None
Declare major at the end of the second academic year	PHY105		College Physics I	None
	PHY106		College Physics II	College Physics I
	PHY104B		Experiments of Fundamental Physics	None
	MA117		Calculus I	None
	MA127		Calculus II	Calculus I
	MA113		Linear Algebra	None
	Computer Programming (Choose one from five)	CS109	Introduction to Computer Programming	None
		CS110	Introduction to Java Programming	None
		CS111	Introduction to C programming	None
		CS112	Introduction to Python Programming Python	None
		CS113	Introduction to Matlab Programming	None

Note:

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.

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.

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).

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).

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Physics

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	PHY203-15	Mathematical Methods in Physics	4		2/Fall	MA127, PHY106, MA113	PHY
	PHY205-15	Analytical Mechanics	3		2/Fall	PHY106	PHY
	PHY207-15	Electrodynamics I	3		2/Fall	PHY203-15	PHY
	PHY201-15	Physics Laboratory II	2	2	2/Fall	PHY105, PHY104B	PHY
	PHY202	Physics Laboratory III	2	2	2/Spr	PHY105, PHY104B	PHY
	PHY204	Thermodynamics and Statistical Physics I	3		2/Spr	PHY106	PHY
	PHY206-15	Introduction to Quantum Mechanics	3		2/Spr	PHY203-15, PHY205-15	PHY
	PHY208	Electrodynamics II	3		2/Spr	PHY207-15	PHY
	PHY210	Atomic Physics	3		2/Spr	PHY106	PHY
	Total		26	4			
Major Core Courses	PHY301	Physics Laboratory IV	3	3	3/Fall	PHY105, PHY104B	PHY
	PHY305	Quantum Mechanics II	3		3/Fall	PHY206-15	PHY
	PHY303	Statistical Mechanics II	3		3/Fall	PHY204	PHY
	PHY307	Modern Optics	3		3/Fall	PHY106	PHY
	PHY321-15	Introduction to Solid State Physics	4		3/Fall	PHY206-15	PHY
	PHY336	Introduction to Computational Physics	3		3/Spr	CS110, PHY204, PHY321-15	PHY
	Total		19	3			
Practice-based Courses	PHY480	Scientific Innovation Project	2	2		None	PHY
	PHY490	Thesis (Graduation project)	12	12		None	PHY
	Total		14	14			
Total			59	21			

Note:

- PHY203-15 "Mathematical Methods in Physics" can be replaced by complex variable function courses and partial differential equation courses. Complex variable function courses including MA202 "Complex Analysis" or MA232 "Complex Analysis (H)", and partial differential equation courses including MA303 "Partial Differential Equations" or MA336 "Partial Differential Equations(H)".
- PHY307 "Modern Optics" can be replaced by optical fundamentals courses (including EE210 "Fundamentals of Optics").
- PHY336 "Introduction to Computational Physics" can be replaced by numerical calculation courses (including ESS205 "Computational Methods" or MA305 "Numerical Analysis").
- Students can start their Scientific Innovation Project after the first academic year. The minimum credit hours of the project are 64.
- When choosing course alternatives, attention should be paid to the requirements of the prerequisite courses for the relevant courses, as well as differences in content and difficulty. After the course is replaced, no additional credits will be recognized for the relevant courses. The rules for credit recognition and replacement are interpreted by the Teaching Steering Committee of the Department of Physics.

Table 2: Major Elective Courses

Program of Physics

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Mathematics	MA109	Advanced Linear Algebra	4		1/Spr	MA113	MATH
	MA212	Probability and Statistics	3		2/Fall	MA127	MATH
	MA327	Differential Geometry	3		3/Spr	MA201a/MA201b	MATH
	MA321	Representations of Groups	3		3/Fall	MA214/MA219	MATH
	MA323	Topology	3		3/Fall	MA214/MA219	MATH
Computer	ME112	Introduction to Matlab	2	1	1/Spr	None	ME
	CS205	C/C++ Program Design	3	1	2/Fall	None	CSE
	CS203B	Data Structures and Algorithm Analysis B	3	1	2/Fall	CS102A	CSE
	CS303B	Artificial Intelligence B	3	1	3/Fall	CS110, CS203B, MA212	CSE
	CS405	Machine Learning	3	1	4/Fall	MA113 MA212	CSE
Mechanical & Electronic	ME102	CAD and Engineering Drawing	3	1.5	1/Spr	None	ME
	EE104	Fundamentals of Electric Circuits	2		1/Spr	MA127, MA113 or MA107B	EE
	EE201-17	Analog Circuits	3		2/Fall	PHY106, EE104	EE
	EE201-17L	Analog Circuits Laboratory	1	1	2/Fall	EE201-17	EE
	EE202-17	Digital Circuits	3		2/Spr	PHY106	EE
	EE202-17L	Digital Circuits Laboratory	1	1	2/Spr	EE202-17	EE
Physical Theory	ESS314	Fundamentals of Plasma Physics	4		3/Fall	PHY203-15	ESS
	MAE303	Fluid Mechanics	4		3/Fall	MA127, PHY106	MAE
	MAE304	Elasticity	4		3/Spr	MAE203 MAE202	MAE
	PHY5001	Advanced Quantum Mechanics	4		4/Fall	PHY305	PHY
	PHY5011	Group Theory for Physicists	4		4/Fall	PHY206-15, MA113	PHY
	PHY439	General Relativity: from Black Holes to Cosmology	3		4/Fall	MA113, PHY205-15	PHY
	PHY5012	Quantum Information	3		4/Fall	PHY206-15	PHY
	PHY5009	Fundamentals of electronic structures and density functional theory	3		4/Fall	PHY206-15	PHY
	PHY5057	Biological Physics	3		4/Fall	PHY204	PHY
	PHY5056	Principle of Nonlinear Optics	3		4/Fall	PHY208, PHY321-15, PHY305	PHY
	PHY5051	Principles of Photonics	3		4/Spr	PHY106, MA127	PHY
	PHY5052	Cold Atom Physics	3		4/Spr	PHY210, PHY206-15	PHY
	PHY5008	Quantum Transport Theories	3		4/Spr	PHY321-15, PHY305	PHY
	PHY5030	Introduction to Quantum Field Theory	4		4/Spr	PHY305, PHY205-15, MA113	PHY
	PHY5032	Quantum Computation	3		4/Spr	PHY206-15	PHY

	PHY5020	Quantum Optics	3		4/Spr	PHY305	PHY
	PHY5004	Advanced Solid State Physics	4		4/Spr	PHY321-15	PHY
Physical Experiments and Applications	PHY401	Virtual Experiments on Frontiers of Physics	1	1	2/Spr	PHY104B	PHY
	PHY330	Solid Optoelectronics	3		3/Spr	PHY206-15, PHY307	PHY
	PHY5054	Introduction to Surface Physics	3		3/Spr	PHY321-15	PHY
	PHY324	Laser Fundamentals	3		3/Spr	PHY307, PHY210	PHY
	PHY326-15	Semiconductor Physics and Device	4		3/Spr	PHY321-15	PHY
	PHY328	Low Temperature Physics	3	1	3/Spr	PHY204	PHY
	PHY5010	Physics of Thin Films	3		4/Fall	PHY321-15, PHY204	PHY
	PHY425	Modern Techniques in Materials Characterization	3	1	4/Fall	PHY206-15	PHY
	PHY5031	Introduction to Microelectronic Fabrication	2	1	4/Fall	CH105, PHY106	PHY
	PHY5013	Advanced Electron Microscopy	3	1	4/Fall	PHY321-15	PHY
	PHY5060	Experimental Methods in Nuclear Physics	3		4/Fall	PHY106	PHY
	PHY5055	Information Optics	3		4/Fall	PHY106	PHY
Physics Comprehensive Development courses	PHYS001	Open Physics Laboratory I	1	1	1/Smr	None	PHY
	PHY221	Open Physics Laboratory II	1	1	2/Fall	PHY104B	PHY
	GE351	Scientific Literature and Writing	1		3/Fall	None	CHEM
	PHYS002	Lectures on selected Frontiers in Physics	2		3/Smr	PHY106	PHY
	PHY5028	Condensed Matter Physics Forum	3		4/Fall	PHY106	PHY
	PHY5053	Topics in Superconductivity	3		4/Fall	PHY321-15, PHY305	PHY
Total			146	15.5			
Note:							
1. Students should report their plans of major elective courses after claiming their majors by consulting their academic advisors. The minimum credit requirement of major elective course is 15.							
2. The courses whose course codes start with PHYS are summer semester courses. Dynamic course of summer semester may be changed depending on the situation.							
3. Major elective courses of specific semesters may be changed according to the situation. The number of major elective courses may increase with the development of curriculum construction, please refer to the course schedule for the current year.							
4. The course code starting with PHY5 is a graduate course. Students should be guided by their academic advisor and judge whether to take it based on their own abilities. At the same time, please pay attention to the relevant policies of our graduate school on credit recognition during the graduate stage;							
5. Students can take mathematics, statistics, computer, electronics, chemistry, materials and other courses not being listed above according to the advice of academic advisors. The credits obtained can be applied for the credits certification of major elective courses in Physics.							
6. Courses with similar content can be substituted, but credits can not be certificated repeatedly. The credit certification rules should be interpreted by the Teaching Steering Committee of the Department of Physics.							

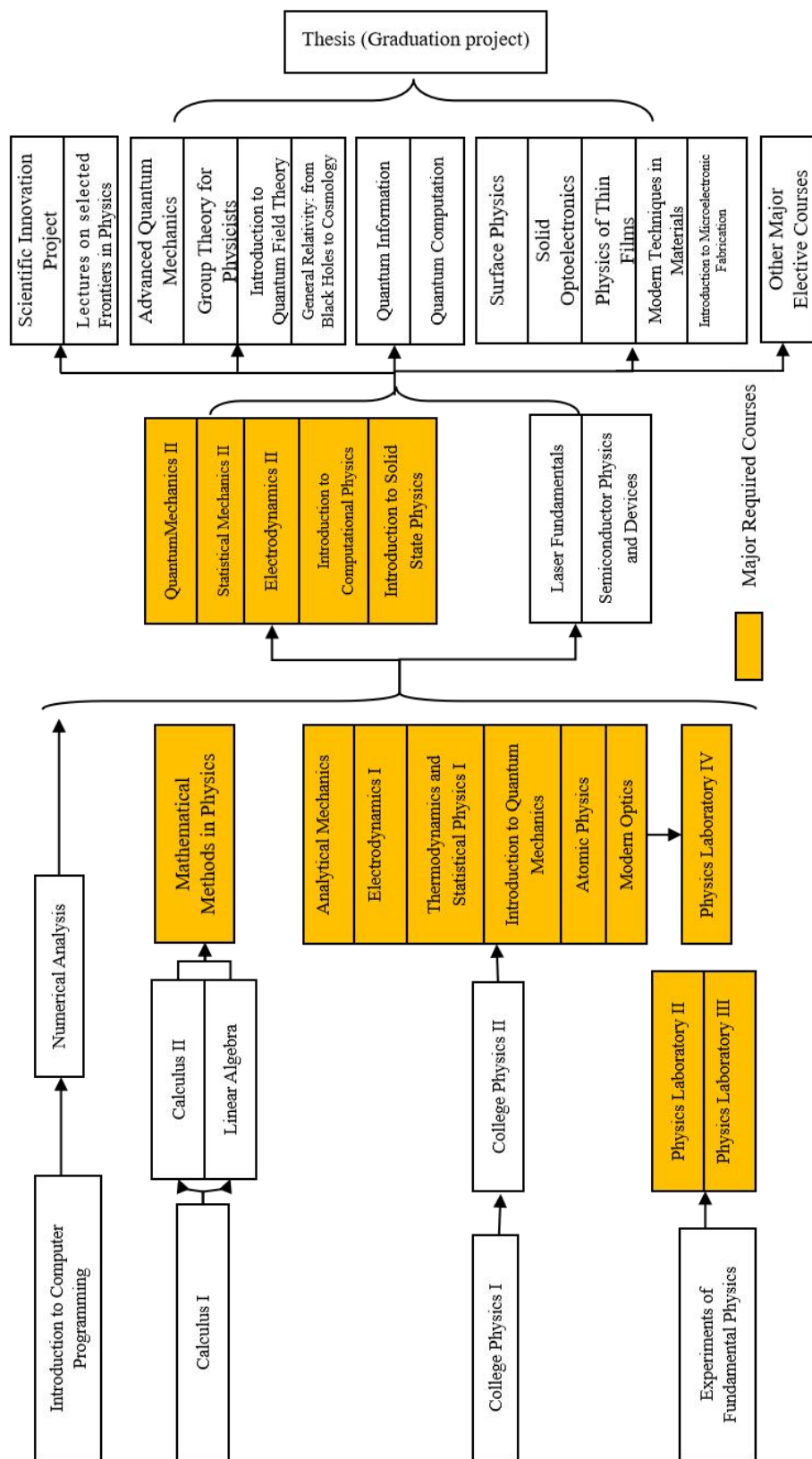
Table 3: Overview of Practice-based Learning**Program of Physics**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
ME102	CAD and Engineering Drawing	3	1.5	1/Spr	None	ME
PHYS001	Open Physics Laboratory I	1	1	1/Smr	PHY104B	PHY
PHY201-15	Physics Laboratory II	2	2	2/Fall	PHY105, PHY104B	PHY
PHY221	Open Physics Laboratory II	1	1	2/Fall	PHY104B	PHY
EE201-17L	Analog Circuits Laboratory	1	1	2/Fall	EE201-17	EE
EE202-17L	Digital Circuits Laboratory	1	1	2/Spr	EE202-17	EE
PHY202	Physics Laboratory III	2	2	2/Spr	PHY105, PHY104B	PHY
PHY301	Physics Laboratory IV	3	3	3/Fall	PHY105, PHY104B	PHY
PHY328	Low Temperature Physics Laboratory	3	1	3/Spr	PHY204	PHY
PHY425	Modern Techniques in Materials Characterization Laboratory	3	1	4/Fall	PHY206-15	PHY
PHY5031	Introduction to Microelectronic Fabrication	2	1	4/Fall	CH105, PHY106	PHY
PHY5013	Advanced Electron Microscopy	3	1	4/Fall	PHY321-15	PHY
PHY480	Scientific Innovation Project ^①	2	2		None	PHY
PHY490	Thesis (Graduation project)	12	12		None	PHY
Total		39	30.5			

Note:

- Students can start their Scientific Innovation Project at terms after the first academic year. The minimum credit hours of the project are 64.

Curriculum Structure of Physics



Department of Chemistry

Program of Chemistry for International Students (2024)

I. Introduction

Chemistry is regarded as the central science because of its role in connecting different subjects and its importance in interdisciplinary research, such as chemical biology, materials science, energy, agricultural development, drug discovery and so on.

For the teaching, the comprehensive 4 years credit-based bachelor curriculum in our Department covers a wide range of chemistry aspects and related disciplines with up-to-date literature materials for their selection. Generally it included the four basic chemistry areas as the core courses (organic, inorganic, analytical and physical chemistry), elective courses included but not limited to medicinal chemistry, polymer chemistry, chemical biology, energy and materials chemistry, supramolecular chemistry and environmental chemistry, which are closely related to the frontiers of current research and the needs of our society. Moreover, in order to encourage inter-disciplinary research, the students are motivated to study other science related subjects in the first year of admission, included but not limited to biology, physic and engineering.

Adhering to our university's motto of "Research, Innovation and Entrepreneurship," the Chemistry Department focuses on cultivating students' innovation, critical thinking and ability for interdisciplinary cooperation. The curriculum design emphasizes not only the basic theory, but also practical training particularly in the areas of new medicine, new energy, and new materials. Undergraduates are strongly encouraged to participate in various research programs supervised by professors to cultivate their creativity, practical skills and ability for interdisciplinary cooperation. The department maintains a wide array of sophisticated instrumentation necessary for modern chemical research and teaching.

Therefore, good chemistry training continues to play a substantial role in the rapid development of science and technology in this century and provides students with good prospects in industry, academia, business as well as civil organizations.

Academic subject areas: Chemistry

Program code: 070301

II. Objectives and Learning Outcomes

1. Objectives

The undergraduate Chemistry program is aimed at training new generations of top-notch innovative personnel who have a solid background in mathematics and physics, extensive knowledge of chemistry, strong experimental skills, an international perspective and an entrepreneurial spirit.

2. Learning Outcomes

- 1) Have a high sense of social responsibility and good scientific and cultural literacy.
- 2) Master basic knowledge of mathematics and physics.
- 3) Master the basic theoretical knowledge and experimental skills of chemistry.
- 4) Understand the history、 frontier and development trend of chemistry.
- 5) Have innovation awareness and practical ability and be able to adapt to the future development of science and technology、 economy and society.

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 Science.
3. The minimum credit requirement for graduation: 149 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	45
		Major Core Courses	3
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	12
	Major Elective Courses	Major Elective Courses	10
Total			149
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/ MA101a	Calculus I/ Mathematical Analysis I	4/5	1 Fall	None	Department of Mathematics
	MA127/ MA102a	Calculus II/ Mathematical Analysis II	4/5	1 Spring	Calculus I/ Mathematical Analysis I	
	MA113/ MA107	Linear Algebra/ Advanced Linear Algebra I	4	1 Spring & Fall	None	
Physics	PHY105/ PHY101	College Physics I/ General Physics I	4/5	1 Fall	None	Department of Physics
	PHY106/ PHY102	College Physics II/ General Physics II	4/5	1 Spring	College Physics I/ General Physics I	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	
Chemistry	CH103/ CH105	General Chemistry/ Chemistry: The Central Science	4/3	1 Fall	None	Department of Chemistry
Geoscience + Life Science	BIO102B/ BIO103/ EOE100	Introduction to Life Science/ Principles of Biology/ Introduction to Earth Sciences	3	1-2 Spring & Fall	None	Department of Biology/ Department of Earth and Space Sciences
Computer Programming	CS109/ CS110/ CS111/ CS112/ CS113	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C Programming/ Introduction to Python Programming/ Introduction to Matlab Programming	3	1-2 Spring & Fall	None	Dept. of Computer Science and Engineering

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	CH103/CH105	General Chemistry/Chemistry: The Central Science	None
	MA117/MA101a	Calculus I/Mathematical Analysis I	None
	MA127/MA102a	Calculus II/Mathematical Analysis II	Calculus I/Mathematical Analysis I
	PHY105/PHY101	College Physics I/General Physics I	None
	PHY106/PHY102	College Physics II/General Physics II	College Physics I/General Physics I
	PHY104B	Experiments of Fundamental Physics	None
Declare major at the end of the second academic year	CH103/CH105	General Chemistry/Chemistry: The Central Science	None
	MA117/MA101a	Calculus I/Mathematical Analysis I	None
	MA127/MA102a	Calculus II/Mathematical Analysis II	Calculus I/Mathematical Analysis I
	PHY105/PHY101	College Physics I/General Physics I	None
	PHY106/PHY102	College Physics II/General Physics II	College Physics I/General Physics I
	PHY104B	Experiments of Fundamental Physics	None
	MA113/MA107	Linear Algebra/Advanced Linear Algebra I	None
	BIO102B/BIO103/EOE100	Introduction to Life Science/ Principles of Biology/ Introduction to Earth Sciences	None
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Chemistry

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	CH102-15	General Chemistry Laboratory	2	2	1/Spring	General Chemistry/Chemistry: The Central Science	Chem.
	CH203	Organic Chemistry I	4		1/Spring	General Chemistry/Chemistry: The Central Science	Chem.
	CH206	Organic Chemistry II	4		2/Fall	Organic Chemistry I	Chem.
	CH208	Organic Chemistry Laboratory	2	2	2/Fall	General Chemistry Laboratory	Chem.
	CH209	Inorganic Chemistry I	4		2/Fall		Chem.
	CH216	Analytical Chemistry I	3		2/Fall	General Chemistry/Chemistry: The Central Science	Chem.
	CH217	Analytical Chemistry Laboratory I	2	2	2/Fall	General Chemistry/Chemistry: The Central Science	Chem.
	CH301	Physical Chemistry I	4		2/Fall	Calculus II, College Physics II, General Chemistry/Chemistry: The Central Science	Chem.
	CH204	Inorganic Chemistry Laboratory	2	2	2/Spring	General Chemistry Laboratory	Chem.
	CH211	Inorganic Chemistry II	4		2/Spring	Inorganic Chemistry I	Chem.
	CH218	Analytical Chemistry II	3		2/Spring	Analytical Chemistry I, Analytical Chemistry Laboratory I	Chem.
	CH219	Analytical Chemistry Laboratory II	2	2	2/Spring	General Chemistry/Chemistry: The Central Science	Chem.
	CH302	Physical Chemistry II	4		2/Spring	Physical Chemistry I	Chem.
	CH303	Physical Chemistry Laboratory	2	2	3/Fall	General Chemistry/Chemistry: The Central Science	Chem.
	CH304	Structural Chemistry	3		3/Spring	Physical Chemistry II	Chem.
		Total		45	12		
Major Core Courses	CH403	Principle of Chemical Engineering	3		3/Spring	Calculus II, College Physics II	Chem.
	Total		3				
Practice-based Courses	CH491	Degree Thesis (Design)	12	12	4/Fall & Spring		Chem.
	Total		12	12			
Total			60	24			

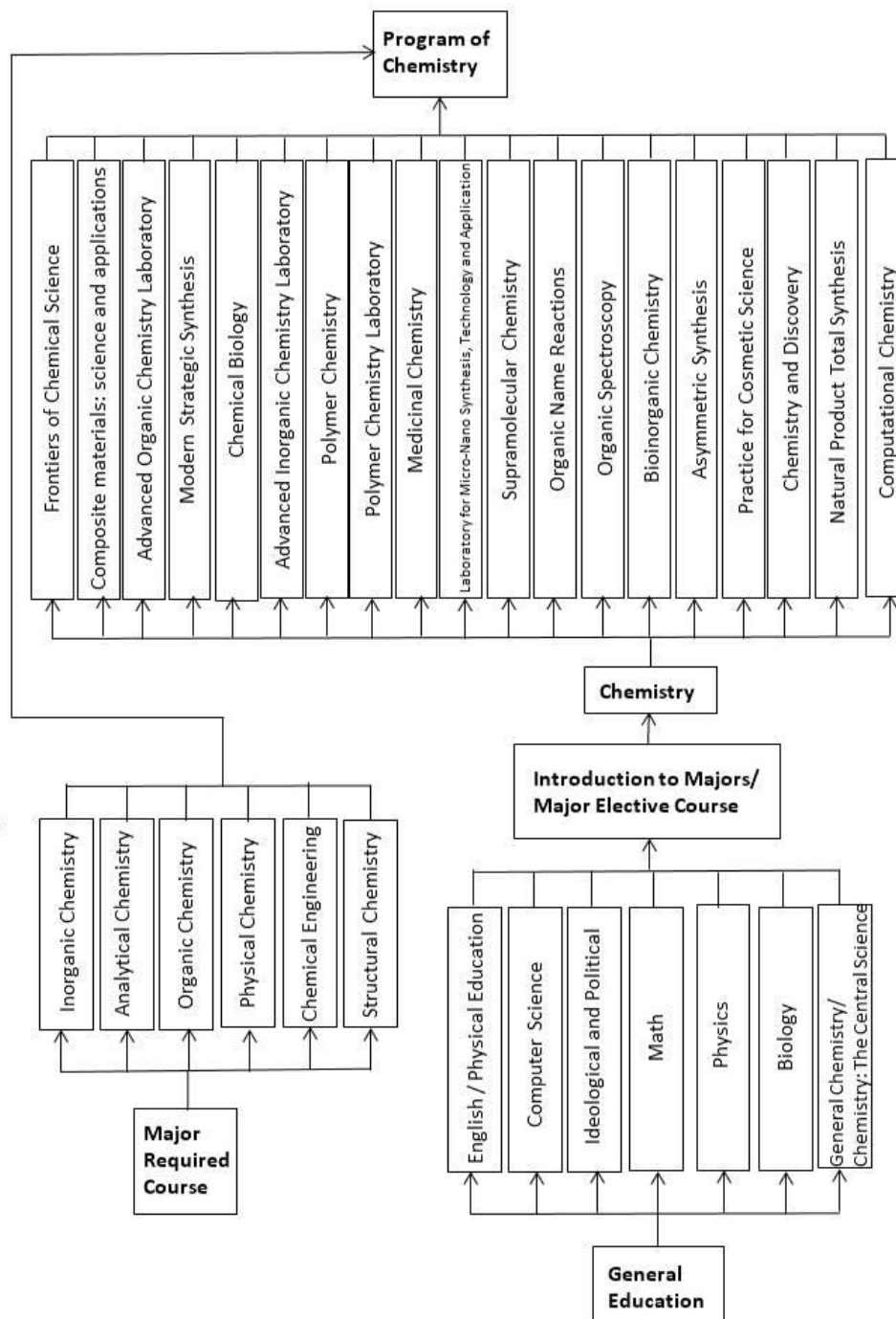
Table 2: Major Elective Courses**Program of Chemistry**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CH210	Frontiers of Chemical Science	2		1/Spring		Chem.
CH311	Modern Strategic Synthesis	3		3/Fall	Organic Chemistry II	Chem.
CH312	Organic Spectroscopy	2		3/Fall	Organic Chemistry II	Chem.
CH314	Asymmetric Synthesis	3		3/Fall	Organic Chemistry II	Chem.
CH315	Polymer Chemistry	3		3/Fall	Organic Chemistry II	Chem.
CH317	Medicinal Chemistry	3		3/Fall		Chem.
CH319	Advanced Inorganic Chemistry Laboratory	2	2	3/Fall	Inorganic Chemistry Laboratory	Chem.
CH321	Polymer Chemistry Laboratory	1	1	3/Fall	Polymer Chemistry	Chem.
CH331	Composite materials: science and applications	3		3/Fall		Chem.
CH306	Laboratory for Micro-Nano Synthesis, Technology and Application	2	2	3/Spring	General Chemistry Laboratory	Chem.
CH308	Supramolecular Chemistry	2		3/Spring		Chem.
CH309	Advanced Organic Chemistry Laboratory	2	2	3/Spring	Organic Chemistry II, Organic Chemistry Laboratory	Chem.
CH313	Chemical Biology	3		3/Spring	General Chemistry/Chemistry: The Central Science	Chem.
CH316	Bioinorganic Chemistry	2		3/Spring	General Chemistry/Chemistry: The Central Science	Chem.
CH320	Organic Name Reactions	2		3/Spring	General Chemistry/Chemistry: The Central Science	Chem.
CH323	Natural Product Total Synthesis	2		3/Spring	Organic Chemistry II	Chem.
CH401	Computational Chemistry	3	1	4/Spring	Physical Chemistry II	Chem.
CH481	Projects of Science and Technology Innovation	4	4	3/Fall or Spring		Chem.
Total		44	12			
Note: Major Elective Courses shall not less than 10 Credits.						

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

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CH102-15	General Chemistry Laboratory	2	2	1/Spring	General Chemistry/Chemistry: The Central Science	Chem.
CH208	Organic Chemistry Laboratory	2	2	2/Fall	General Chemistry Laboratory	Chem.
CH217	Analytical Chemistry Laboratory I	2	2	2/Fall	General Chemistry/Chemistry: The Central Science	Chem.
CH204	Inorganic Chemistry Laboratory	2	2	2/Spring	General Chemistry Laboratory	Chem.
CH219	Analytical Chemistry Laboratory II	2	2	2/Spring	General Chemistry/Chemistry: The Central Science	Chem.
CH303	Physical Chemistry Laboratory	2	2	3/Fall	General Chemistry/Chemistry: The Central Science	Chem.
CH319	Advanced Inorganic Chemistry Laboratory	2	2	3/Fall	Inorganic Chemistry Laboratory	Chem.
CH321	Polymer Chemistry Laboratory	1	1	3/Fall	Polymer Chemistry	Chem.
CH306	Laboratory for Micro-Nano Synthesis, Technology and Application	2	2	3/Spring	General Chemistry Laboratory	Chem.
CH309	Advanced Organic Chemistry Laboratory	2	2	3/Spring	Organic Chemistry II, Organic Chemistry Laboratory	Chem.
CH401	Computational Chemistry	3	1	4/Spring	Physical Chemistry II	Chem.
CH481	Projects of Science and Technology Innovation	4	4	3/Fall or Spring		Chem.
CH491	Degree Thesis (Design)	12	12	4/Fall & Spring		Chem.
Total		38	36			

Curriculum Structure of Chemistry



Department of Earth and Space Sciences

Program of Geophysics for International Students (2024)

I. Introduction

Academic subject areas: Geophysics is a subject of natural science which applies the principles and methods in physics to the study of the Earth and its surrounding space environment and planets. It explores their structure, composition, formation, and evolution and studies the various natural phenomena happening in the systems. The core research areas include Earth Geophysics, Space Science and Technology, and Planetary Science. The discipline values both theoretical and applied studies. These studies not only improve our scientific understanding of the Earth's and planets' structure and the physics behind various natural phenomena, but also support defense sector, natural disaster prevention, and many industrial and high-tech sectors important to the national economic development, such as Monitor nuclear explosions, prediction and prevention of natural disasters such as earthquakes, volcanoes, landslides, rock bursts, solar storms, oil and gas exploration, metallic and nonmetallic mineral mining, underground space exploration such as water, roads, urban construction, etc.

Program code: Geophysics (0708).

II. Objectives and Learning Outcomes

1. Objectives

The program is aimed to cultivate students with systematic theoretical knowledge and experimental skills in geophysics. Graduates are expected to develop a prudent work and research attitude, the ability of self-study, and the innovation and entrepreneurial spirit needed for advancing modern science and technology.

2. Learning Outcomes

(1) At graduation, students should have a solid foundation in mathematics and physics, master a foreign language, and have the ability to apply computer technology to solve practical problems;

- (2) Understand and master the basic theories, basic knowledge and basic skills of geophysics;
- (3) Be capable of the thinking methods and basic skills of scientific research, and have the ability to analyze, propose and solve practical problems;
- (4) Have strong organizational management, communication and teamwork skills;
- (5) Have wide knowledge, strong adaptability, can adapt to the needs of many aspects of modern society.

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 Science.
3. The minimum credit requirement for graduation: 149 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	20
		Major Core Courses	17
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	12
	Major Elective Courses	Major Elective Courses	21
Total			149

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/ MA101a	Calculus I / Mathematical Analysis I	4/5	1 Fall	None	Department of Mathematics
	MA127/ MA102a	Calculus II / Mathematical Analysis II	4/5	1 Spring	Calculus I / Mathematical Analysis I	
	MA113/ MA107	Linear Algebra / Advance Linear Algebra I	4	1 Spring & Fall	None	
Physics	PHY105/ PHY101	College Physics I / General Physics I	4/5	1 Fall	None	Department of Physics
	PHY106/ PHY102	College Physics II / General Physics II	4/5	1 Spring	College Physics I / General Physics I	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	
Chemistry	CH105/ CH103	Chemistry: The Central Science / General Chemistry	3/4	1-2 Spring & Fall	None	Department of Chemistry
Geoscience + Life Science	EOE100 BIO102B/ BIO103	Introduction to Earth Sciences Introduction to Life Science / Principles of Biology also meet the condition	3	1-2 Spring & Fall	None	ESS, OCE and ESE/ Department of Biology
Computer Programming	CS109/ CS110/ CS111/ CS112 CS113	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C Programming/ Introduction to Python Programming/ Introduction to Matlab Programming	3	1-2 Spring & Fall	None	Department of Computer Science and Engineering

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA117/MA101a	Calculus I / Mathematical Analysis I	None
	MA113/MA107	Linear Algebra / Advance Linear Algebra I	None
	PHY105/PHY101	College Physics I / General Physics I	None
Declare major at the end of the second academic year	MA117/MA101a	Calculus I / Mathematical Analysis I	None
	MA127/MA102a	Calculus II / Mathematical Analysis II	Calculus I / Mathematical Analysis I
	PHY105/PHY101	College Physics I / General Physics I	None
	PHY105/PHY101	College Physics I / General Physics I	None
	PHY106/PHY102	College Physics II / General Physics II	College Physics I / General Physics I
	PHY104B	Experiments of Fundamental Physics	None
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Geophysics

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	MA212	Probability and Statistics	3		2 Fall	None	MATH
	ESS213	Continuum Mechanics	3		2 Fall	None	ESS
	PHY203-15	Mathematical Methods in Physics	4		2Fall	None	PHY
	ESS206	Fundamentals of Signal Processing and Data Analysis	4		2 Spr	None	ESS
	PHY205-15	Analytical Mechanics	3		2 Spr	None	PHY
	ESS205	Computational Methods	3		3 Fall	None	ESS
	Total		20				
Major Core Courses	ESS102	Principles of Geology	3		2 Fall	None	ESS
	ESS209	Principles of Geophysics	3		2Spr	None	ESS
	ESS214	Principles of Applied Geophysics	3		2 Spr	None	ESS
	ESS210	Fundamentals of Space Science and Technology	3		2 Spr	None	ESS
	ESS211	Fundamentals of Planetary Science	3		3 Fall	None	ESS
	ESS484	Research Methods and Innovative Training in Earth and Space Sciences	2	1	3 Fall	None	ESS
	Total		17	1			
Practice-based Courses	ESS491	Graduation Thesis/Projects	12	12	4 Spr	None	ESS
	Total		12	12			
Total			49	13			
Notes :							
1. MAE203B Engineering Mechanics I – Statics and Dynamics can replace PHY205-15 Analytical Mechanics;							
2. MAE314 Advanced Numerical Methods or MA305 Numerical Analysis can replace ESS205 Computational Methods ;							
3. MA204 Mathematical Statistics can replace MA212 Probability and Statistics.							

Table 2: Major Elective Courses**Program of Geophysics**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
ESS207	Discussion on Earth Sciences	1		2 Fall	None	ESS
PHY204	Thermodynamics and Statistical Physics I	3		2 Spr	College Physics II	PHY
ESS470	Geology Field Trips	2	2	2 Smr	Principles of Geology or Mineralogy and Petrology	ESS
ESS471	Geophysics Field Trips	2	2	2 Smr	None	ESS
ESS311	Principles of Seismology	3		3 Fall	Calculus I and Linear Algebra	ESS
ESS323	Seismic Exploration	3		3 Fall	Calculus I and Linear Algebra	ESS
ESS317	Fundamentals of Inverse Theory in Geophysics	3		3 Fall	None	ESS
PHY207-15	Electrodynamics I	3		3 Fall	College Physics II, Linear Algebra and Mathematical Methods in Physics	PHY
PHY201-15	Physics Laboratory II	2	2	3 Fall	College Physics I and Experiments of Fundamental Physics	PHY
PHY307	Modern Optics	3		3 Fall	College Physics II	PHY
ESS202	Scientific Computing and Programming	3		3 Spr	None	ESS
ESS420	Frontiers of Planetary Science	3		3 Spr	Fundamentals of Planetary Science	ESS
ESS204	Fundamentals of Astronomy	3		3 Spr	None	ESS
EE104	Fundamentals of Electric Circuits	2		2 Spr	Calculus I and Linear Algebra	EE
CS202	Computer Organization	3	1	2 Spr	Digital Logic or Digital Circuits	CSE
ESS406	Geochemistry	2		3 Spr	None	ESS
MA333	Introduction to Big Data Science	3		3 Spr	Probability and Statistics	MATH
ESS411	Computational Space Physics	2		3 Spr	Introduction to Computer Programming	ESS
ESS312	Geomagnetism, Geoelectricity, and Gravity	3		3 Spr	Calculus I	ESS
ESS414	Fundamentals of Geodynamics	3		3 Spr	Calculus I and College Physics I	ESS
ESS421	Gravity and Earth tide	3		3 Spr	Calculus I and Linear Algebra	ESS
ESS324	Principles and Applications of Geophysical Instruments	2	2	3 Spr	None	ESS
EE210	Fundamentals of Optics	3		3 Spr	None	EE
PHY210	Atomic Physics	3		3 Spr	College Physics II	PHY
PHY202	Physics Laboratory III	2	2	3 Spr	College Physics I	PHY

					and Experiments of Fundamental Physics	
MA325	Numerical Solution of Partial Differential Equations	3		3 Spr	Partial Differential Equations	MATH
ESS310	Geophysical Experiments	3	2	4 Fall	Introduction to Earth and Space Sciences	ESS
ESS303	Fundamentals of Space Geodetics	3		4 Fall	Calculus I and Linear Algebra	ESS
CS303B	Artificial Intelligence B	3	1	4 Fall	Probability and Statistics, Introduction to Computer Programming and Data Structures and Algorithm Analysis	CSE
MA303	Partial Differential Equations	3		4 Fall	Ordinary Differential Equations B	MATH
ESS420	Scientific Application of Artificial Intelligence	3		4 Fall	Introduction to Computer Programming and Linear Algebra	ESS
ESS415	Fundamentals of Tectonics	3		4 Fall	None	ESS
ESS418	Environment and Engineering Geophysics	3		4 Fall	None	ESS
ESS5033	Space Plasma Physics	3		3 Fall	None	ESS
ESS5058	Experimental methods in space science	3	1	3 Fall	College Physics II	ESS
ESS5031	Physics of Earth and Planetary Interiors	3		4 Fall	Calculus II and College Physics II	ESS
ESS5060	Planetary Geomorphology	3		4 Fall	None	ESS
Total		101	15			

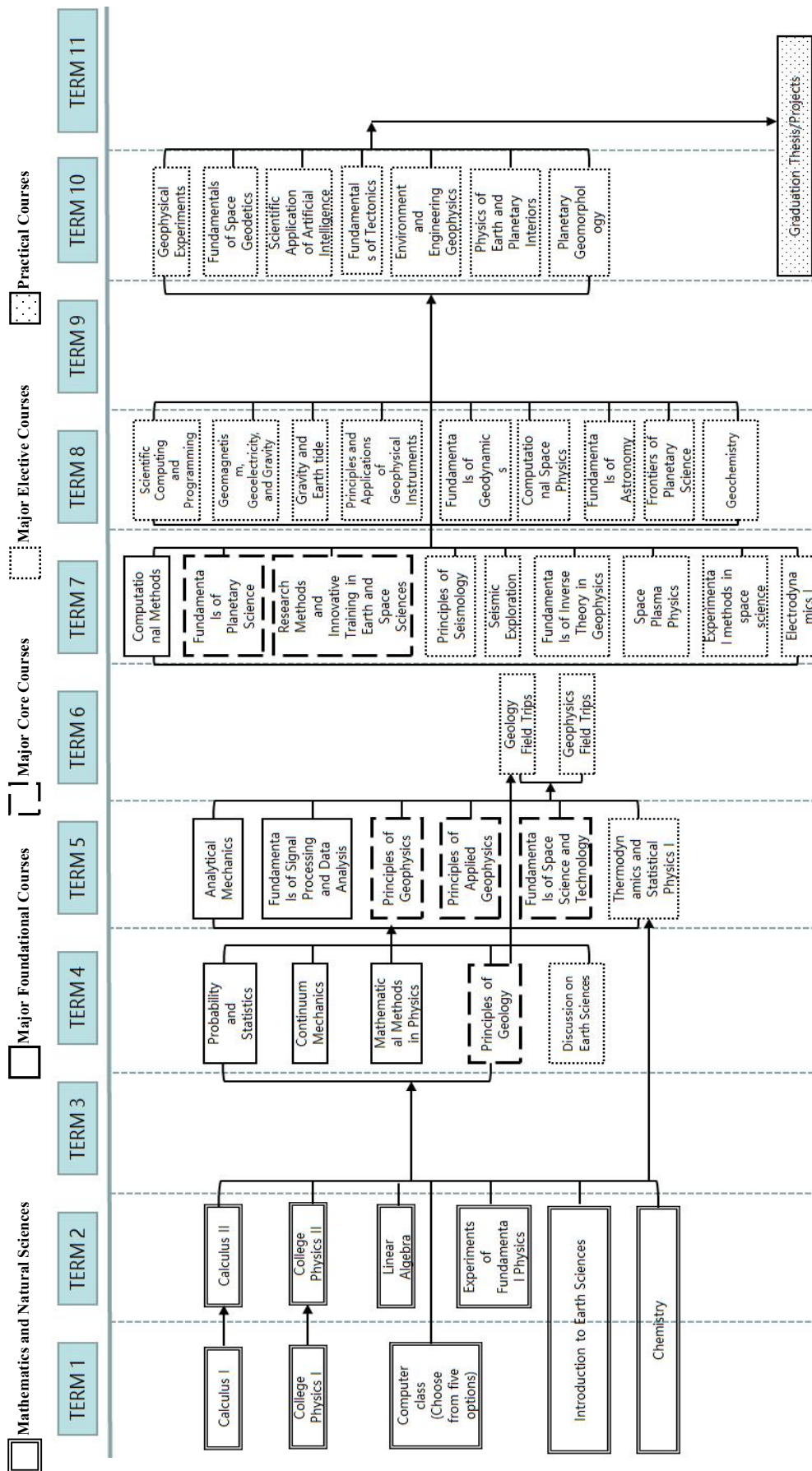
Notes:

1. The minimum requirement is 21 credits for a student.
2. Mathematics and physics intensive courses taken by Science Exploration Elite Class that are not included in the Program are certified as credits for major elective courses.
3. ESS5033 Space Plasma Physics , ESS5058 Experimental methods in space science , ESS5031 Physics of Earth and Planetary Interiors and ESS5060 Planetary Geomorphology are graduate level courses, undergraduate students can choose courses, and the credits taken are counted as professional elective courses.

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

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CS109	Introduction to Computer Programming	3	1	1-2 Spring & Fall	None	CSE
CS110	Introduction to Java Programming	3	1	1-2 Spring & Fall	None	CSE
CS111	Introduction to C Programming	3	1	1-2 Spring & Fall	None	CSE
CS112	Introduction to Python Programming	3	1	1-2 Spring & Fall	None	CSE
CS113	Introduction to Matlab Programming	3	1	1-2 Spring & Fall	None	CSE
PHY104B	Experiments of Fundamental Physics	2	2	1-2 Spring & Fall	None	PHY
CS202	Computer Organization	3	1	2 Spr	Digital Logic or Digital Circuits	CSE
ESS470	Geology Field Trips	2	2	2 Smr	Principles of Geology or Mineralogy and Petrology	ESS
ESS471	Geophysics Field Trips	2	2	3 Smr	Introduction to Earth and Space Sciences	ESS
ESS484	Research Methods and Innovative Training in Earth and Space Sciences	2	1	3 Fall	None	ESS
PHY201-15	Physics Laboratory II	2	2	3 Fall	College Physics I and Experiments of Fundamental Physics	PHY
CS303B	Artificial Intelligence B	3	1	3 Fall	Probability and Statistics, Introduction to Computer Programming and Data Structures and Algorithm Analysis	CSE
ESS324	Principles and Applications of Geophysical Instruments	2	2	3 Spr	None	ESS
PHY202	Physics Laboratory III	2	2	3 Spr	College Physics I and Experiments of Fundamental Physics	PHY
ESS310	Geophysical Experiments	3	2	4 Fall	Introduction to Earth and Space Sciences	ESS
ESS5058	Experimental methods in space science	3	1	3 Fall	College Physics II	ESS
ESS491	Graduation Thesis/Projects	12	12	4 Spr	None	ESS
Total		53	35			

Curriculum Structure of Geophysics



Department of Statistics and Data Science

Program of Statistics for International Students (2024)

I. Introduction

Established in April 2019, the Department of Statistics and Data Science aims to build up a world-class educational training and research center. The department is committed to cultivating top-notch talents with solid scientific knowledge, active thoughts, innovative awareness, and global vision. Until June 2022, the department has 15 full-time (2 of them will join soon) and 5 jointly appointed faculty members, including 4 Chair Professors, 4 Professors, 5 Associate Professors, 7 Tenure-track Assistant Professors and 1 Visiting Assistant Professor. All faculty members have extensive overseas study or work experiences. One member is an invited speaker at the International Congress of Mathematics, and IMS Medallion Lecturer. Two members are the winners of the prestigious State Natural Science Award (2nd class). At present, the department has two undergraduate programs, namely the Program of Statistics and the Program of Data Science and Big Data Technology, as well as two graduate programs (M.Phil. and Ph.D.), which cover a broad array of research areas including Biostatistics, Clinical Trial Design, High Dimensional Data Analysis, Random Matrix, Time Series Analysis, Bayesian Statistics, Financial Statistics, Limit Theory in Probability and Statistics, Data Science and Big Data Technology. Statistics is applied extensively in various disciplines, from natural sciences (like physics, chemistry, biomedicine, etc.) to social sciences and humanities, as well as business and government decision-making. The undergraduate program of Statistics focuses on applying probability theory to establish statistical models based on the collected data, conduct quantitative analysis, and make inferences and predictions to serve as the reference for decision-making.

Academic subject areas: Bachelor of Science in Statistics

Program code: 071201

II. Objectives and Learning Outcomes

1. Objectives

The objective for international undergraduates majoring in statistics is to cultivate professional talents who are interested in statistical research or data analysis. International undergraduates in this major will have a solid theoretical foundation in mathematics and statistics, proficient computer programming skills, and be good at statistical modeling and analysis of real data. Moreover, they will be able to conduct further research related to statistics or engage in data analysis, data mining, statistical investigation, statistical information management in enterprises and government departments. In the era of big data, statistics faces a wealth of opportunities and challenges. Graduates of statistics major will have a strong theoretical background in statistics and a broad range of knowledge to seize the opportunities and meet the challenges.

2. Learning Outcomes

2.1 Students should have a solid mathematical foundation, master the basic knowledge and theories of statistics, and understand the basics of natural science, social science, engineering technologies related to biomedical statistics, social economic statistics, industrial statistics, etc.

2.2 Students should be able to proficiently read statistical literature in English, master the principal methods of literature search, information retrieval, and data query with modern information technology.

2.3 Students should be equipped with the essential skills of applying statistical knowledge and principles to analyze and solve practical problems. These skills include but are not limited to experience in using computer (including commonly used tools, programming languages, and statistical software) and writing simple programs; design questionnaires, conduct survey, collect and process survey data; good communication skills and teamwork spirit.

III. Study Length, Degree and Graduation Requirements

1. Study Length: Four years.
2. Degree Conferred: Students who complete and meet the degree requirements of the undergraduate program will be awarded a bachelor's degree in science.
3. The Minimum Credit Requirement for Graduation: 146 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	12/14
		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	11
		Major Core Courses	18
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	14
	Major Elective Courses	Major Elective Courses	24/22
Total			146
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	Department
Mathematics	MA101a / MA117	Mathematical Analysis I / Calculus I	5/4	1 Fall	None	Mathematics
	MA102a / MA127	Mathematical Analysis II / Calculus II	5/4	1 Spring	MA101a/ MA117	Mathematics
	MA107 / MA113	Advanced Linear Algebra I / Linear Algebra	4	1 Fall / 1 Fall-Spring	None	Mathematics
Physics	PHY101/ PHY105	General Physics I / College Physics I	5/4	1 Fall	None	Physics
	PHY102/ PHY106	General Physics II/ College Physics II	5/4	1 Spring	PHY101/ PHY105	Physics
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	Physics
Chemistry	CH103/ CH105	General Chemistry/ Chemistry: The Central Science	4/3	1-2 Spring & Fall	None	Chemistry
Geoscience + Life Science	BIO103/ BIO102B/ EOE100	Principles of Biology/ Introduction to Life Science/ Introduction to Earth Sciences	3	1-2 Spring & Fall	None	Biology/ ESS, OCE, ESE
Computer Programming	CS109/ CS110/ CS111/ CS112	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C Programming/ Introduction to Python Programming	3	1-2 Spring & Fall	None	Computer Science and Engineering

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare Major at the End of the First Academic Year	MA101a/ MA117	Mathematical Analysis I/ Calculus I	None
	MA102a/ MA127	Mathematical Analysis II/ Calculus II	MA101a
	MA107 / MA113	Advanced Linear Algebra I / Linear Algebra	None
	PHY101 / PHY105	General Physics I / College Physics I	None
	PHY102 / PHY106	General Physics II / College Physics II	PHY101 / PHY105
	CS109/ CS110/ CS111/ CS112	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C Programming/ Introduction to Python Programming	None
Declare Major at the End of the Second Academic Year	MA101a / MA117	Mathematical Analysis I / Calculus I	None
	MA102a / MA127	Mathematical Analysis II / Calculus II	MA101a / MA117
	MA107 / MA113	Advanced Linear Algebra I / Linear Algebra	None
	PHY101 / PHY105	General Physics I / College Physics I	None
	PHY102 / PHY106	General Physics II / College Physics II	PHY101 / PHY105
	PHY104B	Experiments of Fundamental Physics	None
	CH103 / CH105	General Chemistry / Chemistry: The Central Science	None
	BIO103/ BIO102B/ EOE100	Principles of Biology/ Introduction to Life Science/ Introduction to Earth Sciences	None
	CS109/ CS110/ CS111/ CS112/	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C Programming/ Introduction to Python Programming	None
Note: 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. 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. 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). 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).			

VI. Major Course Arrangement

Table 1: Major Required Courses

Program of Statistics

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	STA203	Foundation of Probability Theory	3	0	2 Fall	MA102a / MA127 & MA113	Statistics and Data Science
	MA203a / MA231 / MA213-16	Mathematical Analysis III / Mathematical Analysis III (H) / Mathematical Analysis	5	0	2 Fall	MA102a / MA127	Mathematics
	MA204	Mathematical Statistics	3	0	2 Spring	MA215 / STA203 / MA212	Statistics and Data Science
	Total		11	0			
Major Core Courses	STA201	Operational Research and Optimization	3	0	2 Spring	MA107 / MA113	Statistics and Data Science
	MA329	Statistical Linear Models	3	0	3 Fall	MA204 / MA212	Statistics and Data Science
	MA309	Time Series Analysis	3	0	3 Fall	MA204 / MA212	Statistics and Data Science
	MA308	Statistical Computation and Software	3	0	3 Fall	MA204 / MA212	Statistics and Data Science
	MA304	Multivariate Statistical Analysis	3	0	3 Spring	MA204 / MA212	Statistics and Data Science
	STA306	Bayesian Statistics	3	0	3 Spring	MA329	Statistics and Data Science
	Total		18	0			
Practice-based Courses	STA490	Undergraduate Thesis/Project	12	12	4 Fall & Spring		Statistics and Data Science
	STA480	Research Projects	2	2	Any semester after the first academic year		Statistics and Data Science
	STA470	Internship	2	2	Any summer after the first academic year		Statistics and Data Science
	Total		14	14			
Total			43	14			

Note:

Students are required to choose Research Projects (including all kinds of scientific research activities, scientific and technological innovation projects, winning prizes in competitions above the provincial level, publishing papers, engaging in advanced studies both at home and abroad as well as attending a certain number of seminars or public lectures, and related credits are identified by the Department) and one course in Internship to carry out practice.

Table 2: Major Elective Courses**Program of Statistics**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Department
MA109 / MA111 / MA121	Advanced Linear Algebra / Advanced Linear Algebra II / Advanced Linear Algebra II (H)	4	0	1 Spring	MA113	Mathematics
CS203B	Data Structures and Algorithm Analysis B	3	1	2 Fall	CS205	Computer Science and Engineering
MA201a / MA230	Ordinary Differential Equations A / Ordinary Differential Equations A (H)	4	0	2 Spring	(MA203a / MA213-16) & (MA109 / MA111 / MA121)	Mathematics
MA206	Mathematical Modeling	3	0	2 Spring	MA201a / MA230 / MA201b	Mathematics
MA208	Applied Stochastic Processes	3	0	3-4 Spring	MA203a/ MA213-16 & MA215/ MA212 & (MA109/MA111/ MA121)	Mathematics
MA214 / MA219	Abstract Algebra / Abstract Algebra (H)	3	0	2 Spring	MA109 / MA111/ MA121	Mathematics
MA202 / MA232	Complex Analysis / Complex Analysis (H)	3	0	2 Spring	MA203a / MA213-16	Mathematics
MA322	Life Insurance Actuarial Science	3	0	2 Spring	MA215 / MA212	Mathematics
MAS221	The Basic Principle of Statistical Learning	2	0	2 Summer	MA215 / MA212	Mathematics
MA228	Nonlife Actuarial Models	3	0	3 Fall	MA215 / MA212	Mathematics
MA303	Partial Differential Equations	3	0	3 Fall	MA201a / MA201b	Mathematics
MA301	Real Analysis	3	0	3 Fall	MA203a / MA213-16	Mathematics
MA305	Numerical Analysis	3	0	3 Fall	MA203a / MA213-16	Mathematics
STA322	Sample Surveys and Experimental Design	3	0	3-4 Spring	MA204 / MA212	Statistics and Data Science
MA333	Introduction to Big Data Science	3	0	3 Spring	MA215 / MA212	Mathematics
MA417	Nonparametric Statistics	3	0	3 Spring	MA212 / MA204	Statistics and Data Science
MAT7101	Generalized Linear Models	3	0	3 Spring	MA329	Statistics and Data Science
MA325	Numerical Solution of Partial Differential Equations	3	0	3 Spring	MA303	Mathematics
CS405	Machine Learning	3	1	4 Fall	MA107A & MA212	Computer Science and Engineering
MAT7035	Computational Statistics	3	0	3 Fall	MA204	Statistics and Data Science
MA405	Survival Analysis	3	0	4 Fall	MA329	Statistics and Data Science
MA409	Statistical Data Analysis	3	0	3 Spring	MA329	Statistics and

	with SAS					Data Science
MAT7102	Topics in Probability and Statistics	3	0	3 Spring	MA204	Statistics and Data Science
STA404	Network Science and Computing	3	0	3 Spring	MA204	Statistics and Data Science
STA217	Introduction to Data Science	3	0	2 Fall	MA102a / MA102B	Statistics and Data Science
STA435	Statistical Writing and Communication in English	3	0	3-4 Spring		Statistics and Data Science
STA204	Discrete Mathematics with Applications	3	0	2 Fall	MA102B\MA127\MA102a, MA107A\MA113	Statistics and Data Science
STA327	Generalized Linear Models	3		3 Fall	MA329	Statistics and Data Science
STA320	Statistical Learning	3		3/ Spring	MA329	Statistics and Data Science
Total		85	2			

Note:

1. Students who take the series of courses "Mathematical Analysis I, II, III" will earn 22 credits as elective courses in their major. Students who take the series of courses "Advanced Mathematics (Part I), Advanced Mathematics (Part II), and Comprehensive Analysis of Mathematics" will earn 24 credits as elective courses in their major.
2. Elective courses offered by the Department of Statistics can be recognized as credits for the Statistics major, including some graduate courses open for undergraduate students. Other undergraduate or graduate courses related to statistics offered by other departments (open for undergraduate students) can be recognized as credits for the Statistics major upon approval by the Teaching Guidance Group of the Department of Statistics. Please note that the offering semester of some courses may change, so please refer to the actual semester when the corresponding course is offered by the respective department.
3. Differential Equations A (H) can be recognized as credits for the course Differential Equations A. The enrollment for (H) level courses requires a selection process, which will be organized offline by the department.

Table 3: Overview of Practice-based Courses

Program of Statistics

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
STA470	Internship	2	2	Any summer after the first academic year		Statistics and Data Science
STA480	Research Projects	2	2	Any semester after the first academic year		Statistics and Data Science
STA490	Undergraduate Thesis/Project	12	12	4 Fall & Spring		Statistics and Data Science
CS109 / CS110 / CS111 / CS112	Introduction to Computer Programming / Introduction to Java Programming / Introduction to C Programming / Introduction to Python Programming	3	1	1-2 Spring & Fall		Computer Science and Engineering
MA110	MATLAB Programming and Application	3	1	2 Spring		Mathematics
CS205	C/C++ Program Design	3	1	1 Spring		Computer Science and Engineering
CS203	Data Structures and Algorithm Analysis	3	1	2 Fall	CS205	Computer Science and Engineering
CS405	Machine Learning	3	1	4 Fall	MA107A & MA212	Computer Science and Engineering
PHY104B	Experiments of Fundamental Physics	2	2	1 Spring & Fall		
Total		33	23			

Curriculum Structure of Statistics Major

Semester	First Year	Second Year	Third Year	Third/Fourth Year
Fall	Mathematical Analysis I / Calculus I	Mathematical Analysis III / Mathematical Analysis	Statistical Linear Models	Survival Analysis
	Advanced Linear Algebra I / Linear Algebra	Foundation of Probability Theory	Time Series Analysis	Computational Statistics
		Introduction to Data Science	Statistical Computation and Software	Real Analysis
				Advanced Statistics
				Generalized Linear Model
Spring	Mathematical Analysis II / Calculus II	Mathematical Statistics	Multivariate Statistical Analysis	Undergraduate Thesis/Project
	Linear Algebra	Operational Research and Optimization	Bayesian Statistics	Research Projects or Internship (Any summer after the first school year)
		Ordinary Differential Equations A	Statistical Data Analysis with SAS	Sample Surveys and Experimental Design
		Introduction to Big Data Science	Statistical Writing and Communication in English	Nonparametric Statistics
			Statistical Learning	Selected Research Topics in Statistics
				Network Science and Computing
				Applied Stochastic Processes

Department of Statistics and Data Science

Program of Data Science and Big Data Technology for International Students (2024)

I. Introduction

Established in April 2019, the Department of Statistics and Data Science aims to build up a world-class educational training and research center. The department is committed to cultivating top-notch talents with solid scientific knowledge, active thoughts, innovative awareness, and global vision. Until June 2023, the department has 18 full-time and 4 jointly appointed faculty members, including 3 Chair Professors, 4 Professors, 5 Associate Professors, 10 Tenure-track Assistant Professors. All faculty members have extensive overseas study or work experiences. One member is an invited speaker at the International Congress of Mathematics, and IMS Medallion Lecturer. Two members are the winners of the prestigious State Natural Science Award (2nd class). At present, the department has two undergraduate programs, namely the Program of Statistics and the Program of Data Science and Big Data Technology, as well as two graduate programs (M.Phil. and Ph.D.), which cover a broad array of research areas including Biostatistics, Clinical Trial Design, High Dimensional Data Analysis, Random Matrix, Time Series Analysis, Bayesian Statistics, Financial Statistics, Limit Theory in Probability and Statistics, Data Science and Big Data Technology. Statistics is applied extensively in various disciplines, from natural sciences (like physics, chemistry, biomedicine, etc.) to social sciences and humanities, as well as business and government decision-making. The undergraduate program of Statistics focuses on applying probability theory to establish statistical models based on the collected data, conduct quantitative analysis, and make inferences and predictions to serve as the reference for decision-making.

Academic subject areas: Data Science and Big Data Technology

Professional code: 080910T

II. Objectives and Learning Outcomes

1. Objectives

The objective for international undergraduates majoring in Data Science and Big Data Technology is to cultivate professional talents who are interested in data analysis and big data technology. International undergraduates in this major will have a solid theoretical foundation in mathematics, theoretical foundations in statistics and big data technology, skilled computer programming techniques, good at practical data collection, mining, modeling and analysis, algorithm design and data visualization, and

strong social communication skills.

Moreover, they will be able to conduct further research related to artificial intelligence or engage in data analysis, data mining, information management in enterprises and government departments. Graduates can pursue further graduate studies as well as employment in a wide range of industries and sectors: government departments that need to engage in data analysis; financial departments such as banks, securities, and fund companies; communication, software, and robotics industries; market analysis, risk management, and quality management departments of small, medium, and large enterprises; higher and secondary schools and research institutes; survey companies, consulting companies, etc. Specialized agencies for data analysis, and various industrial sectors that generate demand for big data processing and analysis, etc. In the era of big data, data science faces a wealth of opportunities and challenges. Graduates of Data Science and Big Data Technology major will have a strong theoretical background and a broad range of knowledge to seize the opportunities and meet the challenges.

2. Learning Outcomes

2.1 Students should have a solid mathematical foundation, master the basic knowledge and theories of statistics, and understand the basics of computer science, etc.

2.2 Students should be able to proficiently read data science literature in English, master the principal methods of literature search, information retrieval, and data query with modern information technology.

2.3 Students should be equipped with the essential skills of applying data science knowledge and principles to analyze and solve practical problems.

III. Study Length, Degree and Graduation Requirements

1. Study Length: Four years.

2. Degree Conferred: Students who complete and meet the degree requirements of the undergraduate program will be awarded a bachelor's degree in science.

3. The Minimum Credit Requirement for Graduation: 151 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	12/14
		Physics	10
		Chemistry	3
		Geoscience + Life Science	3
Major Courses	GE to Majors Bridging Module	Introduction to Majors	2
	Major Required Courses	Major Foundational Courses	20
		Major Core Courses	18
		Practice-based Learning (Undergraduate Thesis, Internships, Research Projects, etc.)	14
	Major Elective Courses	Major Elective Courses	20/18
Total Credits			151
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	Credit	Terms	Prerequisite	Department
Mathematics	MA101a / MA117	Mathematical Analysis I / Calculus I	5/4	1 Fall	None	Mathematics
	MA102a / MA127	Mathematical Analysis II / Calculus II	5/4	1 Spring	MA101a/ MA117	Mathematics
	MA107 / MA113	Advanced Linear Algebra I / Linear Algebra	4	1 Fall / 1 Fall-Spring	None	Mathematics
Physics	PHY101/ PHY105	General Physics I / College Physics I	5/4	1 Fall	None	Physics
	PHY102/ PHY106	General Physics II/ College Physics II	5/4	1 Spring	PHY101/ PHY105	Physics
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	Physics
Chemistry	CH103/ CH105	General Chemistry/ Chemistry: The Central Science	3	1-2 Spring & Fall	None	Chemistry
Geoscience + Life Science	BIO103/ BIO102B/ EOE100	Principles of Biology/ Introduction to Life Science/ Introduction to Earth Sciences	3	1-2 Spring & Fall	None	Biology/ ESS, OCE, ESE
Computer Programming	CS109/ CS110/	Introduction to Computer Programming/ Introduction to Java Programming/	3	1-2 Spring & Fall	None	Computer Science and Engineering

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare Major at the End of the First Academic Year	MA101a/MA117	Mathematical Analysis I	
	MA102a/MA127	Mathematical Analysis II	MA101a/MA117
	MA107 / MA113	Advanced Linear Algebra I / Linear Algebra	
	PHY101 / PHY105	General Physics I / College Physics I	
	PHY102 / PHY106	General Physics II / College Physics II	PHY101 / PHY105
	CS109/ CS110/ CS111/ CS112	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C Programming/ Introduction to Python Programming	
Declare Major at the End of the Second Academic Year	MA101a / MA117	Mathematical Analysis I / Calculus I	None
	MA102a / MA127	Mathematical Analysis II / Calculus II	MA101a / MA117
	MA107 / MA113	Advanced Linear Algebra I / Linear Algebra	None
	PHY101 / PHY105	General Physics I / College Physics I	None
	PHY102 / PHY106	General Physics II / College Physics II	PHY101 / PHY105
	PHY104B	Experiments of Fundamental Physics	None
	CH103 / CH105	General Chemistry / Chemistry: The Central Science	None
	BIO103/ BIO102B/ EOE100	Principles of Biology/ Introduction to Life Science/ Introduction to Earth Sciences	None
	CS109/ CS110/	Introduction to Computer Programming/ Introduction to Java Programming/	None
Note: 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. 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. 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). 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).			

VI. Major Course Arrangement

Table 1: Major Required Courses

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	STA203	Fundamentals of probability theory	3		2/ Autumn	MA102a/MA127 and MA113	Statistics
	MA204	Mathematical Statistics	3		2/ Spring 3/ Autumn	MA215/MA212	Statistics
	STA201	Operational Research and Optimization	3		2/ Spring	MA107/MA113	Statistics
	CS203/CS203B	Data Structures and Algorithm Analysis / Data Structures and Algorithm Analysis B	3	1	2/ Spring	CS109	Computer Science
	STA204	Discrete Mathematics	3		2/Autumn	MA127 and MA113	Computer Science / Mathematics
	MA203a/MA213-16	Mathematical Analysis III/ Mathematical analysis	5		2/ Autumn	MA102a/MA127	Mathematics
	Total		20				
Major Core Courses	STA321	Distributed Storage and Parallel Computing	3	1	3/ Autumn	CS109/CS110, CS203/CS203B	Statistics
	STA303	Artificial Intelligence B	3	1	3/ Autumn	CS109/CS110, CS203/CS203B;	Computer Science
	MA329	Statistical linear model	3		3/ Autumn	MA204/MA212	Statistics
	MA304	Multivariate Statistical Analysis	3		3/ Spring	MA204/MA212	Statistics
	STA323	Big Data Analytics Software and Applications (Hadoop or Spark)	3	1	3/ Spring	CS102, CS203	Statistics
	STA326	Data Science Practice	3	1	3/ Spring	STA303/CS303/CS303B	Statistics
	Total		18				
Practice-based Courses	STA490	Thesis (Design)	12	12	4/ Spring		Statistics
	STA480	Research and innovation projects**	2	2	Any semester		Statistics

	STA470	Professional Internship**	2	2	Summer Vacation		Statistics
	Total		14	14			
Total			52	18			

Notes:

1. Students must choose one of the scientific research and innovation projects (including various scientific research activities, innovative projects in science and technology, winning competitions at the provincial level or above, publishing papers, further studies at home and abroad and attending a certain amount of seminars, etc., which will be recognized by the department for credit) and professional internship to carry out their practice. Students can choose to carry out their research and innovation projects and professional internship in any semester after the first academic year, with a minimum requirement of 4 weeks for professional internship.

2. Some courses are subject to change, so please take the corresponding courses in the actual semester of the course offering unit.

Table 2 Major Elective Courses

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
MA109/MA111/MA121	Linear algebra intensive/ Higher Algebra II/ Higher Algebra II (H)	4		1/Spring	MA113	Mathematics
CS307	Database Principles	3	1	2/ Autumn	CS102B	Computer Science
STA217	Introduction to Data Science	3		2/ Autumn	MA102a/MA127	Statistics
MA206	Mathematical modeling	3		2/ Spring	MA201a/MA230 /MA201b	Mathematics
MA201a/ MA230	The ordinary differential equation A/ Ordinary differential equation A(H)	3		2/ Spring	MA203a/MA213-16) and (MA109/ (MA111/MA121)	Mathematics
MA202/MA232	Functions of complex variables/ Function of complex variable (H)	3		2/ Spring	MA203a/MA213-16) and (MA109/MA111/ MA121)	Mathematics
MA208	Applying Stochastic Processes	3		2/ Spring	MA213-16 and (MA215/MA212) and (MA109/MA111/ (MA121)	Mathematics
MA309	Time Series Analysis	3		3/ Autumn	MA204/MA212	Statistics
STA320	Statistical Learning	3		3/ Spring	MA329	Statistics
MA305	Numerical analysis	3		3/ Autumn	MA203a/MA213-16	Mathematics
MA301	Real variable function*	3		3/ Autumn	MA203a/MA213-16	Mathematics
CS305	Computer Networks	3	1	3/ Autumn	CS109	Computer Science

MAT7035	Calculate statistics	3		3/ Autumn	MA204	Statistics
MA308	Statistical computing and software	3		3/ Autumn	MA329	Statistics
STA327	Generalized Linear Models	3		3/ Autumn	MA329	Statistics and Data Science
CS306	Data Mining	3	1	3/ Spring	CS203/CS203B	Computer Science
STA306	Bayesian statistics	3		3/ Spring	MA329	Statistics
MA417	Non-parametric statistics	3		3/ Spring	MA212/MA204	Statistics
CS324	Deep Learning	3		3/ Spring	CS303	Computer Science
MA409	Statistical Data Analysis (SAS)	3		3/ Spring	MA329	Statistics
STA404	Network Science and Computing	3		3/ Spring	MA212	Statistics
STA435	Statistical English Writing and Speaking	3		3-4/spring	None	Statistics
CS405	Machine Learning	3	1	4/ Autumn	MA113 and MA212	Computer Science
MA405	Survival Analysis	3		4/ Autumn	MA329	Statistics
Total		73	4			

Notes:

- 1、 Students enrolled in Mathematical Analysis I and II will receive 18 credits of elective courses, and students enrolled in Advanced Mathematics I and II will receive 20 credits of elective courses.
- 2、 After this training program is developed, all new courses offered by the Department of Statistics and Data Science can be recognized as elective credits for the Data Science and Big Data Technology program.
- 3、 Some courses may be offered in different semesters, so please take the courses in the actual semester of the course offering unit. The additional credits of mathematics and science courses in the science experimental classes can be used as credits of professional elective courses.

Table 3 Overview of Practice-based Courses

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
STA470	Professional Internship*	2	2	Summer Vacation		Statistics
STA480	Research and innovation projects*	2	2	Any semester		Statistics
STA490	Thesis (Design)	12	12	4/ Spring		Statistics
CS109	Fundamentals of Computer Programming	3	1	1-2/Spring	None	Computer Science
MA110	MATLAB Programming	3	1	2/ Spring	None	Mathematics
MA206	Mathematical modeling	3		2/ Spring	MA201a/ MA230/MA201b	Mathematics
CS205	C/C++ Programming	3	1	1/Spring	None	Computer Science
CS203 /CS203B	Data Structures and Algorithm Analysis/ Data Structures and Algorithm Analysis B	3	1	2/ Autumn	CS102A	Computer Science
CS332	Information Retrieval	3	1	3/ Spring	CS203	Computer Science
CS306	Data Mining	3	1	3/ Spring	CS203/CS203B	Computer Science
CS405	Machine Learning	3	1	4/ Autumn	MA113, MA212	Computer Science
MA308	Statistical computing and software	3	1	3/ Autumn	MA204/MA212	Statistics
Total		48	27			

Data Science and Big Data Technology Program Curriculum Structure

Time	First Year	Second Year	3rd grade	3rd/4th grade
Autumn	Mathematical Analysis I / Calculus I	Mathematical Analysis III / Mathematical Analysis	Artificial Intelligence B	Machine Learning
	Advanced Linear Algebra I / Linear Algebra	Discrete Mathematics Foundation of Probability Theory	Distributed Storage and Parallel Computing Statistical linear model	Survival Analysis Time Series Analysis
		Database Principles	Natural Language Processing	Numerical analysis
		Introduction to Data Science		Functions of real variables
				Calculate statistics
				Generalized Linear Models
				Statistical Computation and Software
				Computer Networks
	Mathematical Analysis II / Calculus II	Mathematical Statistics	Big Data Analytics Software and its Applications	Graduation design
	Linear Algebra	Operations and optimization	Multivariate Statistical Analysis	Professional internships or research and innovation projects (Conducted in any semester in grades 2, 3 and 4)
Spring		Data Structures and Algorithm Analysis B	Data Science Practice	Data Mining
		Applying Stochastic Processes	Statistical Data Analysis (SAS)	Nonparametric Statistics
		Ordinary differential equation A	Bayesian statistics	Deep Learning
		Functions of complex variables	Network Science and Computing	
		Mathematical Modeling	Statistical Writing and Communication in English	
			Statistical Learning	

Department of Mechanics and Aerospace Engineering

Program of Theoretical and Applied Mechanics for International Students (2024)

I. Introduction

Theoretical and Applied Mechanics (TAM) is a basic while highly practical scientific discipline with long history, rapid development, and widespread applications. Its strong technical implications make TAM the foundation for many industries and various engineering areas such as aerospace engineering, ocean engineering, manufacturing, civil engineering, and astromechanics. Therefore, students with TAM training often become leaders with a holistic view of technology.

Academic subject areas: Mechanics

Program code: 080101

II. Objectives and Learning Outcomes

1. Objectives

Students majored in TAM will be equipped with necessary theory, knowledge and skills to become senior specialists for research, education, R&D and management in mechanics and related areas.

2. Learning Outcomes

(1) Morality and humanity. With patriotism and professionalism, a firm attitude of pursuing excellence, a sound personality, a sense of social responsibility and rich humanities and sciences accomplishment.

(2) Basic knowledge. Master the basic theoretical knowledge and skills of engineering such as mathematics, mechanics, physics, electronics, machinery and so on.

(3) Core knowledge

3.1 Master the knowledge of the core courses in basic disciplines such as mathematics, mechanics, physics, and information technology, and at the same time have strong computer and foreign language application capabilities.

3.2 Master the core knowledge of mechanics as the engineering foundation and the basic knowledge of mechanics or one other engineering (e.g. aviation, aerospace, machinery, automobiles, energy, environment, etc.)

3.3 Have the basic laboratory and design skills in mechanics and engineering.

(4) Understand the frontier of the subject. Understand the development, theoretical frontier and application prospect of the mechanics and some major projects.

(5) Master the basic methods of literature retrieval and data query, and have the ability to engage in scientific research and practical work.

(6) Management ability and teamwork ability. Good organizational and management skills, good communication skills, as well as environmental adaptation, team work ability.

(7) International vision. Has the international vision and certain international exchange and cooperation ability.

(8) Lifelong learning. Have the consciousness of lifelong learning and self-learning ability, innovative consciousness and grasp the basic innovative methods.

III. Study Length, Degree, and Graduation Requirements

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 Bachelor of Science
3. The minimum credit requirement for graduation: 155 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	17
		Major Core Courses	20
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	21
	Major Elective Courses	Major Elective Courses	18
Total			155
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	1Fall	None	MA
	MA127	Calculus II	4	1Spring	Calculus I	MA
	MA113	Linear Algebra	4	1Spring /Fall	None	MA
Physics	PHY105	College Physics I	4	1Spring /Fall	None	PHY
	PHY106	College Physics II	4	1Spring /Fall	General Physics I	PHY
	PHY104B	Experiments of Fundamental Physics	2	1Spring /Fall	None	PHY
Chemistry	CH105	Chemistry: the Central Science	3	1Spring /Fall	None	CH
Geoscience + Life Science	BIO102B	Introduction to Life Science	3	1Spring /Fall	None	BIO
Computer Programming	CS109	Introduction to Computer Programming	3	1Spring /Fall	None	CS
Note: 1. For Mathematics Category, students can take Mathematical Analysis I and II as alternatives to Calculus I and II; Advanced Linear Algebra I as an alternative to Linear Algebra. 2. For Physics Category, students can take General Physics I and II as alternatives to College Physics I and II. 3. For Chemistry Category, students can take General Chemistry as an alternative to Chemistry: the Central Science. 4. For Geoscience + Life Science Category, students can take Principles of Biology or Introduction to Earth Sciences as an alternative to Introduction to Life Science. 5. For Computer Programming Category, students can choose any one of the five computer programming courses. 6. The above alternative courses 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	None
	MA127	Calculus II	Calculus I
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	College Physics I
Declare major at the end of the second academic year	MA117	Calculus I	None
	MA127	Calculus II	Calculus I
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	College Physics I
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Theoretical and Applied Mechanics

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	ME102	CAD and Engineering Drawing	3	1.5	1Spring	None	ME
	MAE209	Foundations of Engineering Mathematics	4		2Fall	MA127 PHY106 MA113	MAE
	MAE203	Theoretical Mechanics I	3		2Fall	MA127、 MA109 or MAE209	MAE
	MA212	Probability and Statistics	3		2Fall	MA127	MA

	MA201b	Ordinary Differential Equations B	4		2Fall	MA127	MA
	Total		17	1.5			
Major Core Courses	MAE202	Mechanics of Materials	3		2Spring	MAE203	MAE
	MAE204	Theoretical Mechanics II	3		2Spring	MA113 MA127 (or MAE209)	MAE
	MAE303	Fluid Mechanics	4		3Fall	MA127 PHY106	MAE
	MAE304	Elasticity	4		3Spring	MAE203 MAE202 MAE209	MAE
	MAE302-16	Fluid Mechanics Lab	3	3	3Spring	MAE303	MAE
	MAE401-16	Solid Mechanics Lab	3	3	3Fall	MAE202	MAE
	Total		20	6			
Practice-based Courses	MAE499	Research and Innovation Project	2	2	4Fall	None	MAE
	ME103	Awareness Practice of Manufacturing Engineering	3	2	1-4Fall	None	ME
	MAE477	Cognitive Internship	2	2	2Summer	None	MAE
	MAE478	Practical Internship (Research and Production)	2	2	3Summer	None	MAE
	MAE488	Degree Thesis (or Design)	12	12	4Spring	None	MAE
	Total		21	20			
Total			58	27.5			

Note:

Note 1: "Theoretical Mechanics II MAE204" can be replaced by "Analytical Mechanics PHY205".

Note 2: "Fundamentals of Engineering Mathematics MAE209" can be replaced by "Linear Algebra in Detail MA109" and "Mathematical Physics Equations PHY203".

Note 3: Science and technology innovation projects are carried out in any semester after the beginning of the second academic year, so they are not included in the specific weekly credit hour allocation table.

Note 4: The industrial internship is not fixed to a specific semester and therefore is not included in the specific weekly credit hour allocation table.

Note 5: Students who have completed Comprehensive Design I (COE491) and Comprehensive Design II (COE492) are not required to take the graduation design (or thesis) (MAE490).

Table 2: Major Elective Courses**Program of Theoretical and Applied Mechanics**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
EE104	Fundamentals of Electric Circuits	2		1Spring	MA127	EE
MAE206	Introduction to Aeronautics and Mechanics	1		2Fall	None	MAE
MAE498	Research and Innovation Projects of Mechanics and Aerospace Engineering	2	2	2-4Fall	None	MAE
MAE305	Engineering Thermodynamics	3		2Fall	MA127	MAE
CS203B	Data Structures and Algorithm Analysis B	3	1	2Fall	CS102A	CS
PHY221	Open Physics Laboratory II	1	1	2Fall	None	PHY
PHY201-15	Physics Laboratory II	2	2	2Fall	PHY103B	PHY
PHY207-15	Electrodynamics I	3		2Fall	PHY203-15	PHY
MAE208	Lectures on selected Engineering Software	2	2	2Spring /Fall	None	MAE
MAE210	Engineering Materials	3		2Spring	None	MAE
PHY202	Physics Laboratory III	2	2	2Spring	PHY103B	PHY
MAE323	Modern Numerical Methods	3	1	2Spring	MA127 MA113	MAE
MA233	Introduction to MATLAB	4	1	2Spring	MA113	MA
MAE211	Overseas Practice	2	2	2Summer	None	MAE
MAE405	Aerodynamics	3		3Fall	MAE207 or MAE303	MAE
MAE309	General Principles of Transport Phenomena	3		3Fall	MA127	MAE
MAE312	Aircraft Flight Dynamics	3		3Fall	MA127	MAE
MAE307	Aircraft Structural Strength	3		3Fall	MAE202	MAE
MAE313	Aero Engine Structural Strength	3	1	3Fall	None	MAE
MA303	Partial Differential Equations	3		3Fall	MA201b	MA
ME311	Mechanical Design	3		3Fall	None	ME
ME331	Robot Modeling and Control	3		3Fall	MAE203B	ME
ME307	Fundamentals of Control Engineering	3	1	3Fall	EE104	ME
MAE5028	Fundamentals of Combustion	3		3Fall	MAE305	MAE
MAE5017	Aircraft Flight Dynamics	3		3Fall	MAE209 MAE303	MAE
CS205	C/C++ Program Design	3	1	3Spring /Fall	None	CS
MAE318	Theory of Vibration	3		3Spring	MAE203B MA201b	MAE
MAE403	Computational Fluid Dynamics	3		3Spring	MAE207 or MAE303	MAE
MAE310	Computational Solid Mechanics	3		3Spring	MAE202	MAE
MAE320	Mechanism of Flight	3		3Spring	MAE405	MAE

MAE308	Heat Transfer	3		3Spring	MA127	MAE
MAE5027	Interfacial Phenomena	3		3Spring	PHY106	MAE
MAE7002	General Theory of Aeroengine Engineering	3		3Spring	None	MAE
MAE407	Jet and Propulsion	3		3Spring	MAE305 or PHY204	MAE
MAE7001	Multiphase Flow	3		3Spring	MAE207	MAE
MAE5021	Fracture Mechanics	3		3Spring	MAE202	MAE
ME310	Fundamentals of Measurement Technology	3		3Spring	ME307 EE205	ME
MAE417	Aircraft Design Group Practice	3	2	4Fall	MAE405 MAE307 MAE407	MAE
MAE5020	Mechanics of Composite Materials	3		4Fall	MA127	MAE
MAE419	Aerodynamic analysis and design of aircraft	2		4Fall	MAE403	MAE
MAE311	Principles of Turbomachinery	3		4Fall	MAE305 MAE405	MAE
MAE5031	Rarefied gas dynamics: theory and applications	3	1	4Fall		MAE
MAE5027	Mechanics of Soft Materials	3		4Spring	MA113 MAE202	MAE
MAE5033	Mechanics in Photolithography	3		4Spring	PHY106 MAE207 MAE202	MAE
Total		122	18			

Note

Note 1: The above courses should be taken for a minimum of 18 credits; the elective courses of the Department of Mechanics and Aerospace Engineering should be taken for a minimum of 12 credits.

Note 2: "Computational Fluid Dynamics MAE403" and "Computational Solid Mechanics MAE310" at least one of them.

Note 3: Choose at least one of the following directions to complete the requirements.

Engineering numerical simulation direction: "Computational Fluid Dynamics", "Computational Solid Mechanics", "C/C++ Program Design", "Modern Numerical Methods", "Lectures on selected Engineering Software", "Introduction to MATLAB", at least 9 credits

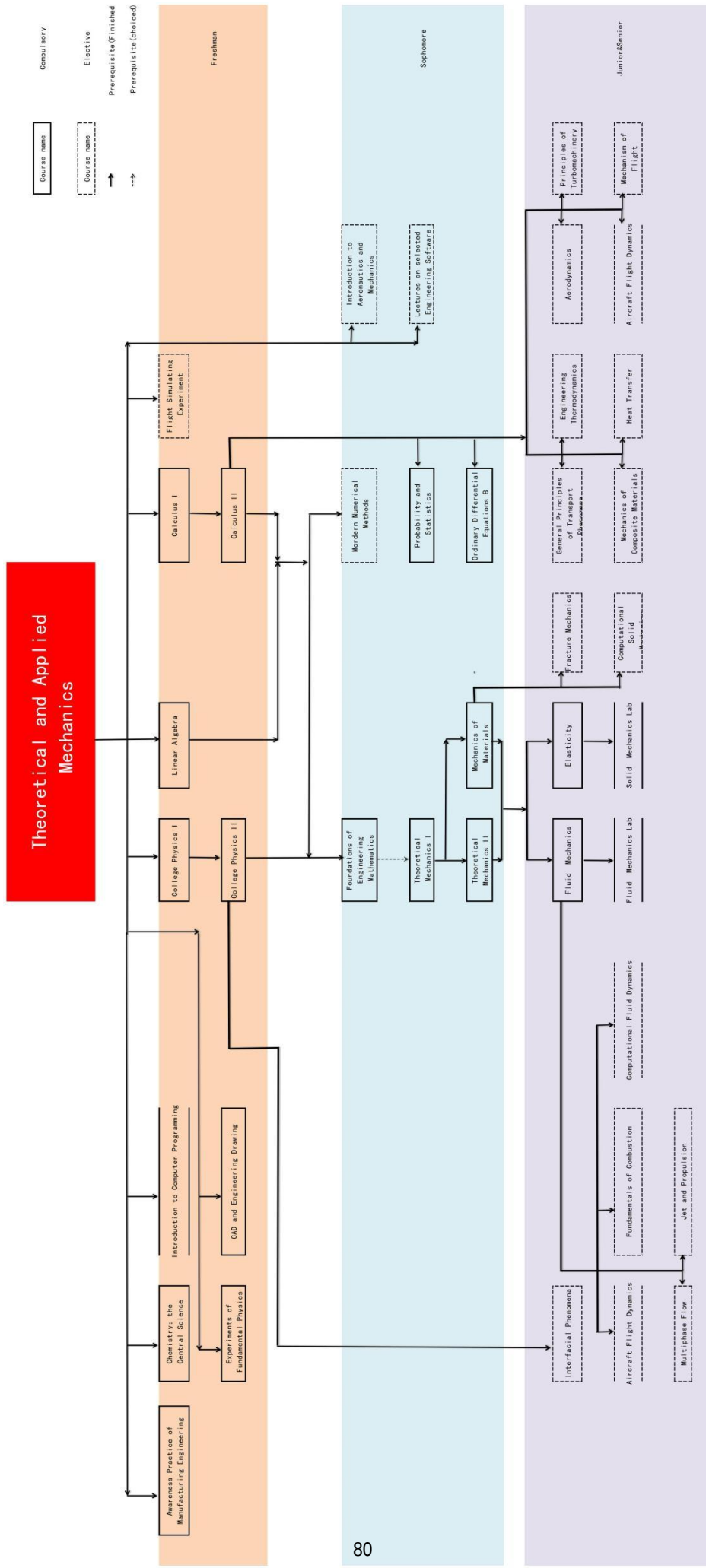
New material mechanics: "Engineering Materials", "Computational Solid Mechanics", "Mechanics of Composite Materials", "Fracture Mechanics", "Theory of Vibration", "Mechanics of Soft Materials", at least 9 elective credits

Note 4: "Engineering Thermodynamics MAE305" can be replaced by "Thermodynamics and Statistical Physics I PHY204".

Table 3: Overview of Practice-based Learning**Program of Theoretical and Applied Mechanics**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
ME102	CAD and Engineering Drawing	3	1.5	1Spring	None	ME
MAE211	Overseas Practice	2	2	2Summer	None	MAE
MAE302-16	Fluid Mechanics Lab	3	3	3Spring	MAE303	MAE
MAE401-16	Solid Mechanics Lab	3	3	3Fall	MAE202	MAE
MAE499	Research and Innovation Project	2	2	4Fall	None	MAE
ME103	Awareness Practice of Manufacturing Engineering	3	2	1-4Fall	None	ME
MAE477	Cognitive Internship	2	2	2Summer	None	MAE
MAE478	Practical Internship (Research and Production)	2	2	3Summer	None	MAE
MAE488	Degree Thesis (or Design)	12	12	4Spring	None	MAE
Total		32	29.5			

Curriculum Structure of Theoretical and Applied Mechanics



Department of Mechanics and Aerospace Engineering

Program of Aerospace Engineering for International Students (2024)

I. Introduction

Academic subject areas: Aerospace

Program code: 082001

Aerospace Engineering is a modern area that exemplifies the need for interdisciplinary problem solving and the mind for innovation. Aerospace Engineering is also an area of national strategic importance and high priority for growth. The Aerospace Engineering bachelor program at SUSTech is led by the Member of Chinese National Academy of Engineering, and the faculty consists of several renowned scholars. Major areas include aircraft design and engineering, aircraft propulsion, and aircraft manufacturing. The design and analysis of Aerospace Engineering relies on solid grasp of broad subjects of mechanics, heat transfer, material science, and electronics; the proficient knowledge of these subjects are applicable in other areas such as mechanical engineering and civil engineering. The students trained by the Aerospace Engineering program are expected to establish solid foundations of mathematics and mechanics, as well as deep understanding of basic aircraft design theory, strong capabilities in structural analysis, and good hands-on skills.

II. Objectives and Learning Outcomes

1. Objectives

The Aerospace Engineering program at SUSTech is dedicated to train students of high calipers by empowering them with solid foundations of mathematics and mechanics, broad knowledge in aerospace engineering, good overall capability of aircraft design, and a mind for innovation. The students who successfully complete the program may perform consulting, research and development, planning, and management roles in the industries of aerospace engineering, mechanical engineering, and mechanics. They can also enter top universities and research institutes to pursue master or doctoral degrees.

2. Learning Outcomes

Morality and humanity. With professionalism, a firm attitude of pursuing excellence, a sound personality, a sense of social responsibility and rich humanities and sciences accomplishment.

Basic knowledge. Master the basic theoretical knowledge and skills of engineering such as mathematics, mechanics, physics, electronics, machinery and so on.

Core knowledge

Have the necessary ability of drawing, computing, experimenting and testing in this major. Through the professional curriculum design, students can initially achieve the design, control, debugging and research abilities of aircraft application system. At the same time, they have strong computer and foreign language application abilities.

Master the complete basic knowledge system of aerospace engineering, including material mechanics, engineering thermodynamics, aircraft dynamics, aerodynamics, control principle, aircraft design, aircraft turbomachinery principle, aircraft structural strength and so on.

Master the general engineering design, aircraft design, Aerial engine Design and other design methods.

Understand the frontiers of the discipline. Understand the development trends, theoretical frontiers and application prospects in the field of aerospace.

Master the basic methods of literature retrieval and data query, and have the ability to engage in scientific research and practical work.

Management ability and teamwork ability. Good organizational and management skills, good communication skills, as well as environmental adaptation, team work ability.

International vision. Has the international vision and certain international exchange and cooperation ability.

Life long learning. Have the consciousness of lifelong learning and self-learning ability, innovative consciousness and grasp the basic innovative methods.

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 Bachelor of Engineering
3. The minimum credit requirement for graduation: 160 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	24
		Major Core Courses	19
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	21
	Major Elective Courses	Major Elective Courses	17
Total			160
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	1Fall	None	MA
	MA127	Calculus II	4	1Spring	Calculus I	MA
	MA113	Linear Algebra	4	1Spring /Fall	None	MA
Physics	PHY105	College Physics I	4	1Spring /Fall	None	PHY
	PHY106	College Physics II	4	1Spring /Fall	General Physics I	PHY
	PHY104B	Experiments of Fundamental Physics	2	1Spring /Fall	None	PHY
Chemistry	CH105	Chemistry: the Central Science	3	1Spring /Fall	None	CH
Geoscience + Life Science	BIO102B	Introduction to Life Science	3	1Spring /Fall	None	BIO
Computer Programming	CS109	Introduction to Computer Programming	3	1Spring /Fall	None	CS
Note: 1. For Mathematics Category, students can take Mathematical Analysis I and II as alternatives to Calculus I and II; Advanced Linear Algebra I as an alternative to Linear Algebra. 2. For Physics Category, students can take General Physics I and II as alternatives to College Physics I and II. 3. For Chemistry Category, students can take General Chemistry as an alternative to Chemistry: the Central Science. 4. For Geoscience + Life Science Category, students can take Principles of Biology or Introduction to Earth Sciences as an alternative to Introduction to Life Science. 5. For Computer Programming Category, students can choose any one of the five computer programming courses. 6. The above alternative courses 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	None
	MA127	Calculus II	Calculus I
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	College Physics I
Declare major at the end of the second academic year	MA117	Calculus I	None
	MA127	Calculus II	Calculus I
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	College Physics I
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Aerospace Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	ME102	CAD and Engineering Drawing	3	1.5	1Spring /Summer	None	ME
	EE104	Fundamentals of Electric Circuits	2		1Spring	MA113 MA117	EE
	MAE203B	Engineering Mechanics I - Statics and Dynamics	3		2Fall	MA113	MAE
	MAE209	Foundations of	4		2Fall	MA127	MAE

		Engineering Mathematics				PHY106 MA113	
	MAE305	Engineering Thermodynamics	3		2Fall	MA127	MAE
	MAE207	Engineering Fluid Mechanics	3		2Fall	MA127	MAE
	MAE202	Mechanics of Materials	3		2Spring	MA113 MA127	MAE
	ME311	Mechanical Design	3		3Fall	None	ME
	Total		24	1.5			
Major Core Courses	MAE405	Aerodynamics	3		3Fall	MAE207	MAE
	MAE307	Aircraft Structural Strength	3		3Fall	MAE202	MAE
	MAE315	Aero-Thermal Fluid Lab	2	2	3Fall	MAE207 or MAE303	MAE
	MAE322	Fundamentals of Combustion	3		3Fall	MAE305	MAE
	MAE316	Experiments in Aircraft Structural Mechanics	2	2	3Spring	MAE202	MAE
	MAE407	Jet and Propulsion	3		3Spring	MAE305 or PHY204	MAE
	MAE417	Aircraft Design Group Practice	3	2	4Fall	MAE405 MAE307 MAE407	MAE
	Total		19	6			
Practice-based Courses	MAE499	Research and Innovation Project	2	2	4Fall	None	MAE
	ME103	Awareness Practice of Manufacturing Engineering	3	2	1-4Fall	None	ME
	MAE477	Cognitive Internship	2	2	2Summer	None	MAE
	MAE478	Practical Internship (Research and Production)	2	2	3Summer	None	MAE
	MAE488	Degree Thesis (or Design)	12	12	4Spring	None	MAE
	Total		21	20			
Total			64	27.5			

Note:

Note 1: "Engineering Mechanics I - Statics and Dynamics MAE203B" can be replaced by "Theoretical Mechanics I MAE203".

"Engineering Fluid Mechanics MAE207" can be replaced by "Fluid Mechanics MAE303".

"Engineering Thermodynamics MAE305" can be replaced by "Thermodynamics and Statistical Physics I PHY204".

Note 2: Science and technology innovation projects are carried out in any semester after the beginning of the second academic year, so they are not included in the specific weekly credit hour allocation table.

Note 3: The industrial internship is not fixed to a specific semester and therefore is not included in the specific weekly credit hour allocation table.

Note 4: Students who have completed Comprehensive Design I (COE491) and Comprehensive Design II (COE492) are not required to take the graduation design (or thesis) (MAE490).

Table 2: Major Elective Courses**Program of Aerospace Engineering**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
MAE498	Research and Innovation Projects of Mechanics and Aerospace Engineering	2	2	2-4Fall	None	MAE
MAE206	Introduction to Aircraft Engines	1		2Fall	None	MAE
MAE208	Lectures on selected Engineering Software	2		2Spring	None	MAE
MAE210	Engineering Materials	3		2Spring	None	MAE
MAE204	Theoretical Mechanics II	3		2Spring	MA113 MA127 (or MAE209)	MAE
MAE323	Mordern Numerical Methods	3	1	2Spring	MA127 MA113	MAE
MAE211	Overseas Practice	2	2	2Summer	None	MAE
MAE312	Aircraft Flight Dynamics	3		3Fall	MA127	MAE
MAE313	Aero Engine Structure and Strength	3	1	3Fall	None	MAE
MAE309	General Principles of Transport Phenomena	3		3Fall	MA127	MAE
MAE304	Elasticity	4		3Spring	MAE203 MAE202 MAE209	MAE
MAE403	Computational Fluid Dynamics	3		3Spring	MAE207 Or MAE303	MAE
MAE310	Computational Solid Mechanics	3		3Spring	MAE202	MAE
MAE320	Mechanism of Flight Vehicle	3		3Spring	MAE405	MAE
MAE318	Theory of Vibration	3		3Spring	MAE203B MA201b	MAE
MAE5027	Interfacial Phenomena	3		3Spring	PHY106	MAE
MAE5021	Fracture Mechanics	3		3Spring	MAE202	MAE
MAE7001	Multiphase Flow	3		3Spring	MAE207	MAE
MAE308	Heat Transfer	3		3Spring	MA127	MAE
MAE7002	General Theory of Aeroengine Engineering	3		3Spring	None	MAE
MAE5017	Aeroacoustics	3		4Fall	MAE207 Or MAE303	MAE
MAE311	Principles of Turbomachinery	3		4Fall	MAE305 MAE405	MAE
MAE5020	Mechanics of Composite Materials	3		4Fall	MA127	MAE
MAE419	Aerodynamic analysis and design of aircraft	2		4Fall	MAE403	MAE
MAE5031	Rarefied gas dynamics: theory and applications	3	1	4Fall		MAE
MAE5027	Mechanics of Soft Materials	3		4Spring	MA113 MAE202	MAE
MAE5033	Mechanics in Photolithography	3		4Spring	PHY106 MAE207	MAE

					MAE202	
MA201b	Ordinary Differential Equations B	4		2Fall	MA127	MA
MA212	Probability and Statistics	3		2Fall	MA127	MA
MA233	Introduction to MATLAB	4	1	2Spring	MA113	MA
ME307	Fundamentals of Control Engineering	3	1	3Fall	EE104	ME
ME331	Robot Modeling and Control	3		3Fall	MAE203B	ME
ME310	Fundamentals of Measurement Technology	3		3Spring	ME307 EE205	ME
ME301	Dynamics and Vibration	3	1	3Spring	MA201b MAE203B	ME
EE205	Signals and Systems	3	1	2Fall	MA117	EE
EE201-17	Analog Circuits	3		2Fall	PHY106 EE104	EE
EE323	Digital Signal Processing	3	1	4Fall	EE205	EE
CS203B	Data Structures and Algorithm Analysis B	3	1	2Fall	CS109	CS
CS205	C/C++ Program Design	3	1	3Fall/Spring	None	CS
PHY221	Open Physics Laboratory II	1	1	2Fall	None	PHY
PHY201-15	Physics Laboratory II	2	2	2Fall	PHY105	PHY
PHY203-15	Mathematical Methods in Physics	4		2Fall	MA113 MA127	PHY
PHY202	Physics Laboratory III	2	2	2Spring	PHY105	PHY
PHY425	Modern Techniques in Materials Characterization	3	1	4Fall	PHY206-15	PHY
Total		126	20			

Note

Note 1: The above courses should be taken for a minimum of 17 credits; the elective courses of the Department of Mechanics and Aerospace Engineering should be taken for a minimum of 12 credits.

Note 2: "Computational Fluid Mechanics MAE403" and "Computational Solid Mechanics MAE310" at least one of them.

Note 3:

Aircraft design direction: Aircraft Flight Dynamics MAE312, Mechanism of Flight Vehicle MAE320, Aerodynamic analysis and design of aircraft MAE419, at least one elective.

Aircraft dynamics direction: Principles of Turbomachinery MAE311, Aero Engine Structure and Strength MAE313 at least one elective.

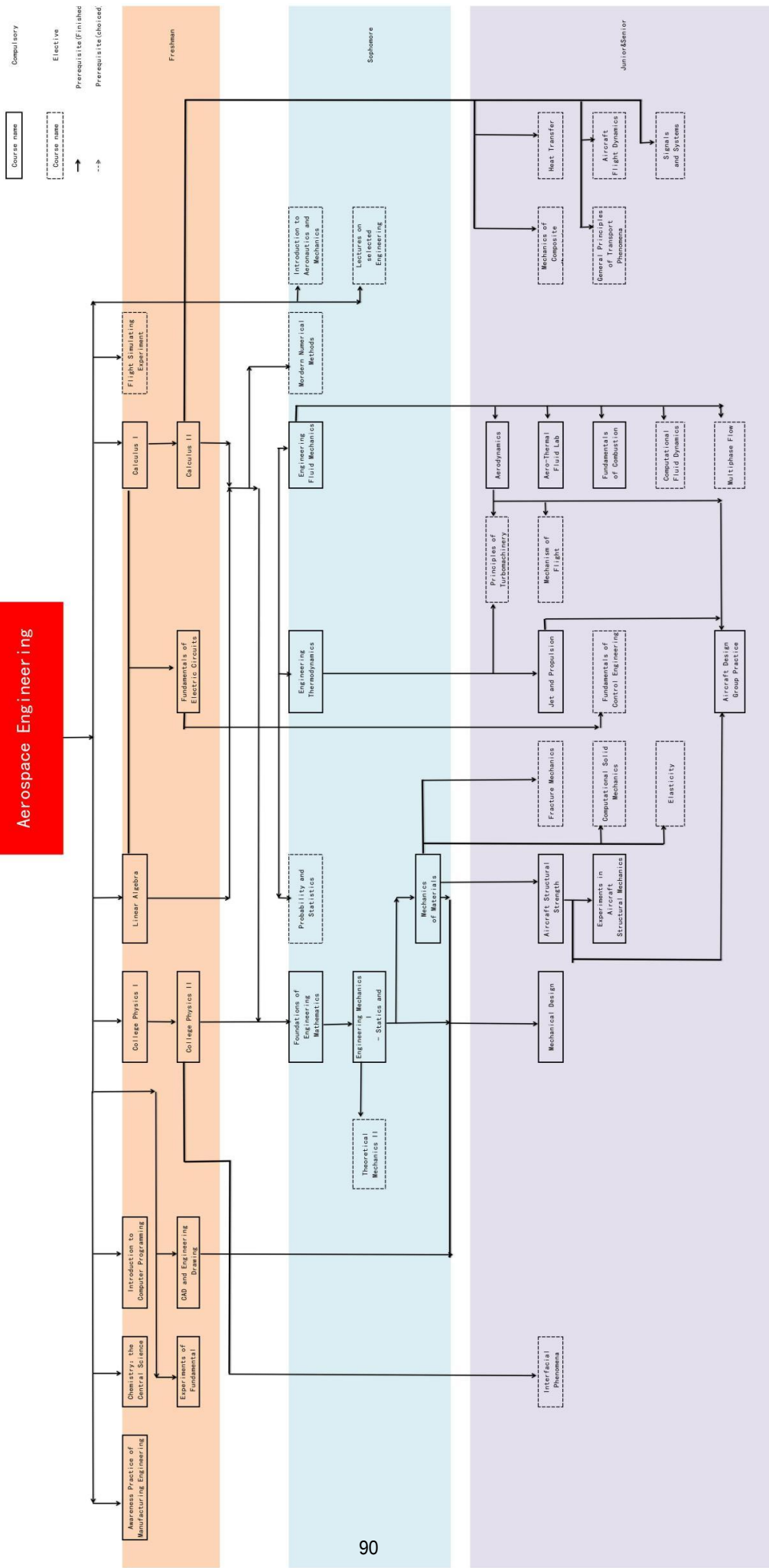
Note 4: "Theory of Vibration MAE318" can be replaced by "Dynamics and Vibration ME301".

Table 3: Overview of Practice-based Learning**Program of Aerospace Engineering**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
ME102	CAD and Engineering Drawing	3	1.5	1Spring	None	ME
MAE211	Overseas Practice	2	2	2Summer	None	MAE
MAE315	Aero-Thermal Fluid Lab	2	2	3Fal	MAE207 Or MAE303	MAE
MAE316	Experiments in Aircraft Structural Mechanics	2	2	3Spring	MAE202	MAE
MAE417	Aircraft Design Group Practice	3	2	4Fal	MAE405 MAE307 MAE407	MAE
MAE499	Research and Innovation Projects	2	2	4Fal	None	MAE
ME103	Awareness Practice of Manufacturing Engineering	3	2	1-4Fal	None	ME
MAE477	Cognitive Internship	2	2	2Summer	None	MAE
MAE478	Practical Internship (Research and Production)	2	2	3Summer	None	MAE
MAE488	Degree Thesis(or Design)	12	12	4Spring	None	MAE
Total		33	29.5			

Curriculum Structure of Aerospace Engineering

Aerospace Engineering



Department of Mechanical and Energy Engineering

Program of Mechanical Engineering for International Students

(2024)

I. Introduction

This academic program is designed to provide broad disciplinary subject training for the development of mechanical engineering. Department of Mechanical and Energy Engineering (MEE) of Southern University of Science and Technology (SUSTech) aims at becoming a world-leading center for engineering education and research. At the advanced stage of this program, three major directions are coherently blended into this program to open specialization options for students: (1) Advanced manufacturing and innovative design; (2) Equipment automation, robotics and artificial intelligence; and (3) Renewable energy engineering. More specifically, our research focuses include advanced and intelligent manufacturing methods, such as advanced forming, additive manufacturing, precision machining, multi-scale robotic mechanisms, control and automation, soft materials, and different battery engineering solutions. We cater for educating two streams of engineering talents: (1) the academic stream of talents who have strong theoretical foundation in research, interdisciplinary perspective and experience, and good humanistic understanding; (2) the engineering innovation stream talents with sharp insight into engineering problems, and strong leadership for solving them.

Academic subject areas: Mechanical Engineering

Program code: 080201

II. Objectives and Learning Outcomes

1. Objectives

The program integrates theoretical and technological education within mechanical engineering domain, and provides students with a set of solid scientific, and practically innovative courses as well as hand-on training in the field. The program aims to develop students into future leaders in the discipline with: (1) balanced training in broad fundamentals of mechanical

engineering as well as yet selectively-specialized knowledge of interdisciplinary engineering; (2) outstanding ability in engineering practice, independent thinking, integrated application of engineering knowledge; and (3) innovation capability, humanistic understanding, and a global vision.

2. Learning Outcomes

- a) Master basic science theories, including mathematics, physics, mechanics, materials, electronics and computer science, management science, etc.
- b) Understand and be able to apply well-established knowledge of mechanical engineering, including theories, the frontier technologies and development of the industry, scientific research methods, engineering design and manufacturing methods. Students should also appreciate the latest inter-disciplinary development of other related fields.
- c) Be able to apply innovative thinking to understand, define, model, analyze and solve problems independently.
- d) Develop an international vision and skills of cross-cultural communication and collaboration.
- e) Acquire effective communication and leadership skills in multi-disciplinary teams.
- f) Develop rigorous and realistic attitude towards science and research, effective engagement in pursuing excellence and commitment to serve humanity.
- g) Have humanistic and social science literacy, and exercise social responsibility and professional engineering ethics.
- h) Develop the ability of independent learning and the awareness of lifelong learning.

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: 156 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	28
		Major Core Courses	22
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	12
	Major Elective Courses	Major Elective Courses	15
Total			156
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	MA101a/ MA117	Mathematical Analysis I /Calculus I	5/4	1 Fall	None	MATH
	MA102a/ MA127	Mathematical Analysis II /Calculus II	5/4	1 Spring	Mathematical Analysis I / Calculus I	MATH
	MA113	Linear Algebra	4	1 Spring & Fall	None	MATH
Physics	PHY101/ PHY105	General Physics I / College Physics I	5/4	1 Fall	None	PHY
	PHY102/ PHY106	General Physics II / College Physics II	5/4	1 Spring	General Physics I / College Physics I	PHY
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	PHY
Chemistry	CH103/ CH105	General Chemistry / Chemistry: The Central Science	4/3	1-2 Spring & Fall	None	CHEM
Geoscience + Life Science	BIO103/BI O102B/EO E100	Principles of Biology / Introduction to Life Science/ Introduction to Earth Sciences	3	1-2 Spring & Fall	None	BIO, ESS, OCE, ESE
Computer Programming	CS109/ CS110/ CS111/ CS112/ CS113	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming / Introduction to Matlab Programming	3	1-2 Spring & Fall	None	CSE
Note: “/” means equivalent courses to be selected by students.						

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA101a/MA117	Mathematical Analysis I /Calculus I	None
	MA102a/MA127	Mathematical Analysis II /Calculus II	Mathematical Analysis I / Calculus I
	PHY101/PHY105	General Physics I /College Physics I	None
	PHY102/PHY106	General Physics II /College Physics II	General Physics I / College Physics I
	Note: The above courses are required to be completed. In addition, at least one of the following Course Category should be passed: 1. Mathematics: MA113 Linear Algebra. 2. Physics: PHY104B Experiments of Fundamental Physics. 3. Chemistry: CH103/CH105 General Chemistry / Chemistry: The Central Science. 4. Geoscience + Life Science: BIO103/BIO102B/EOE100 Principles of Biology / Introduction to Life Science/ Introduction to Earth Sciences . 5. Computer Programming: CS109/CS110/CS111/CS112/CS113 Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming / Introduction to Matlab Programming. (“/”means equivalent courses to be selected by students.)		
Declare major at the end of the second academic year	MA101a/MA117	Mathematical Analysis I /Calculus I	None
	MA102a/MA127	Mathematical Analysis II /Calculus II	Mathematical Analysis I / Calculus I
	PHY101/PHY105	General Physics I /College Physics I	None
	PHY102/PHY106	General Physics II /College Physics II	General Physics I / College Physics I
	MA113	Linear Algebra	None
	Note: The above courses are required to be completed. In addition, at least one of the following Course Category should be passed: 1. Physics: PHY104B Experiments of Fundamental Physics. 2. Chemistry: CH103/CH105 General Chemistry / Chemistry: The Central Science. 3. Geoscience + Life science: BIO103/BIO102B/EOE100 Principles of Biology / Introduction to Life Science/ Introduction to Earth Sciences . 4. Computer Programming: CS109/CS110/CS111/CS112/CS113 Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming / Introduction to Matlab Programming. (“/”means equivalent courses to be selected by students.)		
Note: 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. 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. 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). 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).

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Mechanical Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	ME102	CAD and Engineering Drawing	3	1.5	2 Spring & Fall		MEE
	ME103	Awareness Practice of Manufacturing Engineering	3	2	1-2 Spring & Fall		MEE
	MAE203B	Engineering Mechanics I – Statics and Dynamics	3		2/Fall	MA113	MAE
	ME212	Mechanics of Materials M	3		2/Fall	MA127	MEE
	MA201b	Ordinary Differential Equations B	4	1	2/Fall	MA127	MATH
	ME271	Fundamentals of Thermodynamics and Heat Transfer	4		2/Fall	MA127	MEE
	EE104	Fundamentals of Electric Circuits	2		2/Spring	MA101B, MA113	EE
	ME261	Engineering Materials - Science, Processing and Design	3		2/Spring	PHY106, CH105/CH103	MEE
	MAE207	Engineering Fluid Mechanics	3		2/Spring	MA127	MAE
	Total		28	4.5			
Major Core Courses	ME213	Principles of Machinery	3		2/Spring & Fall		MEE
	ME311	Mechanical Design	3		3/Fall		MEE
	ME316	Machinery and Mechanical Design Labs	2	2	3 Spring & Fall		MEE
	ME302	Fundamentals of Manufacturing	3		3/Fall	ME103	MEE
	ME307	Fundamentals of Control Engineering	3	0.5	3/Spring	EE104	MEE
	ME301	Dynamics and Vibration	3	1	3/Spring	MAE203B, MA201b	MEE
	ME357	Intelligent Manufacturing System Technology	3		3/Spring		MEE
	ME308	Advanced Manufacturing Practice	2	2	4/Fall	ME302	MEE
	Total		22	5.5			

Practice-based Courses	ME498	Senior Project*	12	12	4/Spring		MEE
	Total		12	12			
	Total		62	22			

Note: *Students who have completed Comprehensive Design I & II are not required to take the Senior Project (ME498) .

Table 2: Major Elective Courses

Program of Mechanical Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
ME211	Advanced Graphics and Computer Aided Design	2	1	2/Fall	ME102	MEE
MA212	Probability and Statistics	3		2/Fall	MA127	MATH
MEE5004	General Education of Laboratory Safety	1		2/Fall		MEE
ME112	Introduction to Matlab	2	1	1/Spring		MEE
ME309	Management Science in Engineering Technology Innovation	1		2/Spring		MEE
PHY203-15	Mathematical Methods in Physics	4		2/Spring	PHY106, MA127, MA113	PHY
ME273	Introduction to Energy Science	3		2/Spring	PHY106, CH105/CH103, ME271	MEE
ME315	Mechanisms and Applications	3		3/Fall	MA127, MA113	MEE
ME322	Robotic Actuation System	3	1	3/Fall	MA127	MEE
ME331	Robot Modeling and Control	3		3/Fall	MAE203B	MEE
ME332	Robot Operating System	3	1	3/Fall	CS109/CS110/CS111/CS112/CS113	MEE
ME354	Manufacturing Process Simulation and Data Analysis	2	1	3/Fall	ME103	MEE
ME364	3D Printing of Functional Soft Materials: Fundamentals, Engineering and Applications	3		3/Fall	PHY105B, MA127	MEE
MEE5304	Frontiers in Hybrid Manufacturing Processes	3		3/Fall	ME302	MEE
SDM274	Artificial Intelligence and Machine Learning	3		3/Fall	MA127, MA113	SDIM
ME310	Fundamentals of Measurement Technology	3		3/Spring	ME307	MEE
ME313	Product Design Practice	3	1	3/Spring	ME213/ME311/ME316/ME331	MEE

ME314	Finite Element Theory and Its Engineering Applications	3		3/Spring	ME212, MA113	MEE
ME323	Fundamentals of Sensing Technology	3	0.5	3/Spring	EE104, EE205	MEE
ME333	Mechatronic Systems	3	1	3/Spring	ME331	MEE
ME336	Collaborative Robot Learning	3	1	3/Spring	ME331	MEE
ME361	Fundamentals of Additive Manufacturing of Metals	3		3/Spring	ME261	MEE
MEE5002	Fundamentals and practices of project management	3		3/Spring		MEE
MEE5210	Microstructure Characterization and Analysis	3		3/Spring	PHY106, CH105/CH103	MEE
ME405	Innovative Design Theory and Practice	3	1	4/Fall		MEE
ME462	Additive Manufacturing and Design	3		4/Fall		MEE
MEE5116	Advanced Kinematics and Dynamics of Mechanisms	3	1	4/Fall	ME331	MEE
MEE5205	Failure Analysis and Fracture Mechanics of Engineering Materials	3		4/Spring	ME212	MEE
ME491	Practice	3	3	1-3 Spring & Fall & Summer, 4 Spring & Fall		MEE
Total		81	13.5			

Note:

1. The minimum requirement for graduation in this module is 15 credits.
2. Major elective courses selected by a student during any specific semester may be changed according to the loading situation.
3. The number and contents of major elective courses offered by the department may be adjusted according to the development of curriculum construction.

Table 3: Overview of Practice-based Learning

Program of Mechanical Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CS109	Introduction to Computer Programming	3	1	1-2 Spr. & Fall	NA	CSE
CS110	Introduction to Java Programming	3	1	1-2 Spr. & Fall	NA	CSE
CS111	Introduction to C Programming	3	1	1-2 Spr. & Fall	NA	CSE
CS112	Introduction to Python Programming	3	1	1-2 Spr. & Fall	NA	CSE
CS113	Introduction to Matlab Programming	3	1	1-2 Spr. & Fall	NA	CSE
PHY104B	Experiments of Fundamental Physics	2	2	1-2 Spr. & Fall	NA	PHY
ME102	CAD and Engineering Drawing	3	1.5	2 Spring & Fall		MEE

ME103	Awareness Practice of Manufacturing Engineering	3	2	1-2 Spring & Fall		MEE
MA201b	Ordinary Differential Equations B	4	1	2/Fall	MA127	MATH
ME316	Machinery and Mechanical Design Labs	2	2	3 Spring & Fall		MEE
ME307	Fundamentals of Control Engineering	3	0.5	3/Spring	EE104	MEE
ME301	Dynamics and Vibration	3	1	3/Spring	MAE203B, MA201b	MEE
ME308	Advanced Manufacturing Practice	2	2	4/Fall	ME302	MEE
ME211	Advanced Graphics and Computer Aided Design	2	1	2/Fall	ME102	MEE
ME112	Introduction to Matlab	2	1	1/Spring		MEE
ME322	Robotic Actuation System	3	1	3/Fall	MA127	MEE
ME332	Robot Operating System	3	1	3/Fall	CS109/ CS110/ CS111/ CS112/ CS113	MEE
ME354	Manufacturing Process Simulation and Data Analysis	2	1	3/Fall	ME103	MEE
ME313	Product Design Practice	3	1	3/Spring	ME213/ ME311/ ME316/ ME331	MEE
ME323	Fundamentals of Sensing Technology	3	0.5	3/Spring	EE104, EE205	MEE
ME333	Mechatronic Systems	3	1	3/Spring	ME331	MEE
ME336	Collaborative Robot Learning	3	1	3/Spring	ME331	MEE
ME405	Innovative Design Theory and Practice	3	1	4/Fall		MEE
MEE5116	Advanced Kinematics and Dynamics of Mechanisms	3	1	4/Fall	ME331	MEE
ME491	Practice	3	3	1-3 Spring & Fall & Summer, 4 Spring & Fall		MEE
ME498	Senior Project	12	12	4/Spring		MEE
Total		82	42.5			

Curriculum Structure of Mechanical Engineering

Curriculum Structure of Mechanical Engineering				Senior Project (12)	
					
General Education Courses (79)	Major Foundational Courses (28)	Major Core Courses (22)	Major Elective Courses* (≥ 15)		
Chinese Language and Culture Module (16) Arts and Physical Education Module (6) : Physical Education, Arts Competence Development Module (19) : Computer Programming, Writing, Foreign Languages Humanities and Social Sciences Module (8) : Humanities, Social Sciences, Chinese Studies Mathematics and Natural Sciences Module (28) : Mathematics, Physics, Chemistry, Geoscience + Life science GE to Majors Bridging Module (2)	CAD and Engineering Drawing	Principles of Machinery	- Advanced Graphics and Computer Aided Design - Probability and Statistics - General Education of Laboratory Safety - Introduction to Matlab - Management Science in Engineering - Technology Innovation - Mathematical Methods in Physics - Introduction to Energy Science - Mechanisms and Applications - Robotic Actuation System - Robot Modeling and Control - Robot Operating System - Manufacturing Process Simulation and Data Analysis 3D Printing of Functional Soft Materials: Fundamentals, Engineering and Applications - Frontiers in Hybrid Manufacturing Processes	- Artificial Intelligence and Machine Learning - Fundamentals of Measurement Technology - Product Design Practice - Finite Element Theory and Its Engineering Applications - Fundamentals of Sensing Technology - Mechatronic Systems - Collaborative Robot Learning - Fundamentals of Additive Manufacturing of Metals - Fundamentals and practices of project management - Microstructure Characterization and Analysis - Innovative Design Theory and Practice - Additive Manufacturing and Design - Advanced Kinematics and Dynamics of Mechanisms - Failure Analysis and Fracture Mechanics of Engineering Materials	
	Awareness Practice of Manufacturing Engineering	Mechanical Design			
	Ordinary Differential Equations B	Machinery and Mechanical Design Labs			
	Fundamentals of Electric Circuits	Fundamentals of Manufacturing			
	Engineering Mechanics I – Statics and Dynamics	Advanced Manufacturing Practice			
	Mechanics of Materials - M	Fundamentals of Control Engineering	Intelligent Manufacturing System Technology		
	Engineering Fluid Mechanics	Dynamics and Vibration			
	Engineering Materials - Science, Processing and Design				
	Fundamentals of Thermodynamics and Heat Transfer		Practice & Internship		

Note*: Here only list some of the major elective courses. The full list is detailed in the program of Mechanical Engineering for International Students.

Department of Mechanical and Energy Engineering

Program of Robotics Engineering for International Students (2024)

I. Introduction

Robotics Engineering is an interdisciplinary program that integrates the learning of mechanical, electronic, and computer technologies. The aim of the program is to cultivate leading talents with solid scientific foundation, excellent innovative practical ability and broad international vision, who are good at comprehensive application of theories and methods of robotics and related disciplines, and who can solve engineering problems with the latest scientific development for the future. In terms of research, its directions cover industrial robots, bionic robots, medical robots, field robots, robot software, microrobots and emerging frontier areas of science and technology such as artificial intelligence, autonomous system, supporting the national economic development plan and Shenzhen's local informatization, intellectualization and manufacturing comprehensive upgrade.

Academic subject areas: Automation

Program code: 080803T

II. Objectives and Learning Outcomes

1. Objectives

This program bases its objectives on the future development of robotics engineering and serves the human resource demand of the field in the background of the national mid and long term development planning. The program is committed to fostering students with a solid scientific foundation, excellent innovation capacity, broad international vision, integrated use of robotics theories and related disciplines, and skills of solving the engineering problems for the future with the latest science development.

2. Learning Outcomes

- a) Solid and broad basic theoretical knowledge (including mathematics, physics, machinery, automation, electronics, computer, etc.), as well as subject knowledge in robot engineering.

- b) Master the robotics theories, research and engineering design methods of robot engineering, and have a good knowledge of engineering technology and frontier development of the industry. Robotics Engineering is a multidisciplinary and interdisciplinary program and foster its students to become leading cross-disciplinary talents for the future.
- c) Develop students with rigorous and practical attitude toward science and research, engagement in pursuing excellence, a strong sense of social responsibility and mission, and good communication skills.
- d) Develop students with innovative thinking and the ability to independently identify, understand and solve problems in the real world with the application of robotics via the learning of the program.
- e) Develop the international outlook and skills of communication and collaboration with international professionals of the related industry.

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: 152 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	26
		Major Core Courses	20
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	12
	Major Elective Courses	Major Elective Courses	15
Total			152
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	MA101a/ MA117	Mathematical Analysis I /Calculus I	5/4	1 Fall	None	MATH
	MA102a/ MA127	Mathematical Analysis II /Calculus II	5/4	1 Spring	Mathematical Analysis I / Calculus I	MATH
	MA107/M A113	Advanced Linear Algebra I / Linear Algebra	4	1 Spring & Fall	None	MATH
Physics	PHY101/ PHY105	General Physics I / College Physics I	5/4	1 Fall	None	PHY
	PHY102/ PHY106	General Physics II / College Physics II	5/4	1 Spring	General Physics I / College Physics I	PHY
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	PHY
Chemistry	CH103/ CH105	General Chemistry / Chemistry: The Central Science	4/3	1-2 Spring & Fall	None	CHEM
Geoscience + Life Science	BIO103/BI O102B/EO E100	Principles of Biology / Introduction to Life Science/ Introduction to Earth Sciences	3	1-2 Spring & Fall	None	BIO, ESS, OCE, ESE
Computer Programming	CS109/ CS110/ CS111/ CS112	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	3	1-2 Spring & Fall	None	CSE
Note: "/" means equivalent courses to be selected by students.						

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA101a/MA117	Mathematical Analysis I /Calculus I	None
	MA102a/MA127	Mathematical Analysis II /Calculus II	Mathematical Analysis I / Calculus I
	PHY101/PHY105	General Physics I /College Physics I	None
	PHY102/PHY106	General Physics II /College Physics II	General Physics I / College Physics I
	Note: The above courses are required to be completed. In addition, at least one of the following Course Category should be passed: 1. Mathematics: MA107/MA113 Advanced Linear Algebra I / Linear Algebra. 2. Physics: PHY104B Experiments of Fundamental Physics. 3. Chemistry: CH103/CH105 General Chemistry / Chemistry: The Central Science. 4. Geoscience + Life science: BIO103/BIO102B/EOE100 Principles of Biology / Introduction to Life Science/ Introduction to Earth Sciences . 5. Computer Programming: CS109/CS110/CS111/CS112 Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming. ("/" means equivalent courses to be selected by students.)		
Declare major at the end of the second academic year	MA101a/MA117	Mathematical Analysis I /Calculus I	None
	MA102a/MA127	Mathematical Analysis II /Calculus II	Mathematical Analysis I / Calculus I
	PHY101/PHY105	General Physics I /College Physics I	None
	PHY102/PHY106	General Physics II /College Physics II	General Physics I / College Physics I
	MA107/MA113	Advanced Linear Algebra I / Linear Algebra	None
	Note: The above courses are required to be completed. In addition, at least one of the following Course Category should be passed: CS109/CS110/CS111/CS112 Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming. ("/" means equivalent courses to be selected by students.)		
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Robotics Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	ME103	Awareness Practice of Manufacturing Engineering	3	2	1-2 Spring &Fall		MEE
	ME102	CAD and Engineering Drawing	3	1.5	2 Spring &Fall		MEE
	EE104	Fundamentals of Electric Circuits	2		2 Spring &Fall	MA101B, MA113	EE
	MAE203B	Engineering Mechanics I – Statics and Dynamics	3		2/Fall	MA113	MAE
	MA212	Probability and Statistics	3		2 Spring &Fall	MA127	MATH
	ME212	Mechanics of Materials M	3		2/Fall	MA127	MEE
	ME307	Fundamentals of Control Engineering	3	0.5	2/Spring	EE104	MEE
	ME213	Principles of Machinery	3		2/Spring		MEE
	EE205	Signals and Systems	3	1	3/Spring	MA127	EE
	Total		26	5			
Major Core Courses	ME311	Mechanical Design	3		2/Spring &Fall		MEE
	ME316	Machinery and Mechanical Design Labs	2	2	3/Spring &Fall		MEE
	ME331	Robot Modeling and Control	3		3/Fall	MAE203B	MEE
	ME322	Robotic Actuation System	3	1	3/Fall	MA127	MEE
	ME323	Fundamentals of Sensing Technology	3	0.5	3/Spring	EE104, EE205	MEE
	ME333	Mechatronic Systems	3	1	3/Spring	ME331	MEE
	ME336	Collaborative Robot Learning	3	1	3/Spring	ME331	MEE
	Total		20	5.5			
Practice-based Courses	ME498	Senior Project*	12	12	4/Spring		MEE
	Total		12	12			
Total			58	22.5			
Note: *Students who have completed Comprehensive Design I & II are not required to take the Senior Project (ME498).							

Table 2: Major Elective Courses**Program of Robotics Engineering**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
ME332	Robot Operating System	3	1	2/Fall	CS109/ CS110/ CS111/ CS112/ CS113	MEE
MA201b	Ordinary Differential Equations B	4	1	2/Fall	MA127	MATH
MEE5004	General Education of Laboratory Safety	1		2/Fall		MEE
CS205	C/C++ Program Design	3	1	2/Spring		CS
ME309	Management Science in Engineering Technology Innovation	1		2/Spring		MEE
EE202-17	Digital Circuits	3		2 Spring & Fall	PHY106	EE
ME315	Mechanisms and Applications	3		3/Fall	MA127, MA113	MEE
ME354	Manufacturing Process Simulation and Data Analysis	2	1	3/Fall	ME103	MEE
ME374	Science and Ethics	2		3/Fall		MEE
CS308	Computer Vision	3	1	3/Fall		CS
EE201-17	Analog Circuits	3		3/Spring & Fall	PHY106, EE104	EE
ME301	Dynamics and Vibration	3	1	3/Spring	MAE203B, MA201b	MEE
ME302	Fundamentals of Manufacturing	3		3/Spring	ME103	MEE
ME313	Product Design Practice	3	1	3/Spring	ME213/ ME311/ ME316/ ME331	MEE
ME314	Finite Element Theory and Its Engineering Applications	3		3/Spring	ME212, MA113	MEE
CS203B	Data Structures and Algorithm Analysis B	3	1	3/Spring	CS109	CS
CS401	Intelligent Robotics	3	1	3/Spring	MA212, CS102B, CS203	CS
MEE5108	Microrobotics	3	0.5	3/Spring	ME307	MEE
MEE5002	Fundamentals and practices of project management	3		3/Spring		MEE
ME405	Innovative Design Theory and Practice	3	1	4/Fall		MEE
ME462	Additive Manufacturing and Design	3		4/Fall		MEE
SDM364	Multi-variable Control and Applications	3		4/Fall	MA127, MA113, EE207 or SDM234, EE205 or SDM246, SDM263	SDIM

MEE5116	Advanced Kinematics and Dynamics of Mechanisms	3	1	4/Fall	ME331	MEE
SDM5007	Engineering Optimization Methods	3		4/Fall	MA127, MA113, MA212	SDIM
ME491	Practice	3	3	1-3 Spring &Fall&Summer, 4 Spring &Fall		MEE
Total		70	14.5			

Note:

1. The minimum requirement for graduation in this module is 15 credits.
2. Major elective courses selected by a student during any specific semester may be changed according to the loading situation.
3. The number and contents of major elective courses offered by the department may be adjusted according to the development of curriculum construction.

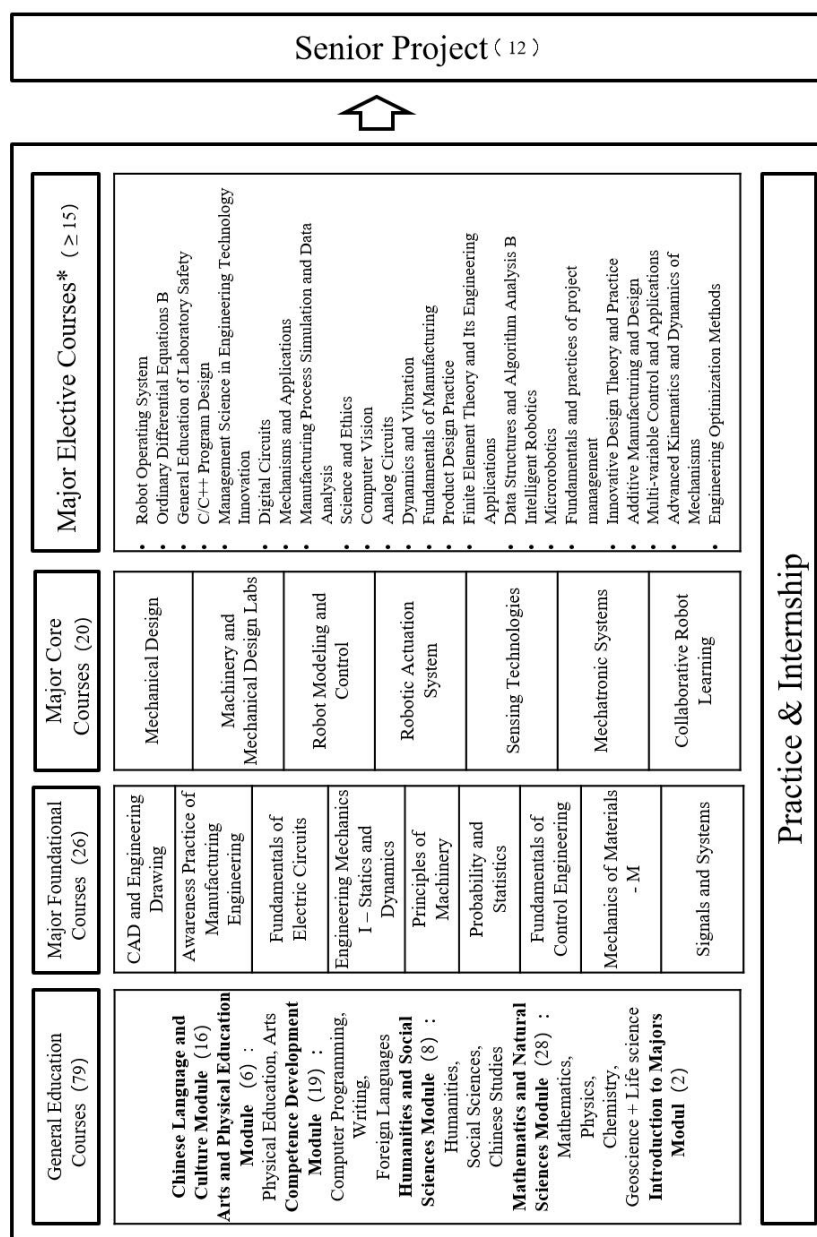
Table 3: Overview of Practice-based Learning

Program of Robotics Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CS109	Introduction to Computer Programming	3	1	1-2 Spr. &Fall	NA	CSE
CS110	Introduction to Java Programming	3	1	1-2 Spr. &Fall	NA	CSE
CS111	Introduction to C Programming	3	1	1-2 Spr. &Fall	NA	CSE
CS112	Introduction to Python Programming	3	1	1-2 Spr. &Fall	NA	CSE
PHY104B	Experiments of Fundamental Physics	2	2	1-2 Spr. &Fall	NA	PHY
ME103	Awareness Practice of Manufacturing Engineering	3	2	1-2 Spring &Fall		MEE
ME102	CAD and Engineering Drawing	3	1.5	2 Spring &Fall		MEE
ME307	Fundamentals of Control Engineering	3	0.5	2/Spring	EE104	MEE
EE205	Signals and Systems	3	1	3/Spring	MA127	EE
ME316	Machinery and Mechanical Design Labs	2	2	3/Spring &Fall		MEE
ME322	Robotic Actuation System	3	1	3/Fall	MA127	MEE
ME323	Fundamentals of Sensing Technology	3	0.5	3/Spring	EE104, EE205	MEE
ME333	Mechatronic Systems	3	1	3/Spring	ME331	MEE
ME336	Collaborative Robot Learning	3	1	3/Spring	ME331	MEE
ME332	Robot Operating System	3	1	2/Fall	CS109/ CS110/ CS111/ CS112/ CS113	MEE
MA201b	Ordinary Differential	4	1	2/Fall	MA127	MATH

	Equations B					
CS205	C/C++ Program Design	3	1	2/Spring		CS
ME354	Manufacturing Process Simulation and Data Analysis	2	1	3/Fall	ME103	MEE
CS308	Computer Vision	3	1	3/Fall		CS
ME301	Dynamics and Vibration	3	1	3/Spring	MAE203B, MA201b	MEE
ME313	Product Design Practice	3	1	3/Spring	ME213/ ME311/ ME316/ ME331	MEE
CS203B	Data Structures and Algorithm Analysis B	3	1	3/Spring	CS109	CS
CS401	Intelligent Robotics	3	1	3/Spring	MA212, CS102B, CS203	CS
MEE5108	Microrobotics	3	0.5	3/Spring	ME307	MEE
ME405	Innovative Design Theory and Practice	3	1	4/Fall		MEE
MEE5116	Advanced Kinematics and Dynamics of Mechanisms	3	1	4/Fall	ME331	MEE
ME491	Practice	3	3	1-3 Spring & Fall & Summer, 4 Spring & Fall		MEE
ME498	Senior Project	12	12	4/Spring		MEE
Total		91	43			

Curriculum Structure of Robotics Engineering



Note*: Here only list some of the major elective courses. The full list is detailed in the program of Robotics Engineering for International Students.

Department of Mechanical and Energy Engineering

Program of Science and Engineering for Renewables for

International Students (2024)

I. Introduction

Oriented to the future development of mechanical engineering, the Department of Mechanical and Energy Engineering (MEE) of Southern University of Science and Technology (SUSTech) aims at becoming a world-leading center for engineering education and research. The disciplines of the department include innovative design and advanced manufacturing, robotics, and automation, and new energy engineering with research focus on intelligent manufacturing, advanced forming and additive manufacturing, precision machining, robotics and automation, and energy engineering. There are three teaching and practice platforms in our department: advanced manufacturing, innovative design, and automation, robotics and artificial intelligence. We focus on educating two types of engineering talents: the academic talents who have solid science foundation in research, interdisciplinary perspective and experience, and good humanistic understanding, and insight into engineering problems, and the innovative talents with strong engineering leadership for solving important engineering problems.

The development and utilization of renewable energy is an important part of the national energy strategy and a key technology related to Chinese realization of the carbon peak in 2030 and carbon neutrality in 2060. In this context, the Ministry of Education has added a new major of science and engineering for renewable energy. This major involves the acquisition, storage, conversion, and utilization of renewable energy, such as solar energy, wind energy, geothermal energy and biomass energy. It is mainly oriented to the national energy development strategy and the new development trend of energy dynamics. It cultivates the basic knowledge of energy engineering, engineering thermodynamics, heat transfer and so on, and masters the principles of renewable energy conversion and utilization, photoelectric and photochemical conversion Professional knowledge in the field of new energy science in the direction of renewable energy heat utilization and thermal power generation principles and systems, energy storage science and

technology, and senior applied talents who can carry out teaching, scientific research, technology development, engineering application, operation and management in the field of national new energy science and engineering.

Academic subject areas: Energy and Power

Program code: 080503T

II. Objectives and Learning Outcomes

1. Objectives

The major cultivates interdisciplinary compound senior professionals with renewable energy scientific knowledge and engineering technology. The students need to master the basic theoretical knowledge of renewable energy science and engineering discipline, as well as various specialized technologies related to the major of this major, and be competent for the related technology development, engineering design, operation management, science and technology education and teaching in the field of renewable energy science and engineering. Graduates can engage in research, teaching, design, development, management, and other work in renewable energy utilization, energy conservation and emission reduction, carbon neutralization and other related directions in energy and power, chemical industry, metallurgy, electronics, automobile, machinery and other departments. Senior professionals with common sense of social responsibility, world-class vision, innovative spirit, practical ability and competitiveness.

The qualities that graduates of this major should have:

- a) Professional capability: in the field of renewable energy science and engineering, the graduates have the technical ability to engage in research and development in academia and industry.
- b) Engineering concept: the graduates have creative thinking and critical thinking. The graduates should be able to find and solve engineering and non-engineering problems in work based on engineering principles, and use the thinking mode of professional analysis to synthesize the obtained information, make reasonable judgments and propose innovative solutions.
- c) Attitude: the graduates should be proactive, keep learning and keep pace with the times. The graduates should be honest, responsible, optimistic and calm in the face of difficulties, and have a world-class vision and make positive contributions to their posts.
- d) Leadership: the graduates should be good at communication, gradually cultivate leadership

ability in team cooperation, and lead the team to achieve goals.

2. Learning Outcomes

- a) Engineering knowledge: systematically master the basic technical theories necessary for this major, mainly including the basic theories and knowledge of thermodynamics, heat transfer, new energy acquisition and storage, energy conversion and utilization, energy management and other directions; Master the basic principles and professional skills of the whole process of new energy acquisition, storage, utilization and management; Be able to use the basic theory and engineering knowledge learned to identify, formulate and solve complex engineering problems.
- b) Experiment and data analysis: be able to design and complete new energy related experiments, analyze and interpret data, and draw reasonable and effective conclusions based on professional judgment of engineering knowledge.
- c) Engineering solutions: be able to apply the engineering design concept to design solutions that meet specific needs, and consider several factors such as energy, environment, and economy in the design process.
- d) Communication: have certain basic theoretical knowledge of humanities, social sciences, and natural sciences, and be able to effectively communicate with the audience.
- e) Professional ethics and responsibility: be able to follow the engineering professional ethics and norms in engineering practice and perform professional duties; Have a good sense of social responsibility, be able to synthesize the information obtained and make reasonable and effective judgments.
- f) Teamwork: be able to show leadership in team projects, create a collaborative and inclusive work environment, set goals, make plans, and achieve goals.
- g) Independent learning: have a rigorous and realistic scientific attitude, the spirit of pursuing excellence, have good self-control and self-study ability, and the lifelong learning ability to constantly learn and adapt to new energy science and engineering.

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: 152 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	28
		Major Core Courses	18
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	12
	Major Elective Courses	Major Elective Courses	15
Total			152
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	MA101a/ MA117	Mathematical Analysis I /Calculus I	5/4	1 Fall	None	MATH
	MA102a/ MA127	Mathematical Analysis II /Calculus II	5/4	1 Spring	Mathematical Analysis I / Calculus I	MATH
	MA107/ MA113	Advanced Linear Algebra I / Linear Algebra	4	1 Spring & Fall	None	MATH
Physics	PHY101/ PHY105	General Physics I / College Physics I	5/4	1 Fall	None	PHY
	PHY102/ PHY106	General Physics II / College Physics II	5/4	1 Spring	General Physics I / College Physics I	PHY
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	PHY
Chemistry	CH103/ CH105	General Chemistry / Chemistry: The Central Science	4/3	1-2 Spring & Fall	None	CHEM
Geoscience + Life science	BIO103/BI O102B/EO E100	Principles of Biology / Introduction to Life Science/ Introduction to Earth Sciences	3	1-2 Spring & Fall	None	BIO, ESS, OCE, ESE
Computer Programming	CS109/ CS110/ CS111/ CS112/ CS113	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming / Introduction to Matlab Programming	3	1-2 Spring & Fall	None	CSE
Note: “/”means equivalent courses to be selected by students.						

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA101a/MA117	Mathematical Analysis I /Calculus I	None
	MA102a/MA127	Mathematical Analysis II /Calculus II	Mathematical Analysis I / Calculus I
	PHY101/PHY105	General Physics I /College Physics I	None
	PHY102/PHY106	General Physics II /College Physics II	General Physics I / College Physics I
	Note: The above courses are required to be completed. In addition, at least one of the following Course Category should be passed: 1. Mathematics: MA107/MA113 Advanced Linear Algebra I / Linear Algebra.. 2. Physics: PHY104B Experiments of Fundamental Physics. 3. Chemistry: CH103/CH105 General Chemistry / Chemistry: The Central Science. 4. Geoscience + Life science: BIO103/BIO102B/EOE100 Principles of Biology / Introduction to Life Science/ Introduction to Earth Sciences. 5. Computer Programming: CS109/CS110/CS111/CS112/CS113 Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming/ Introduction to Matlab Programming. (“/”means equivalent courses to be selected by students.)		
Declare major at the end of the second academic year	MA101a/MA117	Mathematical Analysis I /Calculus I	None
	MA102a/MA127	Mathematical Analysis II /Calculus II	Mathematical Analysis I / Calculus I
	PHY101/PHY105	General Physics I /College Physics I	None
	PHY102/PHY106	General Physics II /College Physics II	General Physics I / College Physics I
	MA107/MA113	Advanced Linear Algebra I / Linear Algebra	None
Note: The above courses are required to be completed. In addition, at least one of the following Course Category should be passed: 1. Physics: PHY104B Experiments of Fundamental Physics. 2. Chemistry: CH103/CH105 General Chemistry / Chemistry: The Central Science. 3. Geoscience + Life science: BIO103/BIO102B/EOE100 Principles of Biology / Introduction to Life Science/ Introduction to Earth Sciences. 4. Computer Programming: CS109/CS110/CS111/CS112/CS113 Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming/ Introduction to Matlab Programming. (“/”means equivalent courses to be selected by students.)			
Note: 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. 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. 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). 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).

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Science and Engineering for Renewables

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	ME271	Fundamentals of Thermodynamics and Heat Transfer	4	0	2/Fall	MA127	MEE
	ME102	CAD and Engineering Drawing	3	1.5	2/Fall		MEE
	EE104	Fundamentals of Electric Circuits	2	0	2/Fall	MA101B, MA113	EE
	MAE207	Engineering Fluid Mechanics	3	0	2/Fall	MA127	MAE
	MSE202	Physical Chemistry	3	0	2/Spring	CH105/CH103, MA127	MSE
	MSE204	Physical Chemistry Experiments	1	1	2/Spring	MSE202	MSE
	ME272	Semiconductor Physics for Energy Devices	3	0	2/Spring	PHY106	MEE
	ME261	Engineering Materials - Science, Processing and Design	3	0	2/Spring	PHY106, CH105/CH103	MEE
	ME273	Introduction to Energy Science	3	0	2/Spring	PHY106, CH105/CH103, ME271	MEE
	ME103	Awareness Practice of Manufacturing Engineering	3	2	2-3 Spring & Fall		MEE
	Total		28	4.5			
Major Core Courses	ME371	Principle of Solar to Electricity and Solar Photochemistry Conversion	3	0	3/Fall	ME272	MEE
	ME372	Principles of Electrochemistry	3	0	3/Fall	MSE202, MSE204	MEE
	ME373	Energy Materials Chemistry	3	0	3/Fall	ME273	MEE
	ME376	Fundamentals of Energy Catalysis	3	0	3/Spring	ME273	MEE
	ME377	Fundamentals of Energy Storage Science	3	0	3/Spring	ME273	MEE

Practice -based Courses	ME378	Characterization Technique of Energy Materials	3	0	3/Spring	ME273	MEE
	Total		18	0			
	ME498	Senior Project*	12	12	4/Spring		MEE
	Total		12	12			
	Total		58	16.5			
Note: *Students who have completed Comprehensive Design I & II are not required to take the Senior Project (ME498) .							

Table 2: Major Elective Courses

Program of Science and Engineering for Renewables

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Elective Courses of Professional Capability	ME381	Photovoltaic Power Generation Technology	3	0	3/Fall	ME273	MEE
	ME382	Artificial Light Synthesis Fuel Technology	3	0	3/Fall	ME273	MEE
	ME383	Grid Connection Technology of New Energy Power Generation	3	1	3/Fall	ME273	MEE
	MEE5402	New energy technology: hydrogen and fuel cell technology	3	0	3/Fall	ME273	MEE
	MEE5405	Solar Thermal Energy Utilization Technologies	3	0	3/Spring	MA127	MEE
	ME385	Photoelectric Conversion Films and Devices	2	0	3/Spring	ME273	MEE
	ME384	Electrochemical Measurement	3	2	3/Spring	ME372	MEE
	MEE5410	Lithium Ion Battery Technology	3	0	3/Spring	ME273	MEE
	ME387	Solid State Electrochemistry and All Solid State Battery	3	0	3/Spring	ME372	MEE
	ME386	Advanced Batteries for Electrical Vehicles	3	0	3/Spring	PHY106	MEE
	ME487	Hydrogen Energy	3	0	3-4/Fall		MEE
Elective Courses of Engineering Basic	ME212	Mechanics of Materials M	3	0	2/Fall	MA127	MEE
	MEE5004	General Education of Laboratory Safety	1	0	2/Fall		MEE
	ME309	Management Science in Engineering Technology Innovation	1	0	2/Spring		MEE

	ME374	Science and Ethics	2	0	3/Fall		MEE
	SDM274	Artificial Intelligence and Machine Learning	3	0	3/Fall	MA127, MA113	SDIM
	ME364	3D Printing of Functional Soft Materials: Fundamentals, Engineering and Applications	3	0	3/Fall	PHY105B, MA127	MEE
	MEE5215	Flexible and Wearable Electronics: Design and Fabrication Techniques	3	0	3/Fall	ME261	MEE
	ME361	Fundamentals of Additive Manufacturing of Metals	3	0	3/Spring	ME261	MEE
	ME388	Energy System for Electric Vehicle	3	1	3/Spring	ME372	MEE
	ME485	Energy Policy	1	0	3/Spring	ME273	MEE
	ME486	Comprehensive Experiment for Energy Engineering	2	2	3/Spring		MEE
	MEE5411	Renewable Energy Conversion and Utilization Technology	3	0	3/Spring	ME273	MEE
	ME462	Additive Manufacturing and Design	3	0	4/Fall		MEE
	ME471	Photoelectric conversion and measurement	3	2	4/Fall	ME371	MEE
	ME491	Practice	3	3	1-3 Spring & Fall&Summer, 4 Spring & Fall		MEE
Total			69	11			
Note:							
1. The minimum requirement for graduation in this module is 15 credits.							
2. Major elective courses selected by a student during any specific semester may be changed according to the loading situation.							
3. The number and contents of major elective courses offered by the department may be adjusted according to the development of curriculum construction.							

Table 3: Overview of Practice-based Learning**Program of Science and Engineering for Renewables**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CS109	Introduction to Computer Programming	3	1	1-2 Spr. & Fall	NA	CSE
CS110	Introduction to Java Programming	3	1	1-2 Spr. & Fall	NA	CSE
CS111	Introduction to C Programming	3	1	1-2 Spr. & Fall	NA	CSE
CS112	Introduction to Python Programming	3	1	1-2 Spr. & Fall	NA	CSE
CS113	Introduction to Matlab Programming	3	1	1-2 Spr. & Fall	NA	CSE
PHY104B	Experiments of Fundamental Physics	2	2	1-2 Spr. & Fall	NA	PHY
ME102	CAD and Engineering Drawing	3	1.5	2/Fall		MEE
MSE204	Physical Chemistry Experiments	1	1	2/Spring	MSE202	MSE
ME103	Awareness Practice of Manufacturing Engineering	3	2	2-3 Spring & Fall		MEE
ME383	Grid Connection Technology of New Energy Power Generation	3	1	3/Fall	ME273	MEE
ME384	Electrochemical Measurement	3	2	3/Spring	ME372	MEE
ME388	Energy System for Electric Vehicle	3	1	3/Spring	ME372	MEE
ME471	Photoelectric conversion and measurement	3	2	4/Fall	ME371	MEE
ME486	Comprehensive Experiment for Energy Engineering	2	2	3/Spring	ME273	MEE
ME491	Practice	3	3	1-3 Spring & Fall & Summer, 4 Spring & Fall		MEE
ME498	Senior Project	12	12	4/Spring		MEE
Total		53	34.5			

Curriculum Structure of Science and Engineering for Renewables

Senior Project (12)			
			
General Education Courses (79)	Major Foundational Courses (28)	Major Core Courses (18)	Major Elective Courses* (≥ 15)
Chinese Language and Culture Module (16) Arts and Physical Education Module (6) : Physical Education, Arts Competence Development Module (19) : Computer Programming, Writing, Foreign Languages Humanities and Social Sciences Module (8) : Humanities, Social Sciences, Chinese Studies Mathematics and Natural Sciences Module (28) : Mathematics, Physics, Chemistry, Geoscience + Life science GE to Majors Bridging Module (2)	Fundamentals of Thermodynamics and Heat Transfer	Principle of Solar to Electricity and Solar Photochemistry Conversion	Elective Courses of Professional Capability • Photovoltaic Power Generation Technology • Artificial Light Synthesis Fuel Technology • Grid Connection Technology of New Energy Power Generation • New energy technology: hydrogen and fuel cell technology • Solar Thermal Energy Utilization Technologies • Photoelectric Conversion Films and Devices • Electrochemical Measurement • Lithium Ion Battery Technology • Solid State Electrochemistry and All Solid State Battery • Advanced Batteries for Electrical Vehicles • Hydrogen Energy
	CAD and Engineering Drawing	Principles of Electrochemistry	
	Fundamentals of Electric Circuits	Energy Materials Chemistry	
	Engineering Fluid Mechanics	Fundamentals of Energy Catalysis	
	Physical Chemistry	Fundamentals of Energy Storage Science	
	Physical Chemistry Experiments	Characterization Technique of Energy Materials	
	Semiconductor Physics for Energy Devices		
	Engineering Materials - Science, Processing and Design		Elective Courses of Engineering Basic • Mechanics of Materials • Science and Ethics • Artificial Intelligence and Machine Learning • Flexible and Wearable Electronics: Design and Fabrication Techniques • Energy System for Electric Vehicle • Renewable Energy Conversion and Utilization Technology • Energy Policy • Comprehensive Experiment for Energy Engineering • Practice • Management Science in Engineering Technology Innovation • Fundamentals of Additive Manufacturing of Metals
	Introduction to Energy Science		
	Awareness Practice of Manufacturing Engineering		
Practice & Internship			

Note*: Here only list some of the major elective courses. The full list is detailed in the program of Science and Engineering for Renewables for International Students.

Department of Materials Science and Engineering

Program of Materials Science and Engineering for International Students (2024)

I. Introduction

The major of Materials Science and Engineering is a discipline, which systematically studies fundamental theories and experiment skills of materials science and engineering as well as applies these knowledge/abilities for materials' syntheses, preparation, structure characterization/evaluation, and performance controlling in various broad fields based on the principles of materials science, chemistry, and physics. Materials Science and Engineering is an integrated discipline for application science closely related to engineering technology.

Materials are the bases for human survival and development. In the 1970s, people viewed information, materials, and energy as the mainstay of social civilization. In the 1980s, with the rise of high technologies, materials science, information technology, and biotechnology were listed as important symbols of the new technology revolution. Nowadays, materials have become important parts of the national economy, national defense, and people's livelihood.

Academic subject areas: Materials

Program code: 080401

II. Objectives and Learning Outcomes

Materials Science and Engineering (MSE) will cultivate high-quality science and technology talents with firm theoretical knowledge of Materials Science and Engineering, abilities of mastering frontier materials' R&D and characterization techniques, and capabilities of utilizing English and computer technology very well for high-tech R&D in interdisciplinary fields. These trained students possess the capability not only for researching in their disciplines and related fields, designing and developing new materials, teaching and managing, but also for practice innovation, cooperation, and leadership. These graduates can not only engage in conventional material industrial production, new materials creation, and development of new processes and technologies, but also continue their postgraduate studies in Materials Science and Engineering

and serve in the research, development, and management in top-ranked corporations, scientific research institutes, colleges, and government.

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: 161 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	33
		Major Core Courses	17
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	16
	Major Elective Courses	Major Elective Courses	16
Total			161
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	None	MATH
	MA127	Calculus II	4	1 Spring	Calculus I	
	MA113	Linear Algebra	4	1 Spring & Fall	None	
Physics	PHY105	College Physics I	4	1 Fall	None	PHY
	PHY106	College Physics II	4	1 Spring	College Physics I	
	PHY104 B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	
Chemistry	CH103/CH105	General Chemistry/ Chemistry: the Central Science	4/3	1-2 Spring & Fall	None	CHEM
Geoscience + Life science	BIO103/ BIO102 B/ EOE100	Principles of Biology/ Introduction to Life Science/ Introduction to Earth Sciences	3	1-2 Spring & Fall	None	DBIO, ESS, OCE, ESE
Computer Programming	CS109/ CS110/ CS111/ CS112/ CS113	Introduction to Computer Programming / Introduction to Java Programming / Introduction to C Programming / Introduction to Python Programming / Introduction to Matlab Programming	3	1-2 Spring & Fall	None	CSE

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	None
	MA127	Calculus II	Calculus I
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	College Physics I
	PHY104B	Experiments of Fundamental Physics	None
	CH103/CH105	General Chemistry/ Chemistry: the Central Science	None
	Notes: At least 5 of the above courses will be completed in the first year, and the results should be qualified. For Mathematics, students who have completed MA101a & MA102a are not required to take MA117 & MA127. For Physics, students who have completed PHY101 & PHY102 are not required to take PHY105 & PHY106.		
Declare major at the end of the second academic year	MA117	Calculus I	None
	MA127	Calculus II	Calculus I
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	College Physics I
	PHY104B	Experiments of Fundamental Physics	None
	CH103/CH105	General Chemistry/ Chemistry: the Central Science	None
	BIO103/BIO102B/EOE100	Principles of Biology/ Introduction to Life Science/ Introduction to Earth Sciences	None
	CS109/CS110/CS111/CS112/CS113	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C Programming/ Introduction to Python Programming/ Introduction to Matlab Programming	None
	Notes: All of the above courses should be completed in the second year, and the results should be qualified. For Mathematics, students who have completed MA101a & MA102a are not required to take MA117 & MA127. For Physics, students who have completed PHY101 & PHY102 are not required to take PHY105 & PHY106.		
Note:			
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.			
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.			
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).			
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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Materials Science and Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	ME102	CAD Engineering Drawing	3	1.5	1 Spring	None	MEE
	MSE001	Fundamentals of Materials Science and Engineering*	3		2 Fall	PHY106 CH103/CH105	MSE
	MSE002	Experiments for Fundamentals of Materials Science and Engineering*	1	1	2 Fall	PHY106 CH103/CH105	MSE
	MSE205	Fundamentals of Circuits and Electronics	3		2 Fall	MA127 PHY106	MSE
	MSE203	Crystallography	2		2 Fall	None	MSE
	MSE213	Mechanics of Materials B	3		2 Spring	None	MSE
	MSE202	Physical Chemistry*	3		2 Spring	MA127 CH103/ CH105	MSE
	MSE204	Physical Chemistry Experiments*	1	1	2 Spring	MA127 CH103/ CH105	MSE
	MSE301	Materials Chemistry	3		3 Fall	MSE001 MSE002	MSE
	MSE307	Comprehensive Experiments of Materials I	4	4	3 Fall	MSE001 MSE002	MSE
	MSE328	Physics of Materials	3		3 Spring	MA127 MSE001	MSE
	MSE304	Comprehensive Experiments of Materials II	4	4	3 Spring	MSE307	MSE
	Total		33	11.5			
	Note: *Please choose MSE001 and MSE002 at the same semester; Please choose MSE202 and MSE204 at the same semester.						
Major Core Courses	MSE306	Materials Characterization Techniques	3		2 Spring	MSE001	MSE
	MSE313	Polymer Materials	3		2 Spring	MSE001	MSE
	MSE319	Physical Metallurgy A	3		3 Fall	MSE001 MSE002	MSE
	MSE317	Ceramic Materials	3		3 Fall	MSE001	MSE
	MSE345	Experiments for Advanced Materials Science and Engineering I	1	1	3 Fall	MSE002	MSE
	MSE311	Thermodynamics of Materials	3		3 Spring	MSE001	MSE
	MSE346	Experiments for Advanced Materials Science and Engineering II	1	1	3 Spring	MSE345	MSE
	Total		17	2			
Practice-based Courses	MSE470-17	Industrial Practice	4	4	3 Summer	None	MSE
	MSE492	Thesis (Graduation Project)*	12	12	4 Spring	None	MSE
	Total		16	16			
	Note: *Students who have completed Comprehensive Design I&II (COE493 & COE494) are not required to						

	take the MSE492 Thesis (Graduation Project).		
Total	66	29.5	

Table 2: Major Elective Courses

Program of Materials Science and Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Restricted Electives Courses	Materials Chemistry Track						
	MSE210	General Organic Chemistry*	3		2 Spring	CH103/CH105	MSE
	MSE212	Basic Experiments for Organic Chemistry*	1	1	2 Spring	CH103/CH105	MSE
	MSE332	Fundamentals of Electrochemistry	3		3 Fall	None	MSE
	MSE325	Functional Polymers	3		3 Fall	None	MSE
	MSE338	Biomaterials*	2		3 Spring	MSE001	MSE
	MSE340	Experiments for Biomaterials*	2	2	3 Spring	MSE002	MSE
	Total		14	3			
	Materials Physics Track						
	MSE344	Applied Quantum Mechanics	3		2 Spring	PHY106	MSE
	MSE335	Applied Solid State Physics	3		3 Fall	MSE344	MSE
	MSE310	Semiconducting Materials, Devices and Technology	3		3 Spring	MSE001	MSE
	MSE5021	Computational Materials Science	3		3 Spring	None	MSE
	MSE338	Biomaterials*	2		3 Spring	MSE001	MSE
	MSE340	Experiments for Biomaterials*	2	2	3 Spring	MSE002	MSE
	Total		16	2			
	Note: 1. The Restricted Electives Courses are divided into Materials Physics Track and Materials Chemistry Track. Under the guidance of the research tutor, the students should choose at least 8 credits in one direction. 2. MSE210 & MSE212 , MSE338 & MSE340 are co-required courses, please take them in the same semester. Both courses co-required must be completed, and their credits can count as Restricted Electives Courses.						
Unrestricted Electives Courses	MSE103	Magic Materials	1	1	1 Fall	None	MSE
	MA212	Probability and Statistics	3		2 Fall	MA127	MATH
	MSE207	Engineering Mathematical Physics	3		2 Fall	MA127 MA113	MSE
	MSE209	Heat and Mass Transfer	3		2 Spring	MA127 PHY106	MSE
	MSE356	Electronic Information Materials and Devices	3		3 Fall	MSE001	MSE
	MSE413	3D Printing and Laser-based Additive Manufacturing	3		3 Fall	None	MSE
	MSE407	Advanced Thin Film Technology	3		3 Fall	None	MSE
	MSE322	Composite Materials	3		3 Spring	None	MSE
	MSE337	Crystal Growth	3		3 Spring	MSE001	MSE
	MSE339	Optical Materials and Devices	3		3 Spring	PHY106	MSE
	MSE349	Integrated Circuit Processing	3		3 Spring	MSE001	MSE

		Technology					
	MSE320	Introduction to Photovoltaics and Photo-thermal	3		3 Spring	None	MSE
	MSE410	Experiments of Circuit Design	2	2	4 Fall	MSE205	MSE
	MSE404	Electronic Component Reliability and Failure Analysis	3		4 Fall	MSE306	MSE
	MSE480	Projects of Science and Technology Innovation	2	2	3-4 Spring & Fall	None	MSE
Total			41	5			
Notes: At least 8 credits are required for Unrestricted Electives Courses.							

Table 3: Overview of Practice-based Learning

Program of Materials Science and Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
MSE103	Magic Materials	1	1	1 Fall	None	MSE
ME102	CAD Engineering Drawing	3	1.5	1 Spring	None	MEE
MSE002	Experiments for Fundamentals of Materials Science and Engineering	1	1	2 Fall	PHY106 CH103/CH105	MSE
MSE204	Physical Chemistry Experiments	1	1	2 Spring	MA127 CH103/CH105	MSE
MSE212	Basic Experiments for Organic Chemistry	1	1	2 Spring	CH103/CH105	MSE
MSE307	Comprehensive Experiments of Materials I	4	4	3 Fall	MSE001 MSE002	MSE
MSE345	Experiments for Advanced Materials Science and Engineering I	1	1	3 Fall	MSE002	MSE
MSE304	Comprehensive Experiments of Materials II	4	4	3 Spring	MSE307	MSE
MSE346	Experiments for Advanced Materials Science and Engineering II	1	1	3 Spring	MSE345	MSE
MSE340	Experiments for Biomaterials	2	2	3 Spring	MSE002	MSE
MSE410	Experiments of Circuit Design	2	2	4 Fall	MSE205	MSE
MSE480	Projects of Science and Technology Innovation	2	2	3-4 Spring & Fall	None	MSE
MSE470-17	Industrial Practice	4	4	3 Summer	None	MSE
MSE492	Thesis (Graduation Project)	12	12	4 Spring	None	MSE
Total		39	37.5			

Materials Science and Engineering



Thesis (Graduation Project)

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Department of Materials Science and Engineering

Program of Electronic and Photonic Materials and Devices for International Students (2024)

I. Introduction

The major of Electronic and Photonic Materials and Devices is based on the principles of materials science and engineering, chemistry and physics, and integrates with electronics, photons, integrated circuits, information, and other disciplines. It focuses on various materials related to electronic science and engineering, information science and engineering, including semiconductor materials, photons and electromagnetic materials, functional and sensing materials, quantum information materials, and other core and key materials required for information processing and transmission. And materials' structure characterization/evaluation, performance test, process technology, manufacturing equipment, and device application. Cultivate new engineering talents with basic knowledge and application ability in the fields of materials and electronics, photonics, information, etc.

Academic subject areas: Materials

Program code: 080418T

II. Objectives and Learning Outcomes

The major of Electronic and Photonic Materials and Devices will cultivate high-quality science and technology talents with firm theoretical knowledge of Electronic and Photonic Materials and Devices, abilities of mastering frontier materials' R&D and characterization techniques, and capabilities of utilizing English and computer technology very well for high-tech R&D in interdisciplinary fields. These trained students possess the capability not only for research in the fields of materials and electronics, photonics, and information, for designing and developing new materials and devices, for teaching and managing, but also for practice innovation, cooperation, and leadership. These graduates can not only engage in conventional material industrial production, new materials creation, and development of new processes and technologies, but also continue their postgraduate studies in the fields of materials, electronics, photonics and

information, and serve in the research, development and management in top-ranked corporations, scientific research institutes, colleges, and government.

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: 161 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	24
		Major Core Courses	20
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	16
	Major Elective Courses	Major Elective Courses	22
Total			161
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	None	MATH
	MA127	Calculus II	4	1 Spring	Calculus I	
	MA113	Linear Algebra	4	1 Spring & Fall	None	
Physics	PHY105	College Physics I	4	1 Fall	None	PHY
	PHY106	College Physics II	4	1 Spring	College Physics I	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	
Chemistry	CH103/ CH105	General Chemistry/ Chemistry: the Central Science	4/3	1-2 Spring & Fall	None	CHEM
Geoscience + Life Science	BIO103/ BIO102B/ EOE100	Principles of Biology/ Introduction to Life Science/ Introduction to Earth Sciences	3	1-2 Spring & Fall	None	DBIO, ESS, OCE, ESE
Computer Programming	CS109/ CS110/ CS111/ CS112/ CS113	Introduction to Computer Programming / Introduction to Java Programming / Introduction to C Programming / Introduction to Python Programming / Introduction to Matlab Programming	3	1-2 Spring & Fall	None	CSE

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	None
	MA127	Calculus II	Calculus I
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	College Physics I
	PHY104B	Experiments of Fundamental Physics	None
	CH103/CH105	General Chemistry/ Chemistry: the Central Science	None
	Notes: At least 5 of the above courses will be completed in the first year, and the results should be qualified. For Mathematics, students who have completed MA101a & MA102a are not required to take MA117 & MA127. For Physics, students who have completed PHY101 & PHY102 are not required to take PHY105 & PHY106.		
Declare major at the end of the second academic year	MA117	Calculus I	None
	MA127	Calculus II	Calculus I
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	College Physics I
	PHY104B	Experiments of Fundamental Physics	None
	CH103/CH105	General Chemistry/ Chemistry: the Central Science	None
	BIO103/BIO102B/EOE100	Principles of Biology/ Introduction to Life Science/ Introduction to Earth Sciences	None
	CS109/CS110/CS111/CS112/CS113	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C Programming/ Introduction to Python Programming/ Introduction to Matlab Programming	None
	Notes: All of the above courses should be completed in the second year, and the results should be qualified. For Mathematics, students who have completed MA101a & MA102a are not required to take MA117 & MA127. For Physics, students who have completed PHY101 & PHY102 are not required to take PHY105 & PHY106.		
Note:			
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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Electronic and Photonic Materials and Devices

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	MSE001	Fundamentals of Materials Science and Engineering*	3		2 Fall	PHY106 CH103/CH105	MSE
	MSE002	Experiments for Fundamentals of Materials Science and Engineering*	1	1	2 Fall	PHY106 CH103/CH105	MSE
	MSE205	Fundamentals of Circuits and Electronics	3		2 Fall	MA127 PHY106	MSE
	MSE203	Crystallography	2		2 Fall	None	MSE
	MSE207	Engineering Mathematical Physics	3		2 Fall	MA127 MA113	MSE
	MSE344	Applied Quantum Mechanics	3		2 Spring	PHY106	MSE
	MSE213	Mechanics of Materials B	3		2 Spring	None	MSE
	MSE335	Applied Solid State Physics	3		3 Fall	MA127 PHY106	MSE
	MSE301	Materials Chemistry	3		3 Fall	MSE001 MSE002	MSE
	Total		24	1			
	Note: *Please choose MSE001 and MSE002 at the same semester.						
Major Core Courses	MSE306	Materials Characterization Techniques	3		2 Spring	MSE001	MSE
	MSE209	Heat and Mass Transfer	3		2 Spring	MA127 PHY106	MSE
	MSE333	Comprehensive Experiments of Electronic and Photonic Materials and Devices I	4	4	3 Fall	MSE001 MSE002	MSE
	MSE311	Thermodynamics of Materials	3		3 Spring	MSE001	MSE
	MSE337	Crystal Growth	3		3 Spring	MSE001	MSE
	MSE357	Comprehensive Experiments of Electronic and Photonic Materials and Devices II	4	4	3 Spring	MSE333	MSE
	Total		20	8			
Practice-based Courses	MSE470-1 7	Industrial Practice	4	4	3 Summer	None	MSE
	MSE492	Thesis (Graduation Project)*	12	12	4 Spring	None	MSE
	Total		16	16			
	Note: *Students who have completed Comprehensive Design I&II (COE493 & COE494) are not required to take the MSE492 Thesis (Graduation Project).						
Total			60	25			

Table 2: Major Elective Courses

Program of Electronic and Photonic Materials and Devices

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Restricted Electives Courses	MSE407	Advanced Thin Film Technology	3		3 Fall	None	MSE
	MSE356	Electronic Information Materials and Devices	3		3 Fall	MSE001	MSE
	MSE339	Optical Materials and Devices	3		3 Spring	PHY106	MSE
	MSE310	Semiconducting Materials, Devices and Technology	3		3 Spring	None	MSE
	MSE349	Integrated Circuit Processing Technology	3		3 Spring	MSE001	MSE
	MSE404	Electronic Component Reliability and Failure Analysis	3		4 Fall	MSE306	MSE
	MSE409	Packaging Materials and Technology	3		4 Fall	MSE001	MSE
	Total		21				
	Note: At least 12 credits are required for Restricted Electives Courses.						
Unrestricted Electives Courses	MSE103	Magic Materials	1	1	1 Fall	None	MSE
	MSE313	Polymer Materials	3		2 Spring	MSE001	MSE
	MSE319	Physical Metallurgy A	3		3 Fall	MSE001 MSE002	MSE
	MSE332	Fundamentals of Electrochemisty	3		3 Fall	None	MSE
	MSE317	Ceramic Materials	3		3 Fall	MSE001	MSE
	MSE352	The Fundamental of Plasma Technology	3		3 Fall	PHY106	MSE
	MSE413	3D Printing and Lase-based Additive Manufacturing	3		3 Fall	None	MSE
	MSE325	Functional Polymers	3		3 Fall	None	MSE
	MSE322	Composite Materials	3		3 Spring	None	MSE
	MSE320	Introduction to Photovoltaics and Photo-thermal	3		3 Spring	None	MSE
	MSE328	Physics of Materials	3		3 Spring	MA127 MSE001	MSE
	MSE351	Principle of Sensors	3		3 Spring	PHY106	MSE
	MSE354	Introduction to Electron Photon Source	3		3 Spring	None	MSE
	MSE355	Information Storage Materials and Devices	3		3 Spring	MSE337	MSE
	MSE5042	Flexible Electronic Materials and Devices	3		3 Spring	None	MSE
	MSE410	Experiments of Circuit Design	2	2	4 Fall	MSE205	MSE
	MSE402	Lithographic Materials and Processing	3		4 Fall	None	MSE
	MSE408	Optoelectronic Materials and Device	3		4 Fall	None	MSE
	MSE480	Projects of Science and Technology Innovation	2	2	3-4 Spring & Fall	None	MSE
	Total		53	5			
Note: At least 10 credits are required for Unrestricted Electives Courses.							

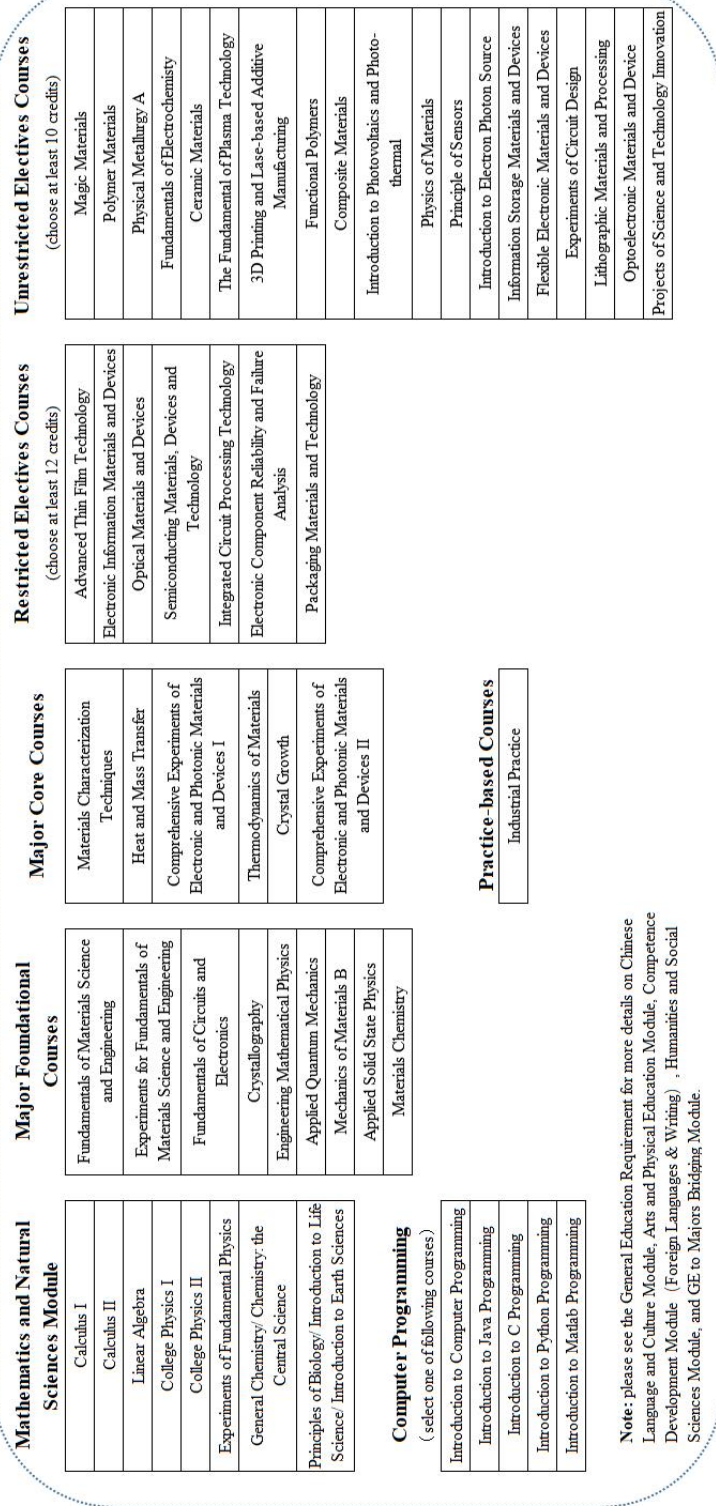
Table 3: Overview of Practice-based Learning

Program of Electronic and Photonic Materials and Devices

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
MSE103	Magic Materials	1	1	1 Fall	None	MSE
MSE002	Experiments for Fundamentals of Materials Science and Engineering	1	1	2 Fall	PHY106 CH103/CH105	MSE
MSE333	Comprehensive Experiments of Electronic and Photonic Materials and Devices I	4	4	3 Fall	MSE001 MSE002	MSE
MSE357	Comprehensive Experiments of Electronic and Photonic Materials and Devices II	4	4	3 Spring	MSE333	MSE
MSE410	Experiments of Circuit Design	2	2	4 Fall	MSE205	MSE
MSE480	Projects of Science and Technology Innovation	2	2	3-4 Spring & Fall	None	MSE
MSE470-17	Industrial Practice	4	4	3 Summer	None	MSE
MSE492	Thesis (Graduation Project)	12	12	4 Spring	None	MSE
Total		30	30			

Curriculum Structure of Electronic and Photonic Materials and Devices

Electronic and Photonic Materials and Devices



Thesis (Graduation Project)

Department of Electrical and Electronic Engineering

Program of Communication Engineering for International Students (2024)

I. Introduction

Communication engineering, especially wireless communications engineering, has become extremely important throughout the world and in particular for Shenzhen, which is recognized as a world-class center of communication industry. With the increasing demand on mobile data access, the development of next generation broadband communication systems has been initiated, which would boost up career opportunity in related academic and industrial fields. The offered 4-year undergraduate program on communication engineering is tailored for the most cutting-edge areas in communication engineering. In addition to lecturers and labs, students are also encouraged to work with supervisors on real research problems as early as the second year of the program. The key areas under study include: classic and modern communication theory, microwave engineering, wireless communications, optical communications, computer networks, embedded systems, microwave imaging, etc.

Academic subject areas: Electronic Information

Program code: 080703

II. Objectives and Learning Outcomes

1. Objectives

Attributes that alumni of Communication Engineering should demonstrate 3-5 years after graduation include 4 aspects. Alumni are:

Technical Skills: technically competent to conduct research and development in the industry and universities in the broad fields of Electronics and Information Engineering in general, and Communication Engineering in particular.

Engineering Ethos: able to think critically and creatively, able to use engineering principles to embrace challenging engineering and non-engineering problems encountered at work, able to

apply an analytic mindset, make informed decisions and able to provide innovative solutions.

Attitude: self-motivated with a desire for lifelong learning to adapt to the fast changing environment, able to operate with integrity and responsibility, having optimism and composure under tight schedule, and committed to make a positive impact on society locally and globally.

Leadership: effective communicators, well-prepared to advance towards leadership positions, able to capitalize the individual strengths of team members, and able to nurture the team to achieve goals.

2. Learning Outcomes

Student Outcomes (SOs) that prepare graduates to enter the professional practice of engineering:

SO 1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

SO 2: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

SO 3: an ability to communicate effectively with a range of audiences.

SO 4: an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

SO 5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

SO 6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

SO 7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

SO 8: knowledge of probability and statistics including applications, differential and integral calculus, sciences, engineering sciences and computing science and application to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components.

SO 9: knowledge and application of advanced mathematics, such as differential equations, linear algebra, and complex variables.

SO 10: knowledge and application of communication theory and systems, and computer

networks.

SO 11: an ability of analyze, design and develop communication systems and computer networks.

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: 152 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	26
		Major Core Courses	15
		Practice-based Learning (Undergraduate Thesis, Internships.)	14
	Major Elective Courses	Major Elective Courses	18
Total			152
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	None	MA
	MA127	Calculus II	4	1 Spring	MA117	
	MA113	Linear Algebra	4	1 Spring & Fall	None	
Physics	PHY105	College Physics I	4	1 Fall	None	PHY
	PHY106	College Physics II	4	1 Spring	PHY105	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	
Chemistry	CH105	Chemistry: The Central Science	3	1-2 Spring & Fall	None	CH
Geoscience + Life Science	BIO102B	Introduction to Life Science	3	1-2 Spring & Fall	None	BIO
	EOE100	Introduction to Earth Sciences	3	1-2 Spring & Fall	None	EOE
Computer Programming	CS111	Introduction to C programming	3	1-2 Spring & Fall	None	CS
Note: 1. The course of Calculus I and II can be replaced by Mathematical Analysis I and II. 2. The course of College Physics I and II can be replaced by General Physics I and II 3. The course of Linear Algebra can be replaced by Advanced Linear Algebra I. 4. The course of Introduction to C programming can be replaced by Introduction to Computer Programming. 5. The course of Chemistry: the Central Science can be replaced by General Chemistry. 6. The course of Introduction to Life Science can be replaced by Principles of Biology. 7. The course category Geoscience + Life Science can be chosen between Introduction to Life Science and Introduction to Earth Sciences. 8. 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	None
	MA127	Calculus II	MA117
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	PHY105
	PHY104B	Experiments of Fundamental Physics	None
	CS111	Introduction to C programming	None
Declare major at the end of the second academic year	MA117	Calculus I	None
	MA127	Calculus II	MA117
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	PHY105
	PHY104B	Experiments of Fundamental Physics	None
	CS111	Introduction to C programming	None
	CH105	Chemistry: The Central Science	None
	BIO102B	Introduction to Life Science	None
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Communication Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	EE104	Fundamentals of Electric Circuits	2	0	1 Spring	MA117 MA113	EE
	EE201-17	Analog Circuits	3	0	2 Fall	PHY106 EE104	EE
	EE201-17L	Analog Circuits Laboratory	1	1	2 Fall	EE201-17	EE
	EE205	Signals and Systems	3	1	2 Fall	MA117	EE
	EE207	Engineering Mathematics	4	0	2 Fall	MA127 PHY106 MA113	EE
	EE202-17	Digital Circuits	3	0	2 Spring	PHY106	EE
	EE202-17L	Digital Circuits Laboratory	1	1	2 Spring	EE202-17	EE
	EE208	Engineering Electromagnetics	3	1	2 Spring	MA113 EE104	EE
	MA212	Probability and Statistics	3	0	2 Spring	MA127	MA
	EE351	Microprocessors and Microsystems	3	1	3 Fall	EE201-17 EE202-17	EE
	Total		26	5			
Major Core Courses	EE206	Communication Principles	3	1	2 Spring	EE205	EE
	EE317	Advanced Electronic Science Experiment I	1	1	2 Spring	EE201-17 or EE202-17	EE
	EE313	Wireless Communications	3	1	3 Fall	EE206	EE
	EE316	Microwave Engineering	3	1	3 Fall	EE201-17 EE208	EE
	EE318	Advanced Electronic Science Experiment II	1	1	3 Fall	EE317	EE
	EE307	Antennas and Radio Propagation	3	1	3 Spring	EE208 EE104	EE
	EE405	Advanced Electronic Science Experiment III	1	1	3 Spring	EE318	EE
	Total		15	7			
Practice-based Courses	EE470	Internship	2	2	3 Summer	None	EE
	EE492	Undergraduate Thesis/Projects	12	12	4 Spring	None	EE
	Total		14	14			
Total			55	26			
Note: Students who have completed Comprehensive Design I&II are not required to take the Graduation Projects/Thesis.							

Table 2: Major Elective Courses

Program of Communication Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Module A	CS203B	Data Structures and Algorithm Analysis B	3	1	2 Fall	CS109	CS
	CS208	Algorithm Design and Analysis	3	1	2 Spring	CS109 CS203	CS
	EE305	Introduction to VLSI Technology	3	1	3 Fall	EE203	EE
	EE315	Data communications and networking	3	1	3 Fall	None	EE
	CS303B	Artificial Intelligence B	3	1	3 Fall	CS203B CS109 MA212	CS
	MA305	Numerical Analysis	3	0	3 Fall	MA203A or MA213	MA
	EE308	Fiber Communication Principles and Techniques	3	1	3 Spring	None	EE
	EE312	Design of Modern Communication Systems	3	1	3 Spring	EE206 EE313	EE
	EE411	Information Theory and Coding	2	0	4 Fall	MA212	EE
	EE417	Communications System Design II	2	2	4 Fall	EE316 EE206 EE307	EE
Module B	EE108	Optoelectronics Intellisense	3	0	1 Spring	None	EE
	EE203	Solid-state Electronics	3	0	2 Fall	PHY106	EE
	EE211	Robotic Perception and Intelligence	3	1	2 Fall	None	EE
	EE204	Introduction to Semiconductor Devices	3	1	2 Spring	EE203	EE
	EE210	Fundamentals of Optics	3	0	2 Spring	None	EE
	CS307	Principles of Database Systems	3	1	3 Fall	None	CS
	EE303	Fundamentals of Optoelectronic Technology	3	1	3 Fall	PHY106	EE
	EE309	Introduction to Semiconductor Optics	3	0	3 Fall	None	EE
	EE311	Optical Design	3	1	3 Fall	None	EE
	EE323	Digital Signal Processing	3	1	3 Fall	EE205	EE
	EE335	Liquid crystal optoelectronics	3	1	3 Fall	EE210	EE
	EE342	Sensors and Applications	3	0	3 Fall	None	EE
	EE345	Introduction of Wide Bandgap Semiconductors	3	0	3 Fall	EE203 or EE204	EE
	EE346	Mobile Robot Navigation and Control	3	1	3 Fall	EE205 MA212	EE
	EE372	Nonimaging Optics	2	0	3 Fall	None	EE
	EE373	Optical System Design Experiment	1	1	3 Fall	None	EE
	EE310	Principles and Technologies	3	0	3 Spring	None	EE

		of Lasers					
	EE322	Optoelectronics Devices Fabrication Laboratory	2	1	3 Spring	EE204	EE
	EE326	Digital Image Processing	3	1	3 Spring	EE205	EE
	EE328	Speech Signal Processing	3	1	3 Spring	EE323	EE
	EE332	Digital System Design	3	1	3 Spring	EE202-17	EE
	EE336	Fundamentals of Photovoltaics	3	1	3 Spring	EE204	EE
	EE340	Statistical Learning for Data Science	3	0	3 Spring	MA113	EE
	EE348	Modern sensing technology	3	0	3 Spring	None	EE
	EE368	Robotic Motion and Control	3	1	3 Spring	EE205	EE
	CS405	Machine Learning	3	1	4 Fall	MA212 MA113	CS
	EE435	Semiconductor Information Display Technologies	3	0	4 Fall	EE203 EE204	EE
	EE404	Organic Electronics	2	0	4 Spring	None	EE
Total			104	24			
Note: At least 18 credits are required, and at least three courses from Module A are required.							

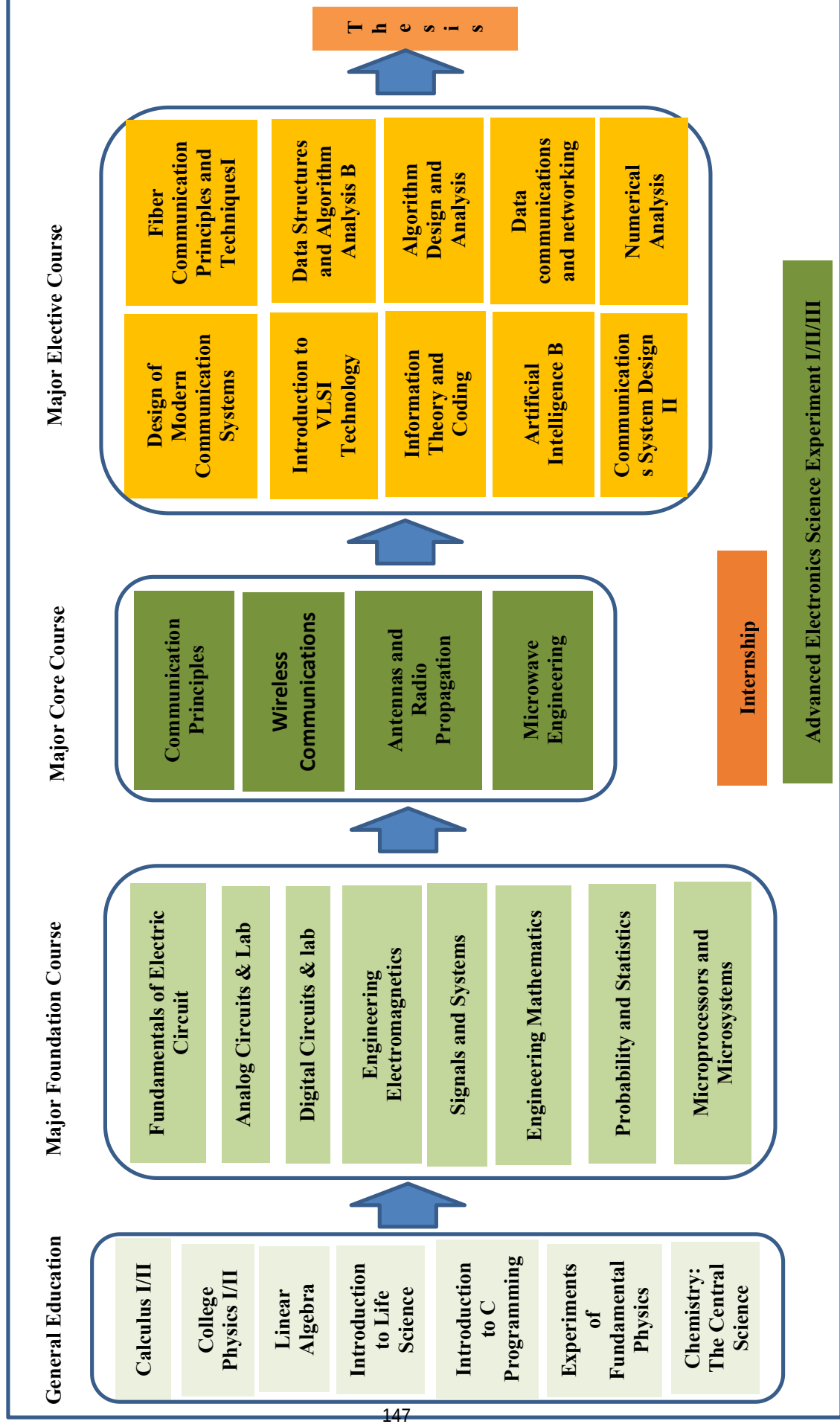
Table 3: Overview of Practice-based Learning

Program of Communication Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
EE201-17L	Analog Circuits Laboratory	1	1	2 Fall	EE201-17	EE
EE205	Signals and Systems	3	1	2 Fall	MA117	EE
EE211	Robotic Perception and Intelligence	3	1	2 Fall	None	EE
CS203B	Data Structures and Algorithm Analysis B	3	1	2 Fall	CS109	CS
EE202-17L	Digital Circuits Laboratory	1	1	2 Spring	EE202-17	EE
EE204	Introduction to Semiconductor Devices	3	1	2 Spring	EE203	EE
EE206	Communication Principles	3	1	2 Spring	EE205	EE
EE208	Engineering Electromagnetics	3	1	2 Spring	MA113 EE104	EE
EE317	Advanced Electronic Science Experiment I	1	1	2 Spring	EE201-17 or EE202-17	EE
CS208	Algorithm Design and Analysis	3	1	2 Spring	CS109 CS203	CS
EE303	Fundamentals of Optoelectronic Technology	3	1	3 Fall	PHY106	EE
EE305	Introduction to VLSI Technology	3	1	3 Fall	EE203	EE
EE311	Optical Design	3	1	3 Fall	None	EE
EE313	Wireless Communications	3	1	3 Fall	EE206	EE
EE315	Data communications and networking	3	1	3 Fall	None	EE
EE316	Microwave Engineering	3	1	3 Fall	EE201-17 EE208	EE

EE318	Advanced Electronic Science Experiment II	1	1	3 Fall	EE317	EE
EE323	Digital Signal Processing	3	1	3 Fall	EE205	EE
EE335	Liquid crystal optoelectronics	3	1	3 Fall	EE210	EE
EE346	Mobile Robot Navigation and Control	3	1	3 Fall	EE205 MA212	EE
EE351	Microprocessors and Microsystems	3	1	3 Fall	EE201-17 EE202-17	EE
CS303B	Artificial Intelligence B	3	1	3 Fall	CS203B CS109 MA212	CS
CS307	Principles of Database Systems	3	1	3 Fall	None	CS
EE307	Antennas and Radio Propagation	3	1	3 Spring	EE208 EE104	EE
EE308	Fiber Communication Principles and Techniques	3	1	3 Spring	None	EE
EE312	Design of Modern Communication Systems	3	1	3 Spring	EE206 EE313	EE
EE322	Optoelectronics Devices Fabrication Laboratory	2	1	3 Spring	EE204	EE
EE326	Digital Image Processing	3	1	3 Spring	EE205	EE
EE328	Speech Signal Processing	3	1	3 Spring	EE323	EE
EE332	Digital System Design	3	1	3 Spring	EE202-17	EE
EE336	Fundamentals of Photovoltaics	3	1	3 Spring	EE204	EE
EE368	Robotic Motion and Control	3	1	3 Spring	EE205	EE
EE405	Advanced Electronic Science Experiment III	1	1	4 Fall	EE318	EE
EE470	Internship	2	2	3 Summer	None	EE
EE417	Communications System Design II	2	2	4 Fall	EE316 EE206 EE307	EE
CS405	Machine Learning	3	1	4 Fall	MA212 MA113	CS
EE492	Undergraduate Thesis/Projects	12	12	4 Spring	None	EE
Total		107	50			

Curriculum Structure of Communication Engineering



Note: The Subject Elective course lists include only part of the courses, see more in Program.

Department of Electrical and Electronic Engineering

Program of Optoelectronic Information Science and Engineering for International Students (2024)

I. Introduction

Optoelectronic Information Science and Engineering is a comprehensive technology, which is composed of optics, optoelectronics, microelectronics and other technologies. It is a new cross-subject with strong practical application, and is widely used in the national economy and defense. The professional training includes the theoretical knowledge of optoelectronics, flat panel display, lighting, solar energy, optical design and optical communication technology. At the same time, English and computer application training are important. Graduated students will be engaged in the field of optoelectronic information, optical communication, photoelectric detection, optoelectronic devices, new display and lighting technology, new energy, and new technology research and development. They are also suitable for the research and development of optoelectronic devices and related high-tech disciplines, scientific research institutions, universities and institutions engaged in scientific research, development, teaching and management.

Academic subject areas: Electronic Information

Program code: 080705

II. Objectives and Learning Outcomes

1. Objectives

Attributes that alumni of Optoelectronic Information Science and Engineering should demonstrate 3-5 years after graduation include 4 aspects. Alumni are:

Technical Skills: technically competent to conduct research and development in the industry and universities in the broad fields of Electronics and Information Engineering in general, and Communication Engineering in particular.

Engineering Ethos: able to think critically and creatively, able to use engineering principles

to embrace challenging engineering and non-engineering problems encountered at work, able to apply an analytic mindset, make informed decisions and able to provide innovative solutions.

Attitude: self-motivated with a desire for lifelong learning to adapt to the fast changing environment, able to operate with integrity and responsibility, having optimism and composure under tight schedule, and committed to make a positive impact on society locally and globally.

Leadership: effective communicators, well-prepared to advance towards leadership positions, able to capitalize the individual strengths of team members, and able to nurture the team to achieve goals.

2. Learning Outcomes

Student Outcomes (SOs) that prepare graduates to enter the professional practice of engineering:

SO 1: an ability to identify, formulate, and solve complex engineering problems¹ by applying principles of engineering, science, and mathematics.

SO 2: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

SO 3: an ability to communicate effectively with a range of audiences.

SO 4: an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

SO 5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

SO 6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

SO 7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

SO 8: knowledge of probability and statistics including applications, differential and integral calculus, sciences, engineering sciences, and computing science and application to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components.

SO 9: knowledge and application of advanced mathematics, such as differential equations, linear algebra, and complex variables.

SO 10: knowledge and application of and appropriate laboratory experience in: geometrical optics, physical optics, optical materials, and optical and/or photonic devices and systems.

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: 152 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	26
		Major Core Courses	15
		Practice-based Learning (Undergraduate Thesis, Internships.)	14
	Major Elective Courses	Major Elective Courses	18
Total			152
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	None	MA
	MA127	Calculus II	4	1 Spring	MA117	
	MA113	Linear Algebra	4	1 Spring & Fall	None	
Physics	PHY105	College Physics I	4	1 Fall	None	PHY
	PHY106	College Physics II	4	1 Spring	PHY105	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	
Chemistry	CH105	Chemistry: The Central Science	3	1-2 Spring & Fall	None	CH
Geoscience + Life Science	BIO102B	Introduction to Life Science	3	1-2 Spring & Fall	None	BIO
	EOE100	Introduction to Earth Sciences	3	1-2 Spring & Fall	None	EOE
Computer Programming	CS111	Introduction to C programming	3	1-2 Spring & Fall	None	CS

Note:

1. The course of Calculus I and II can be replaced by Mathematical Analysis I and II.
2. The course of College Physics I and II can be replaced by General Physics I and II
3. The course of Linear Algebra can be replaced by Advanced Linear Algebra I.
4. The course of Introduction to C programming can be replaced by Introduction to Computer Programming.
5. The course of Chemistry: the Central Science can be replaced by General Chemistry.
6. The course of Introduction to Life Science can be replaced by Principles of Biology.
7. The course category Geoscience + Life Science can be chosen between Introduction to Life Science and Introduction to Earth Sciences.
8. 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	None
	MA127	Calculus II	MA117
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	PHY105
	PHY104B	Experiments of Fundamental Physics	None
	CS111	Introduction to C programming	None
Declare major at the end of the second academic year	MA117	Calculus I	None
	MA127	Calculus II	MA117
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	PHY105
	PHY104B	Experiments of Fundamental Physics	None
	CS111	Introduction to C programming	None
	CH105	Chemistry: The Central Science	None
	BIO102B	Introduction to Life Science	None
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Optoelectronic Information Science and Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	EE104	Fundamentals of Electric Circuits	2	0	1 Spring	MA117 MA113	EE
	EE201-17	Analog Circuits	3	0	2 Fall	PHY106 EE104	EE
	EE201-17L	Analog Circuits Laboratory	1	1	2 Fall	EE201-17	EE
	EE205	Signals and Systems	3	1	2 Fall	MA117	EE
	EE207	Engineering Mathematics	4	0	2 Fall	MA127 PHY106 MA113	EE
	EE202-17	Digital Circuits	3	0	2 Spring	PHY106	EE
	EE202-17L	Digital Circuits Laboratory	1	1	2 Spring	EE202-17	EE
	EE208	Engineering Electromagnetics	3	1	2 Spring	MA113 EE104	EE
	MA212	Probability and Statistics	3	0	2 Spring	MA127	MA
	EE351	Microprocessors and Microsystems	3	1	3 Fall	EE201-17 EE202-17	EE
	Total		26	5			
Major Core Courses	EE204	Introduction to Semiconductor Devices	3	1	2 Spring	EE203	EE
	EE210	Fundamentals of Optics	3	0	2 Spring	None	EE
	EE317	Advanced Electronic Science Experiment I	1	1	2 Spring	EE201-17 or EE202-17	EE
	EE309	Introduction to Semiconductor Optics	3	0	3 Fall	None	EE
	EE318	Advanced Electronic Science Experiment II	1	1	3 Fall	EE317	EE
	EE310	Principles and Technologies of Lasers	3	0	3 Spring	None	EE
	EE405	Advanced Electronic Science Experiment III	1	1	3 Spring	EE318	EE
	Total		15	4			
Practice-based Courses	EE470	Internship	2	2	3 Summer	None	EE
	EE492	Undergraduate Thesis/Projects	12	12	4 Spring	None	EE
	Total		14	14			
Total			55	23			
Note: Students who have completed Comprehensive Design I&II are not required to take the Graduation Projects/Thesis.							

Table 2: Major Elective Courses**Program of Optoelectronic Information Science and Engineering**

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Module A	EE108	Optoelectronics Intellisense	3	0	1 Spring	None	EE
	EE203	Solid-state Electronics	3	0	2 Fall	PHY106	EE
	EE303	Fundamentals of Optoelectronic Technology	3	1	3 Fall	PHY106	EE
	EE311	Optical Design	3	1	3 Fall	None	EE
	EE335	Liquid crystal optoelectronics	3	1	3 Fall	EE210	EE
	EE345	Introduction of Wide Bandgap Semiconductors	3	0	3 Fall	EE203 or EE204	EE
	EE372	Nonimaging Optics	2	0	3 Fall	None	EE
	EE373	Optical System Design Experiment	1	1	3 Fall	None	EE
	EE322	Optoelectronics Devices Fabrication Laboratory	2	1	3 Spring	EE204	EE
	EE336	Fundamentals of Photovoltaics	3	1	3 Spring	EE204	EE
	EE435	Semiconductor Information Display Technologies	3	0	4 Fall	EE203 EE204	EE
	EE404	Organic Electronics	2	0	4 Spring	None	EE
Module B	EE211	Robotic Perception and Intelligence	3	1	2 Fall	None	EE
	CS203B	Data Structures and Algorithm Analysis B	3	1	2 Fall	CS109	CS
	EE206	Communication Principles	3	1	2 Spring	EE205	EE
	CS208	Algorithm Design and Analysis	3	1	2 Spring	CS109 CS203	CS
	EE305	Introduction to VLSI Technology	3	1	3 Fall	EE203	EE
	EE313	Wireless Communications	3	1	3 Fall	EE206	EE
	EE315	Data communications and networking	3	1	3 Fall	None	EE
	EE316	Microwave Engineering	3	1	3 Fall	EE201-17 EE208	EE
	EE323	Digital Signal Processing	3	1	3 Fall	EE205	EE
	EE342	Sensors and Applications	3	0	3 Fall	None	EE
	EE346	Mobile Robot Navigation and Control	3	1	3 Fall	EE205 MA212	EE
	CS303B	Artificial Intelligence B	3	1	3 Fall	CS203B CS109 MA212	CS
	CS307	Principles of Database Systems	3	1	3 Fall	None	CS
	MA305	Numerical Analysis	3	0	3 Fall	MA203A or MA213	MA
	EE307	Antennas and Radio Propagation	3	1	3 Spring	EE208 EE104	EE
	EE308	Fiber Communication	3	1	3 Spring	None	EE

		Principles and Techniques					
	EE312	Design of Modern Communication Systems	3	1	3 Spring	EE206 EE313	EE
	EE326	Digital Image Processing	3	1	3 Spring	EE205	EE
	EE328	Speech Signal Processing	3	1	3 Spring	EE323	EE
	EE332	Digital System Design	3	1	3 Spring	EE202-17	EE
	EE340	Statistical Learning for Data Science	3	0	3 Spring	MA113	EE
	EE348	Modern sensing technology	3	0	3 Spring	None	EE
	EE368	Robotic Motion and Control	3	1	3 Spring	EE205	EE
	EE411	Information Theory and Coding	2	0	4 Fall	MA212	EE
	EE417	Communications System Design II	2	2	4 Fall	EE316 EE206 EE307	EE
	CS405	Machine Learning	3	1	4 Fall	MA212 MA113	CS
Total			104	27			
Note: At least 18 credits are required , and at least three courses from Module A are required.							

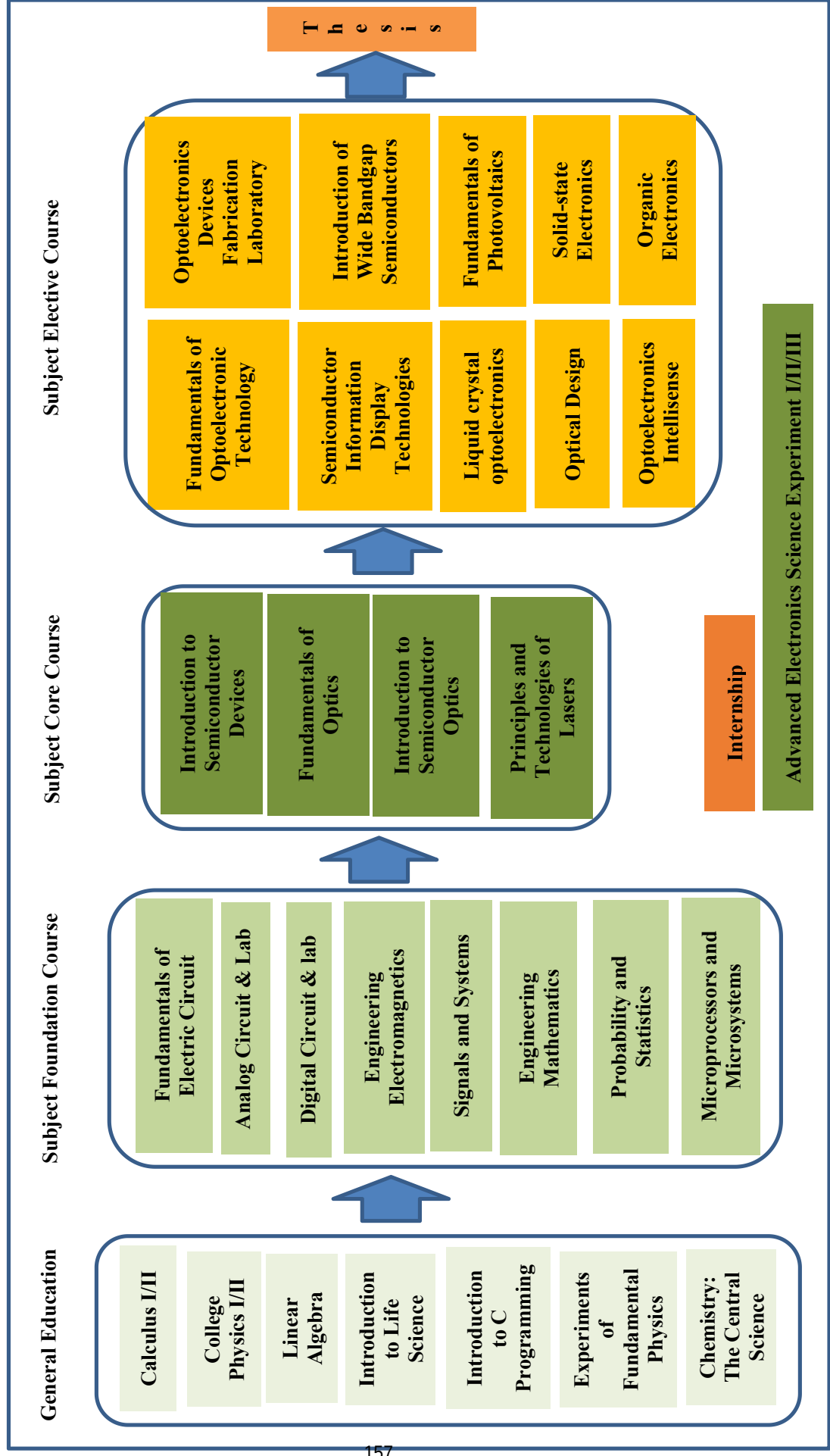
Table 3: Overview of Practice-based Learning

Program of Optoelectronic Information Science and Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
EE201-17L	Analog Circuits Laboratory	1	1	2 Fall	EE201-17	EE
EE205	Signals and Systems	3	1	2 Fall	MA117	EE
EE211	Robotic Perception and Intelligence	3	1	2 Fall	None	EE
CS203B	Data Structures and Algorithm Analysis B	3	1	2 Fall	CS109	CS
EE202-17L	Digital Circuits Laboratory	1	1	2 Spring	EE202-17	EE
EE204	Introduction to Semiconductor Devices	3	1	2 Spring	EE203	EE
EE206	Communication Principles	3	1	2 Spring	EE205	EE
EE208	Engineering Electromagnetics	3	1	2 Spring	MA113 EE104	EE
EE317	Advanced Electronic Science Experiment I	1	1	2 Spring	EE201-17 or EE202-17	EE
CS208	Algorithm Design and Analysis	3	1	2 Spring	CS109 CS203	CS
EE303	Fundamentals of Optoelectronic Technology	3	1	3 Fall	PHY106	EE
EE305	Introduction to VLSI Technology	3	1	3 Fall	EE203	EE
EE311	Optical Design	3	1	3 Fall	None	EE
EE313	Wireless Communications	3	1	3 Fall	EE206	EE
EE315	Data communications and networking	3	1	3 Fall	None	EE
EE316	Microwave Engineering	3	1	3 Fall	EE201-17 EE208	EE

EE318	Advanced Electronic Science Experiment II	1	1	3 Fall	EE317	EE
EE323	Digital Signal Processing	3	1	3 Fall	EE205	EE
EE335	Liquid crystal optoelectronics	3	1	3 Fall	EE210	EE
EE346	Mobile Robot Navigation and Control	3	1	3 Fall	EE205 MA212	EE
EE351	Microprocessors and Microsystems	3	1	3 Fall	EE201-17 EE202-17	EE
CS303B	Artificial Intelligence B	3	1	3 Fall	CS203B CS109 MA212	CS
CS307	Principles of Database Systems	3	1	3 Fall	None	CS
EE307	Antennas and Radio Propagation	3	1	3 Spring	EE208 EE104	EE
EE308	Fiber Communication Principles and Techniques	3	1	3 Spring	None	EE
EE312	Design of Modern Communication Systems	3	1	3 Spring	EE206 EE313	EE
EE322	Optoelectronics Devices Fabrication Laboratory	2	1	3 Spring	EE204	EE
EE326	Digital Image Processing	3	1	3 Spring	EE205	EE
EE328	Speech Signal Processing	3	1	3 Spring	EE323	EE
EE332	Digital System Design	3	1	3 Spring	EE202-17	EE
EE336	Fundamentals of Photovoltaics	3	1	3 Spring	EE204	EE
EE368	Robotic Motion and Control	3	1	3 Spring	EE205	EE
EE405	Advanced Electronic Science Experiment III	1	1	4 Fall	EE318	EE
EE470	Internship	2	2	3 Summer	None	EE
EE417	Communications System Design II	2	2	4 Fall	EE316 EE206 EE307	EE
CS405	Machine Learning	3	1	4 Fall	MA212 MA113	CS
EE492	Undergraduate Thesis/Projects	12	12	4 Spring	None	EE
Total		107	50			

Curriculum Structure of Optoelectronic Information Science and Engineering



Note: The Subject Elective course lists include only part of the courses, see more in Program.

Department of Electrical and Electronic Engineering

Program of Information Engineering for International Students (2024)

I. Introduction

Information Engineering is a new and promising discipline. It is developed as multiple areas involving signal and information processing technology, communication technology, and computer science rapidly penetrate into traditional information technology (IT) industries. In China, information technology industry is currently the most active and fast-growing profession. This area is deeply involved in international technology competition now, and has also globally become the most vital engine of social and economic productivity and development. Recently, with the increasing demand on the eco-friendly, integrated, and smart information system, professional talents in information engineering are deeply in need.

Academic subject areas: Electronic Information

Program code: 080706

II. Objectives and Learning Outcomes

1. Objectives

Attributes that alumni of Information Engineering should demonstrate 3-5 years after graduation include 4 aspects. Alumni are:

Technical Skills: technically competent to conduct research and development in the industry and universities in the broad fields of Electronics and Information Engineering in general, and Communication Engineering in particular.

Engineering Ethos: able to think critically and creatively, able to use engineering principles to embrace challenging engineering and non-engineering problems encountered at work, able to apply an analytic mindset, make informed decisions and able to provide innovative solutions.

Attitude: self-motivated with a desire for lifelong learning to adapt to the fast changing environment, able to operate with integrity and responsibility, having optimism and composure

under tight schedule, and committed to make a positive impact on society locally and globally.

Leadership: effective communicators, well-prepared to advance towards leadership positions, able to capitalize the individual strengths of team members, and able to nurture the team to achieve goals.

2. Learning Outcomes

Student Outcomes (SOs) that prepare graduates to enter the professional practice of engineering:

SO 1: an ability to identify, formulate, and solve complex engineering problems¹ by applying principles of engineering, science, and mathematics.

SO 2: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

SO 3: an ability to communicate effectively with a range of audiences.

SO 4: an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

SO 5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

SO 6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

SO 7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

SO 8: knowledge of probability and statistics including applications, differential and integral calculus, sciences, engineering sciences and computing science and application to analyze and design complex information engineering systems.

SO 9: knowledge and application of advanced mathematics, such as differential equations, linear algebra, and complex variable.

SO 10: knowledge and application of information processing methods.

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: 152 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	26
		Major Core Courses	15
		Practice-based Learning (Undergraduate Thesis, Internships, etc.)	14
	Major Elective Courses	Major Elective Courses	18
Total			152
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	None	MA
	MA127	Calculus II	4	1 Spring	MA117	
	MA113	Linear Algebra	4	1 Spring & Fall	None	
Physics	PHY105	College Physics I	4	1 Fall	None	PHY
	PHY106	College Physics II	4	1 Spring	PHY105	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	
Chemistry	CH105	Chemistry: The Central Science	3	1-2 Spring & Fall	None	CH
Geoscience + Life Science	BIO102B	Introduction to Life Science	3	1-2 Spring & Fall	None	BIO
	EOE100	Introduction to Earth Sciences	3	1-2 Spring & Fall	None	EOE
Computer Programming	CS111	Introduction to C programming	3	1-2 Spring & Fall	None	CS
Note: 1. The course of Calculus I and II can be replaced by Mathematical Analysis I and II. 2. The course of College Physics I and II can be replaced by General Physics I and II 3. The course of Linear Algebra can be replaced by Advanced Linear Algebra I. 4. The course of Introduction to C programming can be replaced by Introduction to Computer Programming. 5. The course of Chemistry: the Central Science can be replaced by General Chemistry. 6. The course of Introduction to Life Science can be replaced by Principles of Biology. 7. The course category Geoscience + Life Science can be chosen between Introduction to Life Science and Introduction to Earth Sciences. 8. 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	None
	MA127	Calculus II	MA117
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	PHY105
	PHY104B	Experiments of Fundamental Physics	None
	CS111	Introduction to C programming	None
Declare major at the end of the second academic year	MA117	Calculus I	None
	MA127	Calculus II	MA117
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	PHY105
	PHY104B	Experiments of Fundamental Physics	None
	CS111	Introduction to C programming	None
	CH105	Chemistry: The Central Science	None
	BIO102B	Introduction to Life Science	None
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Information Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	EE104	Fundamentals of Electric Circuits	2	0	1 Spring	MA117 MA113	EE
	EE201-17	Analog Circuits	3	0	2 Fall	PHY106 EE104	EE
	EE201-17L	Analog Circuits Laboratory	1	1	2 Fall	EE201-17	EE
	EE205	Signals and Systems	3	1	2 Fall	MA117	EE
	EE207	Engineering Mathematics	4	0	2 Fall	MA127 PHY106 MA113	EE
	EE202-17	Digital Circuits	3	0	2 Spring	PHY106	EE
	EE202-17L	Digital Circuits Laboratory	1	1	2 Spring	EE202-17	EE
	EE208	Engineering Electromagnetics	3	1	2 Spring	MA113 EE104	EE
	MA212	Probability and Statistics	3	0	2 Spring	MA127	MA
	EE351	Microprocessors and Microsystems	3	1	3 Fall	EE201-17 EE202-17	EE
	Total		26	5			
Major Core Courses	EE206	Communication Principles	3	1	2 Spring	EE205	EE
	EE317	Advanced Electronic Science Experiment I	1	1	2 Spring	EE201-17 or EE202-17	EE
	EE315	Data communications and networking	3	1	3 Fall	None	EE
	EE318	Advanced Electronic Science Experiment II	1	1	3 Fall	EE317	EE
	EE323	Digital Signal Processing	3	1	3 Fall	EE205	EE
	EE332	Digital System Design	3	1	3 Spring	EE202-17	EE
	EE405	Advanced Electronic Science Experiment III	1	1	3 Spring	EE318	EE
	Total		15	7			
Practice-based Courses	EE470	Internship	2	2	3 Summer	None	EE
	EE492	Undergraduate Thesis/Projects	12	12	4 Spring	None	EE
	Total		14	14			
Total			55	26			
Note: Students who have completed Comprehensive Design I&II are not required to take the Graduation Projects/Thesis.							

Table 2: Major Elective Courses**Program of Information Engineering**

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Module A	EE211	Robotic Perception and Intelligence	3	1	2 Fall	None	EE
	EE342	Sensors and Applications	3	0	3 Fall	None	EE
	EE346	Mobile Robot Navigation and Control	3	1	3 Fall	EE205 MA212	EE
	CS307	Principles of Database Systems	3	1	3 Fall	None	CS
	EE326	Digital Image Processing	3	1	3 Spring	EE205	EE
	EE328	Speech Signal Processing	3	1	3 Spring	EE323	EE
	EE340	Statistical Learning for Data Science	3	0	3 Spring	MA113	EE
	EE348	Modern sensing technology	3	0	3 Spring	None	EE
	EE368	Robotic Motion and Control	3	1	3 Spring	EE205	EE
	CS405	Machine Learning	3	1	4 Fall	MA212 MA113	CS
Module B	EE108	Optoelectronics Intellisense	3	0	1 Spring	None	EE
	EE203	Solid-state Electronics	3	0	2 Fall	PHY106	EE
	CS203B	Data Structures and Algorithm Analysis B	3	1	2 Fall	CS109	CS
	EE204	Introduction to Semiconductor Devices	3	1	2 Spring	EE203	EE
	EE210	Fundamentals of Optics	3	0	2 Spring	None	EE
	CS208	Algorithm Design and Analysis	3	1	2 Spring	CS109 CS203	CS
	EE303	Fundamentals of Optoelectronic Technology	3	1	3 Fall	PHY106	EE
	EE305	Introduction to VLSI Technology	3	1	3 Fall	EE203	EE
	EE309	Introduction to Semiconductor Optics	3	0	3 Fall	None	EE
	EE311	Optical Design	3	1	3 Fall	None	EE
	EE313	Wireless Communications	3	1	3 Fall	EE206	EE
	EE316	Microwave Engineering	3	1	3 Fall	EE201-17 EE208	EE
	EE335	Liquid crystal optoelectronics	3	1	3 Fall	EE210	EE
	EE345	Introduction of Wide Bandgap Semiconductors	3	0	3 Fall	EE203 or EE204	EE
	EE372	Nonimaging Optics	2	0	3 Fall	None	EE
	EE373	Optical System Design Experiment	1	1	3 Fall	None	EE
	CS303B	Artificial Intelligence B	3	1	3 Fall	CS203B CS109 MA212	CS
	MA305	Numerical Analysis	3	0	3 Fall	MA203A or MA213	MA
	EE307	Antennas and Radio	3	1	3 Spring	EE208	EE

		Propagation				EE104	
	EE308	Fiber Communication Principles and Techniques	3	1	3 Spring	None	EE
	EE310	Principles and Technologies of Lasers	3	0	3 Spring	None	EE
	EE312	Design of Modern Communication Systems	3	1	3 Spring	EE206 EE313	EE
	EE322	Optoelectronics Devices Fabrication Laboratory	2	1	3 Spring	EE204	EE
	EE336	Fundamentals of Photovoltaics	3	1	3 Spring	EE204	EE
	EE411	Information Theory and Coding	2	0	4 Fall	MA212	EE
	EE417	Communications System Design II	2	2	4 Fall	EE316 EE206 EE307	EE
	EE435	Semiconductor Information Display Technologies	3	0	4 Fall	EE203 EE204	EE
	EE404	Organic Electronics	2	0	4 Spring	None	EE
Total			104	24			
Note: At least 18 credits are required , and at least three courses from Module A are required.							

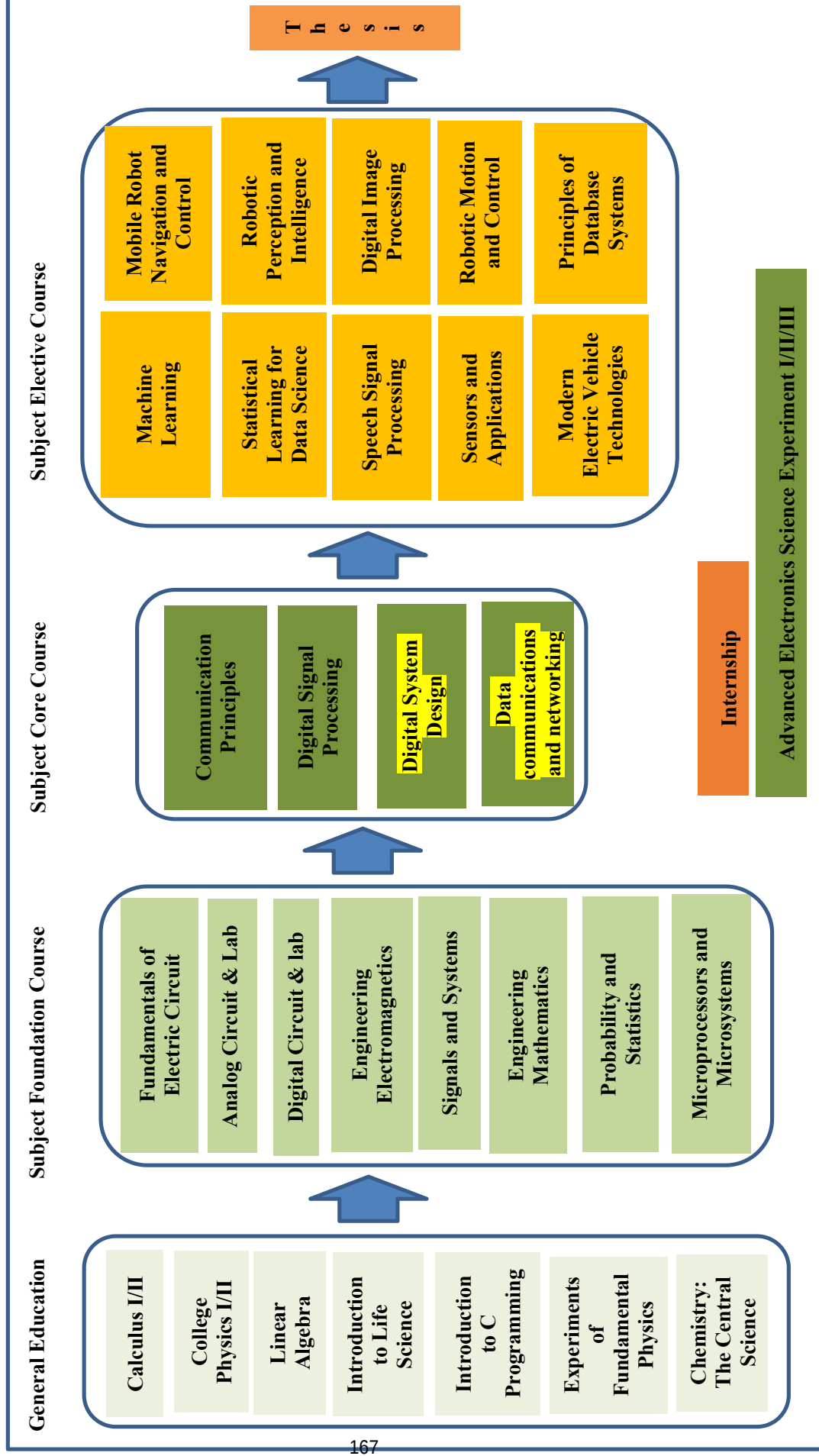
Table 3: Overview of Practice-based Learning

Program of Information Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
EE201-17L	Analog Circuits Laboratory	1	1	2 Fall	EE201-17	EE
EE205	Signals and Systems	3	1	2 Fall	MA117	EE
EE211	Robotic Perception and Intelligence	3	1	2 Fall	None	EE
CS203B	Data Structures and Algorithm Analysis B	3	1	2 Fall	CS109	CS
EE202-17L	Digital Circuits Laboratory	1	1	2 Spring	EE202-17	EE
EE204	Introduction to Semiconductor Devices	3	1	2 Spring	EE203	EE
EE206	Communication Principles	3	1	2 Spring	EE205	EE
EE208	Engineering Electromagnetics	3	1	2 Spring	MA113 EE104	EE
EE317	Advanced Electronic Science Experiment I	1	1	2 Spring	EE201-17 or EE202-17	EE
CS208	Algorithm Design and Analysis	3	1	2 Spring	CS109 CS203	CS
EE303	Fundamentals of Optoelectronic Technology	3	1	3 Fall	PHY106	EE
EE305	Introduction to VLSI Technology	3	1	3 Fall	EE203	EE
EE311	Optical Design	3	1	3 Fall	None	EE
EE313	Wireless Communications	3	1	3 Fall	EE206	EE
EE315	Data communications and networking	3	1	3 Fall	None	EE
EE316	Microwave Engineering	3	1	3 Fall	EE201-17	EE

					EE208	
EE318	Advanced Electronic Science Experiment II	1	1	3 Fall	EE317	EE
EE323	Digital Signal Processing	3	1	3 Fall	EE205	EE
EE335	Liquid crystal optoelectronics	3	1	3 Fall	EE210	EE
EE346	Mobile Robot Navigation and Control	3	1	3 Fall	EE205 MA212	EE
EE351	Microprocessors and Microsystems	3	1	3 Fall	EE201-17 EE202-17	EE
CS303B	Artificial Intelligence B	3	1	3 Fall	CS203B CS109 MA212	CS
CS307	Principles of Database Systems	3	1	3 Fall	None	CS
EE307	Antennas and Radio Propagation	3	1	3 Spring	EE208 EE104	EE
EE308	Fiber Communication Principles and Techniques	3	1	3 Spring	None	EE
EE312	Design of Modern Communication Systems	3	1	3 Spring	EE206 EE313	EE
EE322	Optoelectronics Devices Fabrication Laboratory	2	1	3 Spring	EE204	EE
EE326	Digital Image Processing	3	1	3 Spring	EE205	EE
EE328	Speech Signal Processing	3	1	3 Spring	EE323	EE
EE332	Digital System Design	3	1	3 Spring	EE202-17	EE
EE336	Fundamentals of Photovoltaics	3	1	3 Spring	EE204	EE
EE368	Robotic Motion and Control	3	1	3 Spring	EE205	EE
EE405	Advanced Electronic Science Experiment III	1	1	4 Fall	EE318	EE
EE470	Internship	2	2	3 Summer	None	EE
EE417	Communications System Design II	2	2	4 Fall	EE316 EE206 EE307	EE
CS405	Machine Learning	3	1	4 Fall	MA212 MA113	CS
EE492	Undergraduate Thesis/Projects	12	12	4 Spring	None	EE
Total		107	50			

Curriculum Structure of Information Engineering



Note: The Subject Elective course lists include only part of the courses, see more in Program.

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.

Module		Category	Minimum Credit Requirement
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	1 Spr	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	1 Spr	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: 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. 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. 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). 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).			

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
	Total		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
	Total		18	10			
Practice-based Courses	CS470	Industrial Practice	2	2			
	CS491	Undergraduate Thesis/Projects	12	12			
	Total		14	14			
Total			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
Total		120	34			

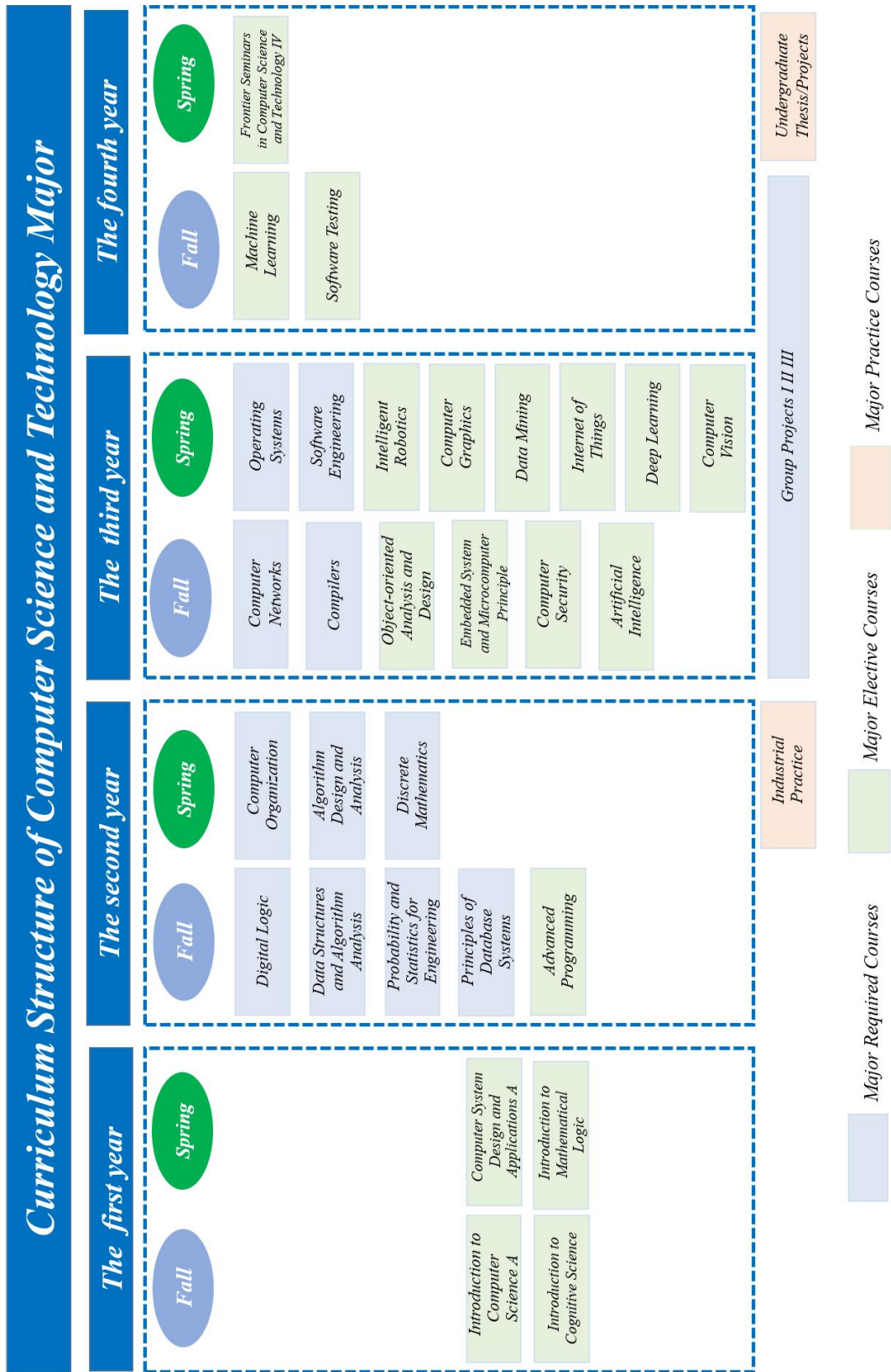
Table 3: Overview of Practice-based Learning

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



Department of Computer Science and Engineering

Program of Intelligence Science and Technology for International Students (2024)

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 learning, 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.

Academic subject areas: Computer

Program code: 080907T

II. Objectives and Learning Outcomes

1. Objectives

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.

2. Learning Outcomes

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, 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: 146 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	23
		Major Core Courses	12
		Practice-based Learning (Undergraduate Thesis, Internships)	14
	Major Elective Courses	Major Elective Courses	18
Total			146
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	1 Spr	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	1 Spr	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: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Intelligence Science and Technology

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	CS104	Introduction to Mathematical Logic	2		1/Spr	NA	CSE
	STA219	Probability and Statistics for Engineering	3		2/Fall	MA127, MA113	STA
	CS203	Data Structures and Algorithm Analysis	3	1	2/Fall	CS109	CSE
	CS307	Principles of Database Systems	3	1	2/Fall	CS109	CSE
	CS207	Digital Logic	3	1	2/ Fall	NA	CSE
	CS202	Computer Organization	3	1	2/ Spr	CS207	CSE
	CS201	Discrete Mathematics	3		2/Spr	MA127, MA113	CSE
	CS208	Algorithm Design and Analysis	3	1	2/Spr	CS203	CSE
	Total		23	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	CS303	Artificial Intelligence	3	1	3 / Fall	CS203, STA219	CSE
	CS405	Machine Learning	3	1	3 / Fall	STA219	CSE
	CS321	Group Projects I	2	2	3 / Fall	NA	CSE
	CS326	Group Projects II	2	2	3 / Spr	NA	CSE
	CS413	Group Projects III	2	2	4 / Fall	NA	CSE
	Total		12	8			
Practice-based Courses	CS470	Industrial Practice	2	2			
	CS491	Undergraduate Thesis/Projects	12	12			
	Total		14	14			
Total			49	27			

Table 2: Major Elective Courses**Program of Intelligence 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
CS209A	Computer System Design and Applications A	3	1	1/ Spr	CS109 or CS110	CSE
CS219	Advanced Programming	3	1	2/ Fall	CS109	CSE
EE205	Signals and Systems	3	1	2/Fall	MA117	EE
CS306	Data Mining	3	1	2 / Spr	CS203 or CS203B	CSE
CS327	The Theory of Computation	2		3/ Fall	CS101A, CS104	CSE
MA309	Time Series Analysis	3		3/ Fall	MA212 or MA204	STAT
MA305	Numerical Analysis	3		3/ Fall	MA203a or MA213-16	MATH
EE323	Digital Signal Processing	3	1	3/ Fall	EE205	EE
CS301	Embedded System and Microcomputer Principle	3	1	3/ Fall	CS207	CSE
CS305	Computer Networks	3	1	3/ Fall	CS109	CSE
CS309	Object-oriented Analysis and Design	3	1	3/ Fall	CS203	CSE
CS313	Automated Reasoning	3	1	3/ Fall	CS104	CSE
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, STA219	CSE
CS302	Operating Systems	3	1	3 / Spr	CS203	CSE
CS308	Computer Vision	3	1	3/ Spr	CS203,MA127,MA113	CSE
CS304	Software Engineering	3	1	3/ Spr	CS203	CSE
CS312	Computer Graphics	3	1	3/ Spr	NA	CSE
CS314	Internet of Things	3	1	3/ Spr	CS305	CSE
CS324	Deep Learning	3	1	3/ Spr	CS303	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
MA234	Introduction to Theoretical and Practical Data Science	4	1	3/ Spr	MA212	MATH
EE326	Digital Image Processing	3	1	3/ Spr	EE205	EE

EE411	Information Theory and Coding	2		4/ Fall	MA212	EE
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
Total		127	37			

Note

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, Multimedia Information Processing).

Table 3: Overview of Practice-based Learning

Program of Intelligence 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
CS203	Data Structures and Algorithm Analysis	3	1	2/ Fall	CS109	CSE
CS307	Principles of Database Systems	3	1	2/ Fall	CS109	CSE
EE205	Signals and Systems	3	1	2/ Fall	MA117	EE
CS219	Advanced Programming	3	1	2 / Fall	CS109	CSE
CS207	Digital Logic	3	1	2/ Fall	NA	CSE
CS208	Algorithm Design and Analysis	3	1	2/ Spr	CS203	CSE
CS202	Computer Organization	3	1	2/ Spr	CS207	CSE
CS306	Data Mining	3	1	2/ Spr	CS203 or CS203B	CSE
CS303	Artificial Intelligence	3	1	3/ Fall	CS203, STA219	CSE
CS405	Machine Learning	3	1	3/ Fall	STA219	CSE
CS321	Group Projects I	2	2	3/ Fall	NA	CSE
EE323	Digital Signal Processing	3	1	3/ Fall	EE205	EE
CS301	Embedded System and Microcomputer Principle	3	1	3/ Fall	CS207	CSE

CS305	Computer Networks	3	1	3/ Fall	CS109	CSE
CS309	Object-oriented Analysis and Design	3	1	3/ Fall	CS203	CSE
CS313	Automated Reasoning	3	1	3/ Fall	CS104	CSE
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, STA219	CSE
CS302	Operating Systems	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
CS304	Software Engineering	3	1	3/ Spr	CS203	CSE
CS312	Computer Graphics	3	1	3/ Spr	NA	CSE
CS314	Internet of Things	3	1	3/ Spr	CS305	CSE
CS324	Deep Learning	3	1	3 / Spr	CS303	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
MA234	Introduction to Theoretical and Practical Data Science	4	1	3 / Spr	MA212	MATH
CS413	Group Projects III	2	2	4/ Fall	NA	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		151	64			

The first year	The second year	The third year	The fourth year
Fall Spring Introduction to Cognitive Science Introduction to Mathematical Logic Introduction to Computer Science A Computer System Design and Applications A	Fall Spring Probability and Statistics for Engineering Discrete Mathematics Data Structures and Algorithm Analysis Algorithm Design and Analysis Principles of Database Systems Computer Organization Digital Logic Data Mining Advanced Programming	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	Fall Spring Software Testing Frontier Seminars in Computer Science and Technology, IV
Major Required Courses	Major Elective Courses	Industrial Practice	Major Practice Courses
		Group Projects I II III	Undergraduate Thesis/Projects

Department of Ocean Science and Engineering

Program of Oceanography for International Students (2024)

I. Introduction

Marine science is based on the basic theories and knowledge of mathematics, physics, chemistry, biology, geology, geophysics and Marine science, learning professional knowledge in specific fields of Marine science, and receiving basic training in Marine investigation, ocean observation, data analysis and research of Marine science problems. Students will master the working methods of a specific professional field of Marine science and have the basic ability to carry out experimental design, data collection, research scientific problems and solve applied problems in a specific professional field of Marine science. At present, with the establishment of national Marine strategy, Marine science has become an important subject direction in our economy and national defense construction.

Academic subject areas: Marine science; Program code:070701

II. Objectives and Learning Outcomes

1. Objectives

This major cultivates high quality science and technology professionals with good ideological and moral quality, high humanistic quality, and international vision. Students will learn the basic energy theory, basic knowledge and basic skills of Marine science in a comprehensive way. Systematically master professional knowledge and special skills in specific fields of Marine science; After graduation, they are qualified for scientific research, teaching, management and technical research and development in Marine science and related fields, and have an international vision of high-quality technical professionals.

2. Learning Outcomes

Graduates should acquire knowledge and abilities in the following aspects:

1. Have scientific spirit, professional spirit and ocean consciousness, have a sense of social responsibility, have the spirit of unity and cooperation and humanities literacy;
2. Master basic theories and basic knowledge in mathematics, physics, chemistry, biology,

geology, geophysics and Marine science (earth system science), master specialized system knowledge in specific fields of Marine science;

3. To master the basic methods of Marine survey, observation and analytical research, as well as the general methods and expertise for carrying out work in specific fields of Marine science;

4. Basic ability to undertake routine Marine surveys and specialized work in specific fields of Marine science;

5. Understand the basic knowledge of relevant disciplines, major academic issues, frontier academic achievements and international academic research trends in specific fields of Marine science;

6. Have the ability to design experimental programs, create experimental conditions, and conduct Marine scientific research by means of observation, simulation, experiment and analysis, and be able to write academic papers scientifically and standardized and participate in academic exchange activities;

7. Familiar with national Marine science and technology policies and international cooperative research management of Marine science, able to participate in Marine investigation and research work of different teams at home and abroad in different sea areas within the framework of relevant policies, laws and regulations such as intellectual property rights, information security and international cooperation agreements;

8. Good quality and ability to receive further education.

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 Science.

3. The minimum credit requirement for graduation: 150 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	3
		Major Core Courses	30
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	18
	Major Elective Courses	Major Elective Courses	20
Total			150
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	MA101a	Mathematical Analysis I	Category A	5	1 Fall		MATH
	MA102a	Mathematical Analysis II		5	1 Spring	MA101a	
	MA117	Calculus I	Category B	4	1 Fall		
	MA127	Calculus II		4	1 Spring	MA117	
	MA118	Advanced calculus II	Category C	4	1 Fall		
	MA128	Advanced calculus II		4	1 Spring	MA118	
	MA107	Advanced Linear Algebra I		4	1 Fall		
	MA113	Linear Algebra		4	1 Spring & Fall		
Physics	PHY101	General Physics I	Category A	5	1 Fall		PHY
	PHY102	General Physics II		5	1 Spring	PHY101	
	PHY105	College Physics I	Category B	4	1 Fall		
	PHY106	College Physics II		4	1 Spring	PHY105	
	PHY104 B	Experiments of Fundamental Physics		2	1-2 Spring & Fall		
Chemistry	CH103	General Chemistry		4	1-2 Spring & Fall		CH
	CH105	College Chemistry		3	1-2 Spring & Fall		
Geoscience + Life Science	EOE100	Introduction to Earth Sciences		3	1-2 Spring & Fall		ESS, OCE, ESE
Computer Programming	CS109	Introduction to Computer Programming		3	1-2 Spring & Fall		CSE
	CS110	Introduction to Java Programming		3	1-2 Spring & Fall		
	CS111	Introduction to C programming		3	1-2 Spring & Fall		
	CS112	Introduction to Python Programming		3	1-2 Spring & Fall		
	CS113	Introduction to MATLAB Programming		3	1-2 Spring & Fall		

Note:

1. For Mathematics, students must select one of the A, B, or C course categories (at least 8 credits) and complete the course Advanced Linear Algebra I or Linear Algebra for 4 credits.
2. For Physics, students must select either course category A or B (at least 8 credits) and complete the course Experiments of Fundamental Physics for 2 credits.
3. For Chemistry, students must choose one of the listed courses to receive at least 3 credits.
4. For Geoscience + Life science, students must choose one of the listed courses to receive 3 credits.
5. For Computer Programming, students must choose one of the listed courses to receive at least 3 credits.

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	EOE100	Introduction to Earth Sciences	
Declare major at the end of the second academic year	EOE100	Introduction to Earth Sciences	

Note:

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.
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.
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).
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).

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Marine science

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	OCE100	Introduction to Marine Science	3	0	1 Fall/Spring		OCE
	Total		3	0			
Major Core Courses	OCE203	Marine Biology	3	0	2/Spring		OCE
	OCE305	Physical Oceanography	3	0	2/Spring		OCE
	OCE301	Introduction to Atmospheric Science	3	0	3/Fall		OCE
	OCE306	Marine Geology	3	0	3/Fall		OCE
	OCE307	Chemical Oceanography	3	0	3/Fall		OCE
	OCE401	Marine Geophysics	3	0	3/Fall	OCE100	OCE
	OCE304	Introduction to Computational Oceanography	3	0	3/Spring		OCE
	OCE308	Microbial Oceanography	3	0	3/Spring		OCE
	OCE340	Multidimensional Data Analysis in Geosciences	3	0	3/Fall	MA113	OCE
	OCE423	Biological Isotopes	3	0	4/Fall		OCE
	Total		30	0			
Practice-based Courses	OCE470	Geology Field Trip	2	2	2/Summer		OCE
	OCE471	Marine Cruises	2	2	3/Summer	OCE100	OCE
	OCE480	Projects of Science and Technology Innovation	2	2	4/Fall		OCE
	OCE490	Thesis (Graduation Project)	12	12	4/Spring		OCE
	Total		18	18			
Total			51	18			

Table 2: Major Elective Courses

Program of Marine science

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Marine science course						
OCE210	Intelligent Ocean Exploration	3	0	2/Spring		OCE
OCE313	Frontiers in Marine Geodynamics	1	0	3/Fall		OCE
OCE412	History of Ocean Sciences	2	0	4/Fall		OCE
Marine geophysics courses						
ESS201	Introduction to Earth and Space Sciences	3	0	2/Fall		ESS
PHY203-15	Mathematical Methods in Physics	4	0	2/Fall	MA102B MA107A PHY105B	PHY
ESS205	Computational Methods	3	0	2/Spring		ESS
EE205	Signals and Systems	3	1	3/Fall		EE
EE323	Digital Signal Processing	3	1	3/Fall	EE205	EE
ESS308	Fundamentals of Geophysics I (Seismology)	3	0	3/Fall	MA101B/MA107A	ESS
ESS309	Fundamentals of Geophysics II (Geomagnetism, Geoelectricity, Geothermics and Gravity)	4	0	3/Fall	MA101B	ESS
ESS310	Geophysical Experiments	3	1	3/Spring	ESS308/ESS309	ESS
ESS421	Gravity and Earth tide	3	0	3/Spring	MA101B/MA107A	ESS
OCE402	Fundamental of Marine Seismology Observations	3	0	4/Fall	OCE304	OCE
ESS209	Principles of Geophysics	3	0	2/Spring		ESS
ESS211	Fundamentals of Planetary Science	3	0	2/Spring		ESS
ESS213	Continuum Mechanics	3	0	2/Spring		ESS
ESS214	Principles of Applied Geophysics	3	0	2/Spring		ESS
PHY204	Thermodynamics and Statistical Physics I	3	0	2/Spring	PHY106	PHY
ESS313	Introduction to Space Physics	3	0	3/Fall	PHY203-15	ESS
ESS317	Fundamentals of Inverse Theory in Geophysics	3	0	3/Fall		ESS
Marine geology courses						
OCE202	Earth System History	3	0	1/Spring		OCE
OCE105	Principle of coastal landform	3	0	2/Fall		OCE

ESS102	Principle of Geological	3	0	2/Fall		ESS
ESE329	Principles of Remote Sensing	3	0	2/Spring	MA102B PHY105B	ESE
OCE309	Paleomagnetism and Environmental Magnetism	3	0	3/Fall		OCE
ESE317	Application of GIS & RS	3	0.5	3/Fall		ESE
ESS406	Geochemistry	2	0	4/Fall		ESS
OCE407	Mineralogy and Petrology	2	0	3/Spring		OCE
OCE303	Physical Geology	3	0	2/Fall		OCE
Marine microbiology courses						
BIO104	General Biology Laboratory	2	2	1/Spring	BIO102B or BIO103	BIO
OCE205	Biology of the Marine Environment Lab	2	2	2/Spring		OCE
OCE472	Field Trip of Life in Extreme Environments	2	2	2/Summer	OCE308 or OCE411	OCE
OCE475	Field Trip of Microbial Oceanography	2	2	2/Summer		OCE
BIO309	Computational Biology	3	1	3/Fall		BIO
OCE318	Marine Molecular Biology Lab	2	2	3/Fall		OCE
OCE411	Life in Extreme Environments	2	0	3/Fall		OCE
OCE316	Marine Microbiology Laboratory	2	2	3/Spring	OCE308	OCE
OCE330	Evolution	3	0	3/Spring		OCE
BIO306	Bioinformatics	4	2	3/Spring	BIO309	BIO
OCE409	Marine Organic Biogeochemistry	3	0	4/Fall		OCE
OCE410	Geomicrobiology	3	0	4/Fall		OCE
BIO203	Microbiology	3	0	2/Fall		BIO
Marine chemistry courses						
CH102-17	General Chemistry Laboratory A	1.5	1.5	1/Spring	CH101A	CH
CH203	Organic Chemistry I	4	0	2/Fall	CH101A	CH
CH208	Organic Chemistry Laboratory	2	2	2/Spring	CH102-17/CH203	CH
ESE206	Environmental Chemistry	3	0	2/Spring	CH101B	ESE
ESE212	Environment Monitoring	2	0	2/Spring	CH101B PHY105B	ESE
ESE214	Environment Monitoring Laboratory	1	1	2/Spring	CH102-17	ESE
OCE311	Seawater Analysis*	3	0	3/Spring		OCE
OCE312	Seawater Analysis Laboratory**	2	2	3/Spring	OCE307	OCE
CH218	Analytical Chemistry II	3	0	4/Spring	CH216/CH217	CH
ESE336	Environmental analytical chemistry	3	0	2/Fall		ESE
CH219	Analytical Chemistry Laboratory II	2	2	4/Spring	CH218	CH
Physical Oceanography courses						

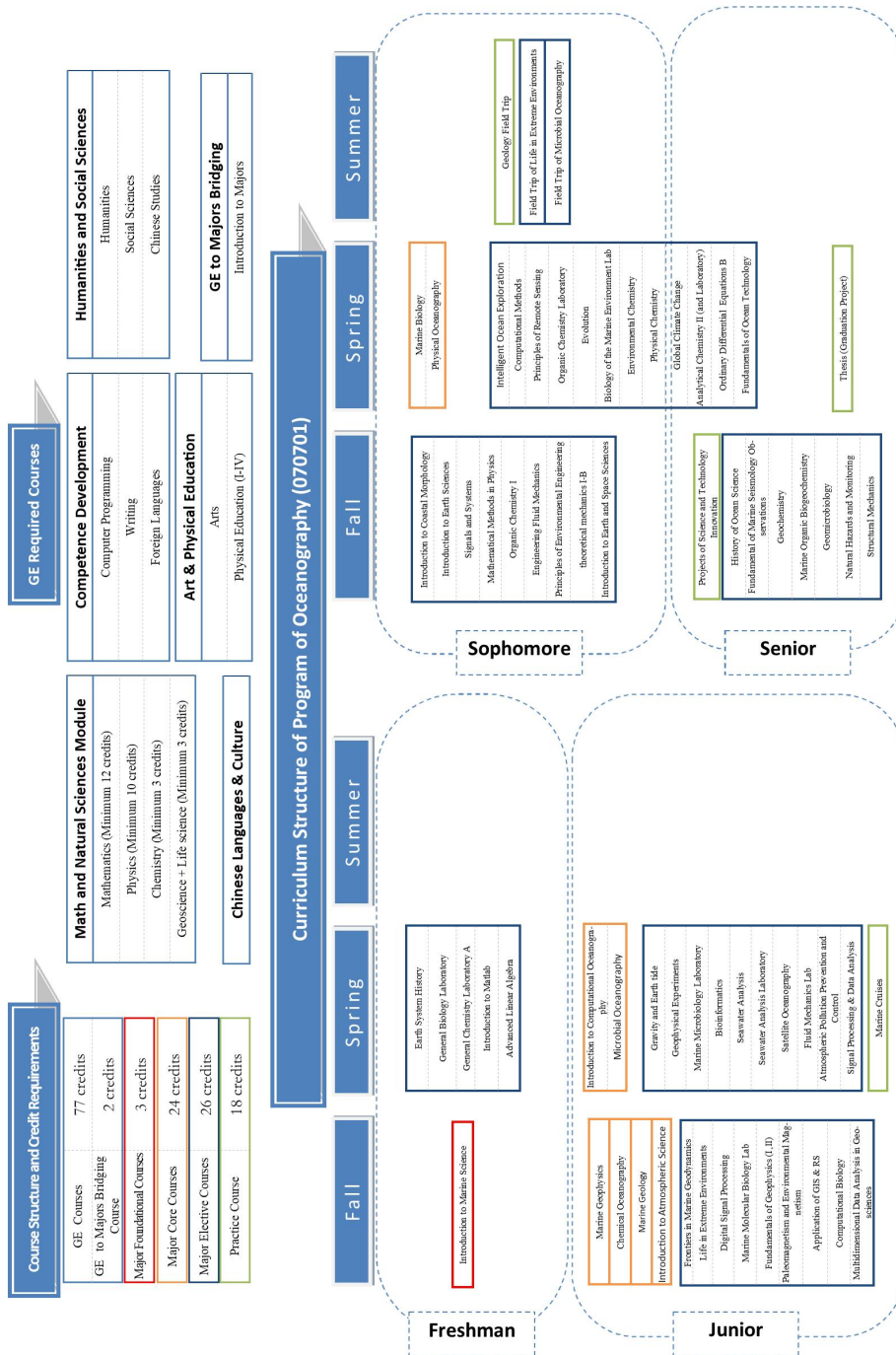
ME112	Introduction to Matlab	2	1	1/Spring		ME
MAE207	Engineering Fluid Mechanics	3	0	2/Fall	MA102B	MAE
ESE204	Principles of Environmental Engineering	2	0	2/Fall	CH101A PHY105B	ESE
ESE319	Global Climate Change	3	0	2/Spring		ESE
MSE202	Physical Chemistry	3	0	2/Spring	MA102B/CH101A	MSE
ESE205	Fundamentals of Physical Chemistry	3	0	2/Spring	CH103 MA127	ESE
MA201b	Ordinary Differential Equations B	4	0	2/Spring	MA102B	MATH
OCE314	Satellite Oceanography	3	0	3/Spring		OCE
MAE302-16	Fluid Mechanics Lab	3	3	3/Spring	MAE207 or MAE303	MAE
ESE304	Atmospheric Pollution Prevention and Control	3	0	3/Spring	ESE206/MSE202	ESE
ESS405	Signal Processing and Data Processing	3	0	3/Spring	MA101B/MA107A	ESS
OCE406	Natural Hazards and Monitoring	2	0	4/Fall		OCE
Marine Engineering courses						
MA109	Advanced Linear Algebra	4	0	1/Spring	MA107B	MATH
MAE203B	Engineering Mechanics I – Statics and Dynamics	3	0	2/Fall	MA107A	MAE
OCE310	Fundamentals of Ocean Technology	3	0	2/Spring		OCE
Big data courses						
MA215 / STA203	Probability Theory / Foundation of Probability Theory	3	0	2 Fall	MA102a / MA127 & MA113	MATH/STA
MA204	Mathematical Statistics	3	0	2 Spring/3 Fall	MA215/MA212	STA
STA201	Operational Research and Optimization	3	0	2 Spring	MA107 / MA113	STA
CS203B	Data Structures and Algorithm Analysis B	3	1	2 Fall	CS102A	CSE
CS201/ MA205	Discrete mathematics	3		2 Spring	MA127/MA113	CS/MATH
MA203a /MA213-16	Mathematical Analysis III / Mathematical Analysis	5		2 Fall	MA102a/MA127	MATH
STA321	Distributed storage and parallel computing	3	1	3 Fall	CS102/CS203	STA
CS303	Artificial intelligence	3	1	3 Fall	CS102A/ CS203B/MA212	CSE
MA329	Statistical Linear Models	3	0	3 Fall	MA204 / MA212	STA
MA304	Multivariate Statistical Analysis	3	0	3 Spring	MA204 / MA212	STA
STA302	Big data analysis software and applications	3	1	3 Spring	CS102/CS203	STA
Computer courses						
CS203	Data Structures and Algorithm Analysis	3	1	2/Fall	CS109	CSE

CS207	Digital Logic	3	1	2/Fall		CSE
MA212	Probability and Statistics	3		2/Fall	MA102a or MA127 or MA102B	MATH
CS307	Principles of Database Systems	3	1	2/Fall	CS109	CSE
CS201	Discrete Mathematics	3		2/Spring	MA127/MA113	CSE
CS202	Computer Organization	3	1	2/Spring	CS207	CSE
CS208	Algorithm Design and Analysis	3	1	2/Spring	CS109, CS203	CSE
CS305	Computer Networks	3	1	3 / Fall	CS109	CSE
CS302	Operating Systems	3	1	3 / Spring	CS109/CS203	CSE
CS304	Software Engineering	3	1	3 / Spring	CS109/CS203	CSE
CS321	Group Projects I	2	2	3 / Full		CSE
CS326	Group Projects II	2	2	3 / Spring		CSE
CS413	Group Projects III	2	2	4 / Fall		CSE
Biomedical courses						
MED105	Medical Organic Chemistry	4		2/Fall		MED
MED221	Molecular Microbiology	3		2/Fall		MED
MED219	Advanced Molecular Biology	3		2/Fall		MED
MED205	Medical Cell Biology	3		2/Spring		MED
MED203	Medical Biochemistry	3		2/Spring		MED
MED405	Medical Immunology	3		3/Fall		MED
MED307	Pathology	3	1	3/Spring	MED306	MED
MED404	Medical Genetics	3		3/Spring		MED
MED206	Basic Biomedical Laboratory	2	2	2/Spring		MED
MED216	Medical Microbiology Laboratory	1	1	2/Spring		MED
Total		286.5	53			
NOTE: Minimum requirement 26 credits. *Note: The credits CH216 Analytical Chemistry I can replace the credits of OCE311 Seawater Analysis. **Note: The credits CH217 Analytical Chemistry Laboratory I can replace the credits of OCE312 Seawater Analysis Laboratory.						

Table 3: Overview of Practice-based Learning**Program of Marine science**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
BIO104	General Biology Laboratory	2	2	1/Spring	BIO102B/BIO103	BIO
ME112	Introduction to Matlab	2	1	1/Spring		ME
CH102-17	General Chemistry Laboratory A	1.5	1.5	1/Spring	CH101A	CH
OCE205	Biology of the Marine Environment Lab	2	2	2/Spring		OCE
CH208	Organic Chemistry Laboratory	2	2	2/Spring	CH 102-17 CH203	CH
ESE214	Environment Monitoring Laboratory	1	1	2/Spring	CH102-17	ESE
OCE470	Geology Field Trip	2	2	2/Summer	OCE202	OCE
OCE472	Field Trip of Life in Extreme Environments	2	2	2/Summer	OCE308 or OCE411	OCE
OCE475	Field Trip of Microbial Oceanography	2	2	2/Summer		OCE
OCE318	Marine Molecular Biology Lab	2	2	3/Fall		OCE
EE205	Signals and Systems	3	1	3/Fall		EE
EE323	Digital Signal Processing	3	1	3/Fall	EE205	EE
ESE317	Application of GIS & RS	3	0.5	3/Fall	CS102B/ESE201	ESE
BIO309	Computational Biology	3	1	3/Fall		BIO
OCE316	Marine Microbiology Laboratory	2	2	3/Spring	OCE308	OCE
OCE312	Seawater Analysis Laboratory	2	2	3/Spring	OCE311	OCE
CH219	Analytical Chemistry Laboratory II	2	2	3/Spring	CH218	CH
ESS310	Geophysical Experiments	3	1	3/Spring	ESS308 ESS309	ESS
MAE302-16	Fluid Mechanics Lab	3	3	3/Spring	MAE207 or MAE303	MAE
CS321	Group Projects I	2	2	3 / Full		CSE
CS326	Group Projects II	2	2	3 / Spring		CSE
CS413	Group Projects III	2	2	4 / Fall		CSE
MED206	Basic Biomedical Laboratory	2	2	2/Spring		MED
MED216	Medical Microbiology Laboratory	1	1	2/Spring		MED
OCE471	Marine Cruises	2	2	3/Summer	OCE100	OCE
OCE480	Projects of Science and Technology Innovation	2	2	4/Fall		OCE
OCE490	Thesis (Graduation Project)	12	12	4/Spring		OCE
Total		67.5	56			

Curriculum Structure of Oceanography



Note: Except for courses of *Marine science*, *Marine geophysics*, *Marine geology*, *Marine microbiology*, *Marine chemistry*, *Physical Oceanography* and *Marine Engineering*, 2023 undergraduate students can also choose courses of *Big data*, *Computer and Biomedical*.

Department of Ocean Science and Engineering

Program of Offshore Engineering and Technology for International Students (2024)

I. Introduction

Offshore Engineering and Technology is an emerging comprehensive discipline that is to effectively develop and utilize marine resources. It provides support for the marine engineering facilities survey, design, construction, offshore installation and maintenance. The subject tackles the talent shortage in high-tech offshore engineering industry, has a vital impact on advancing the Marine Power Strategy and the Marine Power Construction.

Under the guidance of the "New Engineering" construction, this major is characterized by multi-discipline cross-integration, combination of teaching and practice and comprehensive curriculum. It highlights the cultivation of independent thinking, creative spirit and the practical ability of students with higher international competitiveness.

Academic subject areas: Ocean engineering (0819)

Program code: Offshore Engineering and Technology (081902T)

II. Objectives and Learning Outcomes

1. Objectives

Our program aims to train the students with good moral and humanism, and systematically master specific professional knowledge and special skills of offshore engineering and technology. When graduating, students will gain special high-quality scientific and technological talents with international vision and necessary knowledge of ocean engineering, and have the ability to engage in scientific research, management, design, construction and technology research and development in ocean engineering, marine high-end technology and related fields.

2. Learning Outcomes

1. Master the relevant knowledge of mathematics, natural sciences, humanities and social sciences

required for program demonstration, design, construction and engineering issues research;

2. Master the professional knowledge and skills required for offshore engineering and technology program demonstration, design, construction and engineering issues research. Including knowledge of mechanics related ocean engineering, knowledge of engineering materials suitable for the needs and development of emerging ocean engineering, and knowledge of processing, assembly, quality control and drawing;

3. Master the engineering technology theories and methods in the field of ocean engineering.

Including ocean engineering design, construction, development and frontier fields, related knowledge of new materials, processes and equipment. And have the ability to learn and master relevant regulations in the field of ocean engineering, have a broad and in-depth understanding of the cross-technology in ocean engineering, have a unique view of modern social issues, the relationship between engineering and the world and society;

4. Have knowledge of foreign languages and international engineering management suitable for the international development of modern ocean engineering. Including mastering at least 1 foreign language, being familiar with international project management knowledge, etc;

5. Have the ability to learn and accumulate knowledge suitable for the development of ocean engineering. To operate equipment proficiently and improve numerical simulation skills. To acquire knowledge independently, pursue lifelong learning;

6. Have the ability to engage in the design and construction of large marine projects and solve practical engineering problems. To plan systematically, analyze comprehensively, solve practical engineering problems effectively, and work properly and orderly under the ocean engineering industry rules and relevant laws and regulations;

7. Have the ability to manage and implement ocean engineering projects. Including integrate necessary finance, staff and enforce; adapt to changes in technology and management; cope with emergencies in engineering projects design, organization, coordination, and management;

8. Being a critical and creative thinker suitable for the development of ocean engineering. Introduce or use new ideas to solve ocean engineering problems with critical thinking and analytical skills;

9. Have good professional ethics, physical and psychological quality that are suitable for the needs of ocean engineering;

10. Be good at expression and communication with some interpersonal and leadership skills.

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 Bachelor of Engineering

3. The minimum credit requirement for graduation: 156 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	25
		Major Core Courses	20
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	20
	Major Elective Courses	Major Elective Courses	12
Total			156

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	MA101A	Mathematical Analysis I	A	5	1/Fall		MATH
	MA102A	Mathematical Analysis II		5	1/Spr	MA101A	
	MA117	Calculus I	B	4	1/Fall		
	MA127	Calculus II		4	1/Spr	MA101B	
	MA107	Advanced Algebra I		4	1/Fall		
	MA113	Linear Algebra A		4	1/Spr/Fall		
Physics	PHY101	General Physics I	A	5	1/Fall		PHY
	PHY102	General Physics II		5	1/Spr	PHY103B	
	PHY105	College Physics I	B	4	1/Fall		
	PHY106	College Physics II		4	1/Spr	PHY105	
	PHY104B	Experiments of Fundamental Physics		2	1-2 /Spr/Fall		
Chemistry	CH103	General Chemistry		4	1-2 /Spr/Fall		CHEM
	CH105	Chemistry: the Central Science		3	1-2 /Spr/Fall		
Geoscience + Life Science	BIO102B	Introduction to Life Science		3	1-2 /Spr/Fall		BIO
	BIO103	Principles of Biology		3	1-2 /Spr/Fall		
	EOE100	Introduction to Earth Sciences		3	1-2 /Spr/Fall		ESS.OCE. ESE
Computer Programming	CS111	Introduction to C Programming		3	1-2 /Spr/Fall		CSE
	CS112	Introduction to Python Programming		3	1-2 /Spr/Fall		
	CS109	Introduction to Computer Programming		3	1-2 /Spr/Fall		

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA101a\M A117	Mathematical Analysis I/ Calculus I	
	MA102a\M A127	Mathematical Analysis II / Calculus II	MA101a\MA117
	PHY101\PH Y105	General Physics I/ College Physics I	
	PHY102\PH Y106	General Physics II / College Physics II	PHY101\PHY105
Declare major at the end of the second academic year	MA101a\M A117	Mathematical Analysis I/ Calculus I	
	MA102a\M A127	Mathematical Analysis II / Calculus II	MA101a\MA117
	PHY101\PH Y105	General Physics I/ College Physics I	
	PHY102\PH Y106	General Physics II / College Physics II	PHY101\PHY105
	MA113	Linear Algebra	
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Offshore Engineering and Technology

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	ME102	CAD and Engineering Drawing	3	2	1/Fall		ME
	EE271	Artificial Intelligence and Machine Learning	3		2/ Fall		EE
	OCE214	Engineering Mathematics and Numerical Computation	4		2/ Fall		OCE
	OCE215	Engineering Mechanics	4		2/ Fall		OCE
	OCE216	Ocean Environment and Hazards	2		2/ Fall		OCE
	OCE217	Fluid Mechanics	3		2/Spr		OCE
	OCE209	Soil Mechanics and Foundation	3		2/ Spr		OCE
	OCE323	Structure Analysis	3		3/ Fall		OCE
	Total		25	2			
Major Core Courses	OCE219	Engineering Materials and Corrosion	3		2/ Spr		OCE
	OCE341	Ocean Engineering Design	3		3/ Fall		OCE
	OCE342	Project Management and Smart Construction	3		3/ Fall		OCE
	OCE343	Offshore Technology	3		3/ Fall		OCE
	OCE344	Offshore Platform and Underwater Production System	3		3/ Spr		OCE
	OCE345	Offshore Resource Development Technology	2		3/ Spr		OCE
	OCE328	Hydrodynamics Lab	1	1	3/ Fall 3/ Spr		OCE
	OCE324	Ocean Engineering Materials and Structures Lab Sessions	1	1	2/3/ Spr		OCE
	OCE327	Soil Mechanics Lab	1	1	3/ Fall	OCE209	OCE
	Total		20	3			
Practice-based Courses	OCE473	Production Practice	2	2	2/Sum		OCE
	OCE471	Marine Cruises	2	2	3/Sum		OCE
	OCE474	Fieldwork	2	2	3/Sum		OCE
	OCE480	Projects of Science and Technology Innovation	2	2	4/ Fall		OCE
	OCE490	Degree Thesis (Design)	12	12	4/Spr		OCE
	Total		20	20			
Total			65	25			

Table 2: Major Elective Courses

Program of Offshore Engineering and Technology

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
OCE100	Principles of Oceanography	3		Elect One		OCE
OCE305	Physical Oceanography	3				OCE
OCE304	Introduction to Computational Oceanography	3			CS102B	OCE
OCE201	Introduction to Oceanography	3				OCE
MAE304	Elasticity	4		Elect One	MAE203 MAE202	MAE
MAE409	Finite Element Method*	3				MAE
MAE403	Computational Fluid Dynamics	3			MAE303/ MAE207	MAE
OCE346	System Dynamics	3		Elect One		OCE
OCE347	Engineering Sustainability and Climate	2				OCE
OCE348	Offshore Structure Dynamics	3				OCE
ME307	Fundamentals of Control Engineering	3	0.5	Elect One	EE104	ME
ME306	Fundamentals of Robotics	3	1			ME
ESE317	Application of GIS & RS	3	0.5		CS102B ESE201	ESE
STA217	Data Science	3			MA102a/ MA127	STA
STA201	Planning and Optimization	3			MA107/M A113	STA
Total		45	2			

Note:
One takes at least 12 credits among which 8 credits are from OCE. Similar courses might be allowed to full fill the credit requirement.
*Note: The credits of ME314 can replace the credits of MAE409.

Table 3: Overview of Practice-based Learning**Program of Offshore Engineering and Technology**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
ME102	CAD and Engineering Drawing	3	2	1/Fall		ME
OCE324	Ocean Engineering Materials and Structures Lab Sessions	1	1	2/ Spr	OCE322	OCE
OCE473	Production Practice	2	2	2/ Spr		OCE
OCE327	Soil Mechanics Lab	1	1	3/ Fall	OCE209	OCE
OCE328	Hydrodynamics Lab	1	1	3/ Spr		OCE
OCE471	Marine Cruises	2	2	3/Sum		OCE
OCE474	Fieldwork	2	2	3/Sum		OCE
OCE480	Projects of Science and Technology Innovation	2	2	4/ Fall		OCE
OCE490	Degree Thesis (Design)	12	12	4/Spr		OCE
Total		26	25			

Curriculum Structure of Offshore Engineering and Technology

Year One		Year Two			Year Three			Year Four	
	Spr/Fall	Fall	Spr	Sum	Fall	Spr	Sum	Fall	Spr
	Introduction to Ocean Engineering	Engineering Mechanics Engineering Mathematics and Numerical Computation Ocean Environment and Hazards Artificial Intelligence and Machine Learning			Structure Analysis Ocean Engineering Design Project Management and Smart Construction Offshore Technology Soil Mechanics Lab	Offshore Platform and Underwater Production System Offshore Resource Development Technology Hydrodynamics Lab		System Dynamics Offshore Structure Dynamics Engineering Sustainability and Climate Projects of Science and Technology Innovation	Degree Thesis (Design)
	CAD and Engineering Drawing								
	Major Requirement		Fluid Mechanics Soil Mechanics and Foundation Engineering Materials and Corrosion Ocean Engineering Materials and Structures Lab						
	Practice-based Learning			Production Practice Geology Field Trip					
	Elective Courses						Fieldwork		

Department of Biomedical Engineering

Program of Biomedical Engineering for International Students

(2024)

I. Introduction

The department of biomedical engineering was established in June 2016. The department currently has 23 core faculty members. Research areas in the department include mechanomedicine, wearable devices and wireless health monitoring, de novo regenerative engineering, multiscale and multimodal biomedical imaging, computational medicine for big data and health informatics, biomedical MEMS.

The department of biomedical engineering receives strong support from the department of biomedical engineering at Columbia University and has formed its own undergraduate curricula based on the BME curricula of Columbia University. The major core courses and the capstone course ‘biomedical engineering design’ were introduced and adapted.

The SUSTech Biomedical Engineering programme train students in the field of engineering and applied sciences to address problems in biology, medicine and life sciences. This skill is crucial for the students to better understand the living systems and their behavior for the development of biomedical systems and devices. Through complex and sophisticated analysis, modern engineering adapts data acquisition and variable measurements to resolve questions that are currently unanswered. These analysis includes simulation and systems development within individual cells, organs, complex organisms and populative studies. The emphasis of the BME programme is to endow students with the understanding of basic engineering science and applied engineering (in both the physical and biological fields). The BME programme aspires to provide students with professional training in biomedical engineering, preparing them for employment or post-graduate studies in the relevant discipline.

Academic subject areas: Biomedical Engineering

Program code: 082601

II. Objectives and Learning Outcomes

1. Objectives

- (1) Professional employment in areas such as the medical device industry, engineering consulting, and biotechnology;
- (2) Graduate studies in biomedical engineering or related fields;
- (3) Attendance at medical, dental, or other professional schools.

2. Learning Outcomes

- a) An ability to apply knowledge of mathematics, science, and engineering;
- b) An ability to design and conduct experiments, as well as to analyze and interpret data;
- c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- d) An ability to function on multidisciplinary teams;
- e) An ability to identify, formulate, and solve engineering problems;
- f) An understanding of professional and ethical responsibility;
- g) An ability to communicate effectively;
- h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- i) A recognition of the need for, and an ability to engage in life-long learning;
- j) A knowledge of contemporary issue;
- k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice;
- l) An understanding of biology and physiology;
- m) The capability to apply advanced mathematics (including differential equations and statistics), science, and engineering, to solve the problems at the interface of engineering and biology;
- n) The ability to make measurements on and interpret data from living systems, addressing the problems associated with the interaction between living and nonliving materials and systems.

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: 155 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	15
		Major Core Courses	23
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	16
	Major Elective Courses	Major Elective Courses	22 (including a minimum of 6 lab credits)
Total			155
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/ MA101a	Calculus I/ Mathematical Analysis I	4/5	1 Fall	None	Department of Mathematics
	MA127/ MA102a	Calculus II/ Mathematical Analysis II	4/5	1 Spring	Calculus I/Mathematical Analysis I	
	MA113/ MA107	Linear Algebra/ Advanced Linear Algebra I	4	1 Spring & Fall	None	
Physics	PHY105/ PHY101	College Physics I/ General Physics I	4/5	1 Fall	None	Department of Physics
	PHY106/ PHY102	College Physics II/ General Physics II	4/5	1 Spring	College Physics I/General Physics I	
	PHY104 B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	
Chemistry	CH105/ CH103	Chemistry: The Central Science/ General Chemistry	3/4	1-2 Spring & Fall	None	Department of Chemistry
Geoscience + Life Science	BIO103	Principles of Biology	3	1-2 Spring & Fall	None	Department of Biology
Computer Programming ①	CS109	Introduction to Computer Programming	3	1-2 Spring & Fall	None	Department of Computer Science and Engineering
	CS110	Introduction to Java Programming	3	1-2 Spring & Fall	None	
	CS111	Introduction to C programming	3	1-2 Spring & Fall	None	
	CS112	Introduction to Python Programming Python	3	1-2 Spring & Fall	None	
	CS113	Introduction to Matlab Programming	3	1-2 Spring & Fall	None	
	①NOTES: You are required to complete and pass at least 1 course in the part of Computer Programming.					

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA117/MA101a	Calculus I/ Mathematical Analysis I	None
	MA127/MA102a	Calculus II/ Mathematical Analysis II	MA117/MA101a
	MA113/MA107	Linear Algebra/ Advanced Linear Algebra I	None
	PHY105/PHY101	College Physics I/ General Physics I	None
	PHY106/PHY102	College Physics II/ General Physics II	PHY105/PHY102
	CH105/CH103	Chemistry: The Central Science/ General Chemistry	None
		Computer Programming ^①	None
	BIO103	Principles of Biology	None
	PHY104B	Experiments of Fundamental Physics	None
	Notes: There are 9 courses in the list of Pre-requisites courses at the end of First Year and you are required to complete and pass at least 4 courses of them. ① For the Computer Programming, you are required to complete and pass at least 1 course.		
Declare major at the end of the second academic year	MA117/MA101a	Calculus I/ Mathematical Analysis I	None
	MA127/MA102a	Calculus II/ Mathematical Analysis II	MA117/MA101a
	MA113/MA107	Linear Algebra/ Advanced Linear Algebra I	None
	PHY105/PHY101	College Physics I/ General Physics I	None
	PHY106/PHY102	College Physics II/ General Physics II	PHY105/PHY102
	CH105/CH103	Chemistry: The Central Science/ General Chemistry	None
		Computer Programming ^①	None
	BIO103	Principles of Biology	None
	PHY104B	Experiments of Fundamental Physics	None
	Notes: There are 9 courses in the list of Pre-requisites courses at the end of Second Year and you are required to complete and pass at least 7 courses of them. ① For the Computer Programming, you are required to complete and pass at least 1 course.		
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Biomedical Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	BMEB111	Principles of Electric Circuits	3		1/Spring & Fall		BME
	EE205	Signals and Systems	3	1	2/Fall	MA117	EE
	BMEB217	Fundamentals of Engineering Mechanics	3		2/Fall		BME
	BMEB214	Fundamentals of Biomedical Materials	3		2/Spring & Fall		BME
	BMEB218	Molecular Cell Biology ^①	3		2/Fall		BME
	Total		15	1			
Major Core Courses	BMEB315	Biomedical Optics	2		2/Spring		BME
	BMEB311	Quantitative Physiology I	3		3/Fall		BME
	BMEB318	Biomechanics	3		3/Fall		BME
	BMEB317	Principles of Medical Imaging Systems	3		3/Fall	BMEB111	BME
	BMEB321	Biomedical Engineering Lab I	3	3	3/Fall		BME
	BMEB312	Quantitative Physiology II	3		3/Spring	BMEB311	BME
	BMEB319	Biomaterials and Tissue Engineering	3		3/Spring		BME
	BMEB322	Biomedical Engineering Lab II	3	3	3/Spring		BME
	Total		23	6			
Practice-based Courses	BMEB121*	Projects of Science and Technology Innovation	2	2	Start from 1 Spring		BME
	BMEB470	Professional Practice	2	2	Summer		BME
	BMEB491	Degree Thesis (Design) ^②	12	12	4/Spring		BME
	Total		16	16			
Total			54	23			
Note: ① Students who have completed BIO206 are not required to take the BMEB218. ② Students who have completed Comprehensive Design I&II are not required to take the BMEB491.							

Table 2: Major Elective Courses

Program of Biomedical Engineering

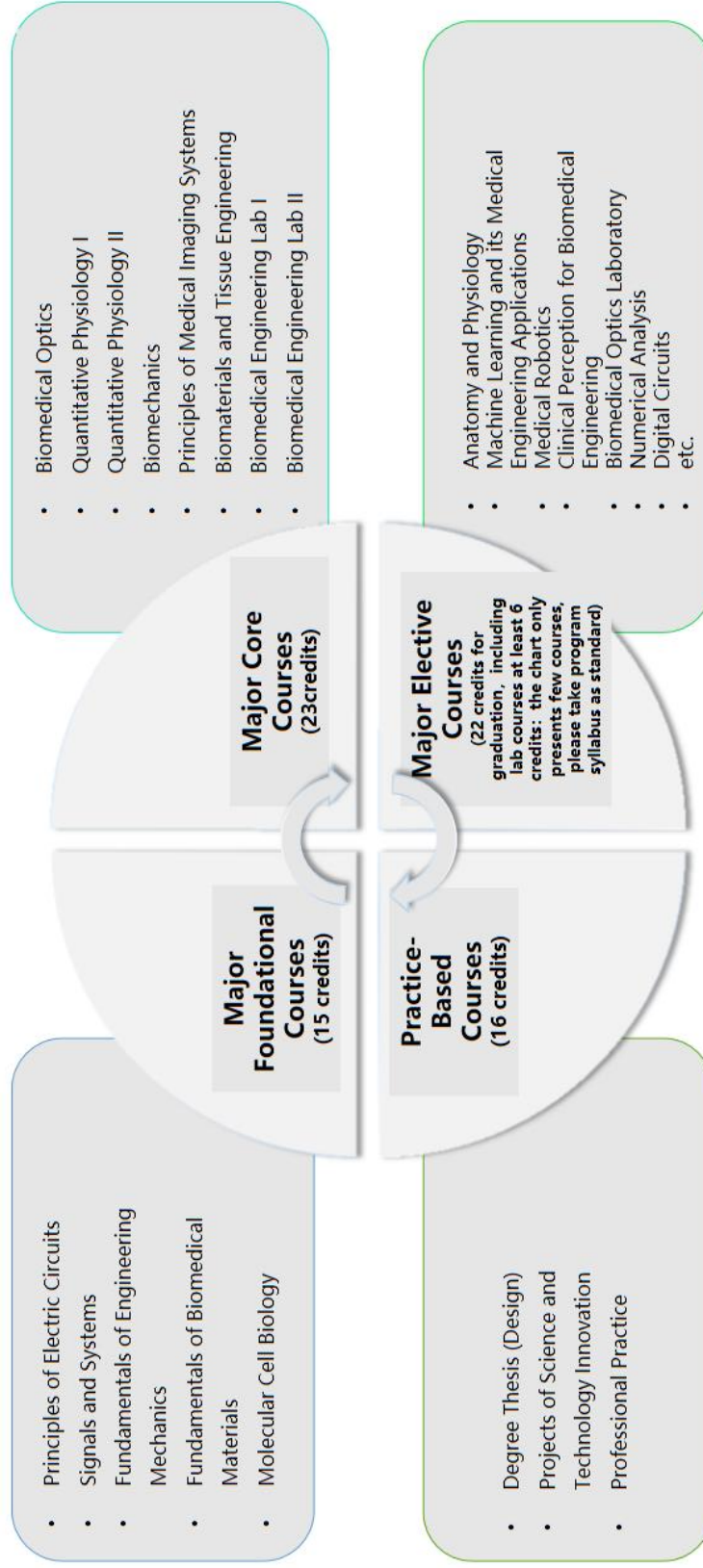
Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
BMEB211	Introduction to Nanobiomedicine	3		1/Spring		BME
BMEB213	Medical Materials and Devices	3		2/Fall		
BMEB324	Biomedical Optics Laboratory	2	2	2/Spring	BMEB315	
BMEB215	Machine Learning and its Medical Engineering Applications	3		2/Spring	MA113, MA212	
BMEB216	Anatomy and Physiology	3		2/Spring		
BMEB326	Clinical Perception for Biomedical Engineering I	2		2/Spring		
BMEB327	Clinical Perception for Biomedical Engineering II	2	2	2/Summer	BMEB326	
BMEB316	Medical Image Processing	3	1	3/Fall		
BMEB333	Neural Engineering and Brain-computer Interface	3		3/Fall	MA113	
BMEB325	Medical Imaging Systems Laboratory	2	2	3/Spring	BMEB317	
BMEB334	Biomaterials and Tissue Engineering Laboratory	2	2	3/ Fall		
BMEB330	Medical Robotics	3		3/Spring	MA113	
BMEB331	Medical Big Data	3		3/Spring	MA127 MA113 MA212	
BMEB332	Intelligent Sensing Technology	3		3/Spring		
EE202-17	Digital Circuits	3		2/Spring	PHY105	EE
EE202-17L	Digital Circuits Laboratory	1	1	2/Spring	EE202-17	
EE323	Digital Signal Processing	3	1	3/Fall	EE205	
EE303	Fundamentals of Optoelectronic Technology	3	1	3/Fall	PHY105	
EE306	Introduction to MEMS	3	1	3/Spring	PHY105	
EE419	Biosensors	3	1	4/Fall		
EEE5011	BioMEMS and Lab-on-a-Chip	3		4/Fall		
BIO104	General Biology Laboratory	2	2	1Spring	BIO103	BIO
BIO320	Molecular Biology	3		2/Fall	BIO103	
BIO201	Biochemistry (Macromolecules)	3		2/Fall	BIO103, CH103	
BIO222	Biochemistry and Molecular Biology Laboratory	2	2	2/Spring	BIO201, BIO104	
BIO202	Biochemistry II (metabolism)	3		2/Spring	BIO201	
BIO203	Microbiology	3		2/Spring		
BIO208	Cell biology laboratory	2	2	2/Spring	BIO206-15	
BIO304	Systems Biology	3		3/Spring	BIO103, MA212	
BIO310	Neurobiology	3		3/Spring	BIO201	
BIO332	Stem Cell and Regenerative	2		3/Spring	BIO206-15	

	Biology					
BIO306	Bioinformatics	4	2	3/Spring	BIO309	
BIO309	Computational Biology	3	1	3/Spring		
BIO405	Immunology	3		4/Fall	BIO206-15	
CS203B	Data Structures and Algorithm Analysis B	3	1	2/Fall	CS109	
CS202	Computer Organization	3	1	2/Spring	EE202-17 EE202-17L CS207	CS
CS207	Digital Logic	3	1	2/Spring		
CS301	Embedded System and Microcomputer Principle	3	1	3/Fall	EE202-17 EE202-17L CS207	
MED306	Histology and Embryology	3	1	3/Fall		MED
MED309	Medical Neurobiology	3		3/Fall		
MA212	Probability and Statistics	3		2/Spring	MA127	MA
MA305	Numerical Analysis	3		3/Fall	MA203a or MA213	
ME102	CAD and Engineering Drawing	3	1.5	1/Fall		ME
CH216	Analytical Chemistry I	3		2/Fall	CH101	CH
Total		122	29.5			
Note: (1) A minimum of 22 credits are required from Major Elective Courses (including a minimum of 6 lab credits). (2) If students have completed the part of Introduction to Majors and have more credits, you can use the course of "Introduction to Biomedical Engineering" to exchange the major elective credits.						

Table 3: Overview of Practice-based Learning**Program of Biomedical Engineering**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
BMEB121*	Projects of Science and Technology Innovation	2	2	Start from 1 Spring		BME
BMEB470	Professional Practice	2	2	3/Summer		
BMEB491	Degree Thesis (Design) ②	12	12	4/Spring		
BMEB321	Biomedical Engineering Lab I	3	3	3/Fall		
BMEB322	Biomedical Engineering Lab II	3	3	3/Spring	BMEB321	
BMEB324	Biomedical Optics Laboratory	2	2	3/Spring	BMEB315	
BMEB325	Medical Imaging Systems Laboratory	2	2	3/Spring	BMEB317	
BMEB316	Medical image processing	3	1	3/Fall		
BMEB327	Clinical Perception for Biomedical Engineering II	2	2	2/Summer	BMEB326	
EE205	Signals and Systems	3	1	2/Fall	MA117	EE
EE202-17L	Digital Circuit Laboratory	1	1	2/Spring	EE202-17	
EE323	Digital Signal Processing	3	1	3/Fall	EE205	
EE303	Fundamental of Optoelectronic Technology	3	1	3/Fall	PHY105	
EE419	Biosensors	3	1	4/Fall		
EE306	Introduction to MEMS	3	1	3/Spring	PHY105	
BIO222	Biochemistry and Molecular Biology Laboratory	2	2	2/Spring	BIO201 BIO104	BIO
BIO208	Cell biology laboratory	2	2	2/Spring	BIO206-15	
BIO306	Bioinformatics	4	2	3/Spring	BIO309	
BIO309	Computational Biology	3	1	3/Spring		
BIO104	General Biology Laboratory	2	2	1/Spring	BIO103	
MED306	Histology and Embryology	3	1	3/Fall		MED
CS301	Embedded System and Microcomputer Principle	3	1	3/Fall	EE202-17 EE202-17L	CS
CS202	Computer Organization	3	1	2/Spring	EE202-17 EE202-17L CS207	
CS207	Digital Logic	3	1	2/Spring		
CS203B	Data Structures and Algorithm Analysis B	3	1	2/Fall	CS109	
ME102	CAD and Engineering Drawing	3	1.5	1/Fall		ME
Total		78	50.5			

Curriculum Structure of Program of Biomedical Engineering for Class 2024



Department of Biomedical Engineering

Program of Intelligent Medical Engineering for International Students (2024)

I. Introduction

The department of biomedical engineering was established in June 2016. Research areas in the department include MechanoMedicine, wearable devices and wireless health monitoring, de novo regenerative engineering, multiscale and multimodal biomedical imaging, computational medicine for big data and health informatics, biomedical MEMS.

The core knowledge base of Intelligent Medical Engineering is obtained through enormous quantities of medical data by applying intelligent perception, big data analysis, intelligent decision making, precision medicine and medical human-machine interface; as well as the investigation of working principles in intelligent biological systems such as the nervous system. Students in the Intelligent Medical Engineering program would also master the fundamentals of Basic Medicine and Clinical Medicine. Graduates of the program are well-equipped for careers not only in general and clinical medical research at large general hospitals, they are also excellent candidates at universities, research institutes, and industries in the fields of artificial intelligence and intelligent medicine for careers in research, development and project management.

Intelligent Medicine is poised to define the future direction of medicine. It is an emerging interdisciplinary field based on theories of modern medicine and natural sciences, while applying the advancement in neuroscience, big data, cloud computing, artificial intelligence, intelligent perception, and robotics, etc. This field of study aims to discover the principles of human life and diseases, and explore intelligent diagnosis and treatment methods through human-machine collaborations. Research in Intelligent Medicine will be conducted through close integration of health care and emerging industries such as artificial intelligence, robotics, and big data. Clinical needs will be the motivation and end-point of Intelligent Medicine research. By building a bridge between the laboratory and the operating table, this field is positioned for the integration of medicine and intelligent technologies, translation of research findings, and innovations in

engineering. The emphasis of the Intelligent Medical Engineering program is the application of emerging intelligent technologies in medicine, including intelligent perception, analysis, and decision-making based on medical data. The objectives of research in Intelligent Medical Engineering include drug discovery, medical robots, intelligent diagnosis and treatment, intelligent image recognition, intelligent health data management, etc. The Intelligent Medical Engineering program aims to become an interdisciplinary, diversified teaching and research platform that promotes the integration of multiple disciplines, and fosters well-rounded, high-quality talents that are able to adapt to future developments.

Academic subject areas: Intelligent Medical Engineering

Program code: 101011T

II. Objectives and Learning Outcomes

1. Objectives

(1) Intelligent Medical Engineering is a highly interdisciplinary field that integrates medicine, science, and engineering. In direct response to the needs of the major national initiative “Healthy China 2030”, this program aims to train top-notch, innovative talents with solid background in medicine in addition of possessing strong practical engineering capabilities.

(2) Training of professional talents with vision in modern medicine, comprehensive data thinking, strong engineering skills and innovative capabilities.

2. Learning Outcomes

(1) Flexibly apply basic sciences such as mathematics, artificial intelligence and modern engineering technologies.

(2) Master basic medical knowledge.

(3) Design and conduct experiments, analyze and interpret data.

(4) Effectively contribute to a multidisciplinary team.

(5) Full understanding of professional and ethical responsibilities.

(6) Strong self-learning ability and capacity to grasp new technologies.

(7) The ability to utilize technologies, techniques and modern tools that are required for engineering practice.

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: 155 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	15
		Major Core Courses	22
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	16
	Major Elective Courses	Major Elective Courses	23 (including a minimum of 6 lab credits)
Total			155
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/ MA101a	Calculus I/ Mathematical Analysis I	4/5	1 Fall	None	Department of Mathematics
	MA127/ MA102a	Calculus II/ Mathematical Analysis II	4/5	1 Spring	Calculus I/Mathematical Analysis I	
	MA113/ MA107	Linear Algebra/ Advanced Linear Algebra I	4	1 Spring & Fall	None	
Physics	PHY105/ PHY101	College Physics I/ General Physics I	4/5	1 Fall	None	Department of Physics
	PHY106/ PHY102	College Physics II/ General Physics II	4/5	1 Spring	College Physics I/General Physics I	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	
Chemistry	CH105/ CH103	Chemistry: The Central Science/ General Chemistry	3/4	1-2 Spring & Fall	None	Department of Chemistry
Geoscience + Life Science	BIO103	Principles of Biology	3	1-2 Spring & Fall	None	Department of Biology
Computer Programming ①	CS109	Introduction to Computer Programming	3	1-2 Spring & Fall	None	Department of Computer Science and Engineering
	CS110	Introduction to Java Programming	3	1-2 Spring & Fall	None	
	①NOTES: You are required to complete and pass at least 1 course in the part of Computer Programming.					

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA117/MA101a	Calculus I/ Mathematical Analysis I	None
	MA127/MA102a	Calculus II/ Mathematical Analysis II	MA117/MA101a
	MA113/MA107	Linear Algebra/ Advanced Linear Algebra I	None
	PHY105/PHY101	College Physics I/ General Physics I	None
	PHY106/PHY102	College Physics II/ General Physics II	PHY105/PHY102
	CH105/CH103	Chemistry: The Central Science/ General Chemistry	None
		Computer Programming ^①	None
	BIO103	Principles of Biology	None
	PHY104B	Experiments of Fundamental Physics	None
	Notes: There are 9 courses in the list of Pre-requisites courses and you are required to complete and pass at least 4 courses of them at the end of First Year. ① For the Computer Programming, you are required to complete and pass at least 1 course.		
Declare major at the end of the second academic year	MA117/MA101a	Calculus I/ Mathematical Analysis I	None
	MA127/MA102a	Calculus II/ Mathematical Analysis II	MA117/MA101a
	MA113/MA107	Linear Algebra/ Advanced Linear Algebra I	None
	PHY105/PHY101	College Physics I/ General Physics I	None
	PHY106/PHY102	College Physics II/ General Physics II	PHY105/PHY102
	CH105/CH103	Chemistry: The Central Science/ General Chemistry	None
		Computer Programming ^①	None
	BIO103	Principles of Biology	None
	PHY104B	Experiments of Fundamental Physics	None
	Notes: There are 9 courses in the list of Pre-requisites courses and you are required to complete and pass at least 7 courses of them at the end of Second Year . ① For the Computer Programming, you are required to complete and pass at least 1 course.		
Note:			
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.			
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.			
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).			
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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Intelligent Medical Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	BMEB111	Principles of Electric Circuits	3		1/Spring		BME
	EE205	Signals and Systems	3	1	2/Fall	MA117	EE
	CS203B	Data Structures and Algorithm Analysis B ^①	3	1	2/Fall	CS109	CS
	MA212	Probability and Statistics	3		2/Spring & Fall	MA127	MA
	BMEB215	Machine Learning and its Medical Engineering Applications	3		2/Spring	MA113,MA212	BME
	Total		15	2			
Major Core Courses	BMEB316	Medical Image Processing	3	1	3/Fall		BME
	BMEB317	Principles of Medical Imaging Systems	3		3/Fall	BMEB111	BME
	BMEB333	Neural Engineering and Brain-computer Interface	3		3/Fall	MA113	BME
	BMEB330	Medical Robotics	3		3/Spring	MA113	BME
	BMEB331	Medical Big Data	3	1	3/Spring	MA127 MA113 MA212	BME
	BMEB332	Intelligent Sensing Technology	3		3/Spring		BME
	BMEB328	Experiment on Intelligence Medical Engineering I	2	2	3/Fall		BME
	BMEB329	Experiment on Intelligence Medical Engineering II	2	2	3/Spring		BME
	Total		22	6			
Practice-based Courses	BMEB121*	Projects of Science and Technology Innovation	2	2	Start from 1 Spring		BME
	BMEB470	Professional Practice	2	2	Summer		BME
	BMEB491	Undergraduate Thesis ^②	12	12	4/Spring		BME
	Total		16	16			
Total			53	24			

Note:

① Students who have completed CS207 are not required to take the CS203B.

② Students who have completed Comprehensive Design I&II are not required to take the BMEB491.

Table 2: Major Elective Courses**Program of Intelligent Medical Engineering**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
BMEB211	Introduction to Nanobiomedicine	3		1/ Spring		BME
BMEB216	Anatomy and Physiology	3		2/ Spring		BME
BMEB315	Biomedical Optics	2		3/ Spring		BME
BMEB324	Biomedical Optics Laboratory	2	2	3/ Spring	BMEB315	BME
BMEB326	Clinical Perception for Biomedical Engineering I	2		2/ Spring		BME
BMEB214	Fundamentals of Biomedical Materials	2		2/Fall		BME
BMEB217	Fundamentals of Engineering Mechanics	3		2/Fall		BME
BMEB218	Molecular Cell Biology	3		2/Fall		BME
BMEB213	Medical Materials and Devices	3		2/ Fall		BME
BMEB327	Clinical Perception for Biomedical Engineering II	2	2	2/ Summer	BMEB326	BME
BMEB318	Biomechanics	3		3/ Fall		BME
BMEB311	Quantitative Physiology I	3		3/ Fall		BME
BMEB312	Quantitative Physiology II	3		3/ Spring	BMEB311	BME
BMEB319	Biomaterials and Tissue Engineering	3		3/ Spring		BME
BMEB325	Medical Imaging Systems Laboratory	2	2	3/ Spring	BMEB317	BME
BMEB334	Biomaterials and Tissue Engineering Laboratory	2	2	3/ Fall		BME
BIO104	General Biology Laboratory	2	2	1/ Spring	BIO103 or BIO102B	BIO
BIO201	Biochemistry (Macromolecules)	3		2/Fall	BIO103, CH103	BIO
BIO306	Bioinformatics	4	2	3/ Spring	BIO309	BIO
BIO304	Systems Biology	3		3/ Spring	BIO103, MA212	BIO
BIO310	Neurobiology	3		3/ Spring	BIO201	BIO
BIO309	Computational Biology	3	1	3/ Fall		BIO
BIO405	Immunology	3		4/ Fall	BIO206-15	BIO
EE202-17	Digital Circuits	3		2/ Spring	PHY105	EE
EE202-17L	Digital Circuits Laboratory	1	1	2/ Spring	EE202-17	EE
EE323	Digital Signal Processing	3	1	3/ Fall	EE205	EE
EE303	Fundamentals of Optoelectronic Technology	3	1	3/ Fall	PHY105	EE
EE332	Digital System Design	3	1	3/ Spring	EE202-17	EE
EE342	Sensors and Applications	3		3/ Spring		EE
CS205	C/C++ Programming Design	3	1	1/ Fall		CS
CS301	Embedded System and Microcomputer Principle	3	1	3/ Fall	EE202-17 EE202-17L CS207	CS

CS207	Digital Logic	3	1	2/Spring		
CS401	Intelligent Robots	3	1	3/ Spring	CS109; CS203; MA212	CS
CS308	Computer Vision	3	1	3/ Spring		CS
CS202	Computer Organization	3	1	2/Spring	EE202-17 EE202-17L CS207	CS
CS306	Data Mining	3	1	3/ Spring	CS203	CS
MA305	Numerical Analysis	3		3/ Fall	MA203a or MA213	MA
MED103	History of Medicine	2		1/ Fall		MED
MED306	Histology and Embryology	3	1	3/ Fall		MED
MED307	Pathology	3	1	3/ Spring	MED204; MED205; MED306	MED
MED404	Medical Genetics	3		3/ Fall	BIO202; MED204; MED205	MED
MED309	Medical Neurobiology	3		3/ Fall		MED
ME112	Introduction to Matlab	2	1	1/Spring		ME
ME232	Prolegomenon to Robotics	3		1/Spring		ME
ME102	CAD and Engineering Drawing	3	1.5	1/Fall		ME
ME331	Robot Modeling and Control	3			MAE203B	ME
Total		127	28.5			

Note:

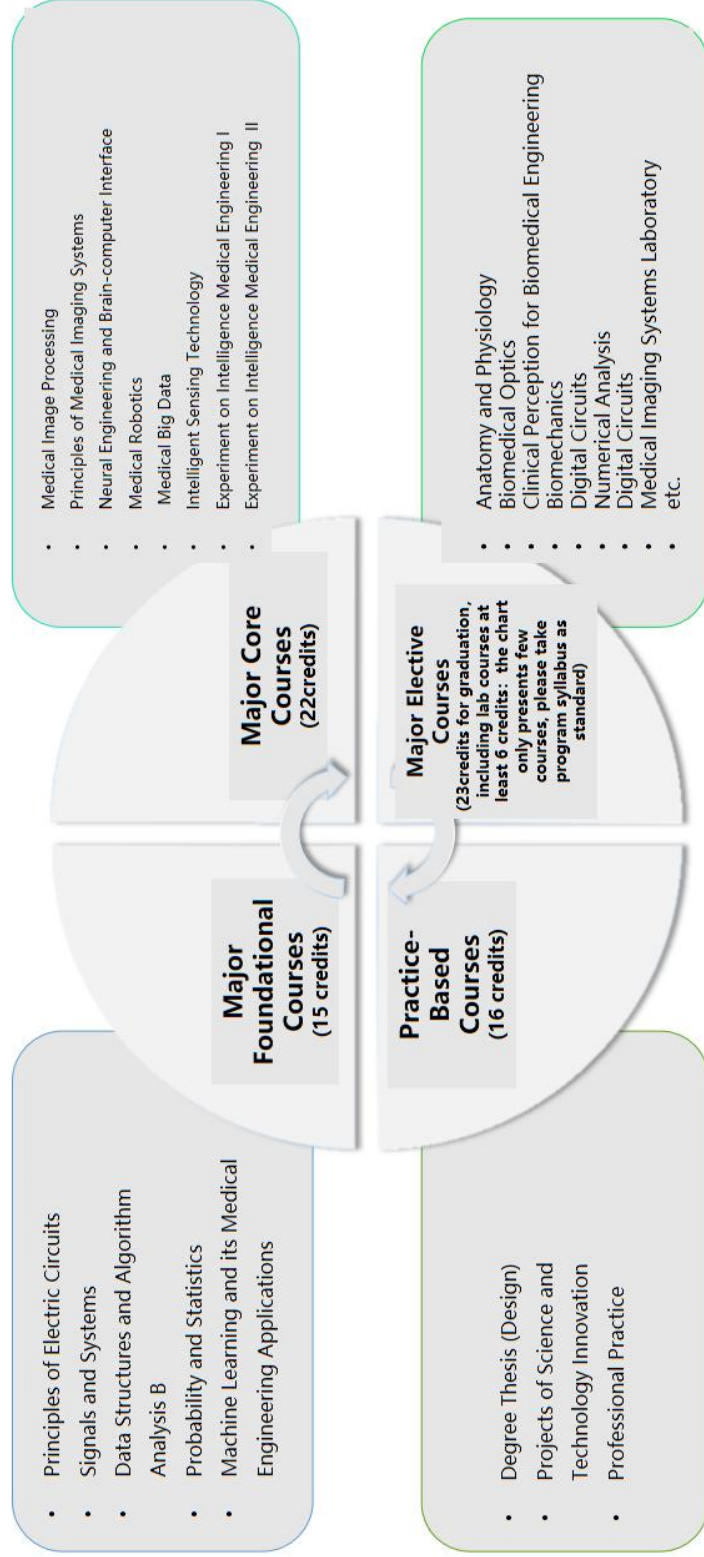
- (1) A minimum of 23 credits are required from Major Elective Courses (including a minimum of 6 lab credits).
(2) If students have completed the part of Introduction to Majors and have more credits, you can use the course of "Introduction to Biomedical Engineering" and "Introduction to Intelligent Medical Engineering" to exchange the major elective credits.

Table 3: Overview of Practice-based Learning

Program of Intelligent Medical Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
BMEB121*	Projects of Science and Technology Innovation	2	2	Start from 1 Spring		BME
BMEB470	Professional Practice	2	2	3/Summer		BME
BMEB491	Undergraduate Thesis	12	12	4/Spring		BME
EE205	Signals and Systems	3	1	2/Fall	MA117	EE
CS203B	Data Structures and Algorithm Analysis B	3	1	2/Fall	CS109	CS
BMEB316	Medical image processing	3	1	3/Fall		BME
BMEB328	Experiment on Intelligence Medical Engineering I	2	2	3/Fall		BME
BMEB329	Experiment on Intelligence Medical Engineering II	2	2	3/Spring	BMEB328	BME
BMEB324	Biomedical Optics Laboratory	2	2	3/Spring	BMEB315	BME
BMEB325	Medical Imaging Systems Laboratory	2	2	3/Spring	BMEB317	BME
BMEB327	Clinical Perception for Biomedical Engineering II	2	2	2/Summer	BMEB326	BME
BIO306	Bioinformatics	4	2	3/Spring	BIO309	BIO
BIO104	General Biology Laboratory	2	2	1/Spring	BIO103 or BIO102B	BIO
BIO309	Computational Biology	3	1	3/Fall		BIO
EE202-17L	Digital Circuit Laboratory	1	1	2/Spring	EE202-17	EE
EE323	Digital Signal Processing	3	1	3/Fall	EE205	EE
EE303	Fundamental of Optoelectronic Technology	3	1	3/Fall	PHY105	EE
EE332	Digital System Design	3	1	3/ Spring	EE202-17	EE
CS205	C/C++ Programming Design	3	1	1/Spring		CS
CS301	Embedded System and Microcomputer Principle	3	1	3/Fall	EE202-17 EE202-17L CS207	CS
CS207	Digital Logic	3	1	2/Spring		CS
CS401	Intelligent Robots	3	1	3/Spring	CS109; CS203; MA212	CS
CS308	Computer Vision	3	1	3/Spring		CS
CS306	Data Mining	3	1	3/Spring	CS203	CS
MED307	Pathology	3	1	3/Spring	MED204; MED205; MED306	MED
MED306	Histology and Embryology	3	1	3/Fall		MED
ME112	Introduction to Matlab	2	1	1/Spring		ME
ME102	CAD and Engineering Drawing	3	1.5	1/Fall		ME
Total		83	48.5			

Curriculum Structure of Program of Intelligent Medical Engineering for Class 2024



School of Environmental Science and Engineering

Program of Environmental Science and Engineering for International Students (2024)

I. Introduction

SUSTech established the School of Environmental Science and Engineering (hereafter referred to as “the School”) in 2015 as a platform to foster top talents in the field of environmental science and engineering in China. The School’s teaching and research mainly focus on water science and technology, resources recycling, atmospheric environment and earth system science.

Environmental Science and Engineering is the first bachelor degree program of the school. This Major cover important environmental issues such as water pollution control, air pollution control, solid waste disposal, treatment and recycling, ecological conservation, environmental monitoring, environmental quality assessment, environmental planning, natural resources management, etc. At present, the School has 71 full-time faculty members (including 13 professors, 25 associate professors, 31 assistant professors). The faculty has received numerous honors and distinctions. Among them, one is academician of CAS, one is member of the U.S. National Academy of Engineering, one is member of the European Academy of Sciences, seven recipients of Outstanding Young Investigator Award from the National Natural Science Foundation of China (NSFC), four recipient of the State Council Special Allowance, five recipients of Outstanding Young Investigator Award (junior level) from the NSFC. All faculty members have prior experiences studying and/or working abroad.

This degree program especially emphasizes the integration of theory and practice. The Engineering Innovation Center (Beijing) of SUSTech is the School’s platform for industry-university-research cooperation, which will provide training opportunities for students to practice what they learned in classes.

The School strives to make Environmental Science and Engineering an internationally recognized degree program, which is unique in the following aspects:

- a. Innovation of engineering science.
- b. Coupling of resources, environment and society.

c. New environmental industries, products, and services targeted.

Academic subject areas: Environmental Science and Engineering

Program code: 082501

II. Objectives and Learning Outcomes

1. Objectives

The major aim of the program is to train talents with firm fundamental knowledge, broaden their vision, and build the innovation ability. Most of the graduates will continue their study in leading universities at home and abroad; while the other will enter government or international organizations for works related to environment management.

2. Learning Outcomes

The School's graduates should have:

- A solid foundation of theoretic knowledge (including math, physics, chemistry, biology, geoscience, et al.), as well as professional knowledge on environmental science and engineering.
- Capability to do scientific research and engineering design, knowing the tendency of environmental science and technology, and be familiar with the standards, guidelines, policies, laws and regulations in the field of environmental protection.
- A rigorous attitude, a desire for excellence, the social responsibility and good communication skills.
- Innovative thinking, and capability to solve problems independently.
- An international vision, fluency in at least one foreign language.

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: 163.5 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	4
		Geoscience + Life Science	3
	GE to Majors Bridging Module	Introduction to Majors	2
Major Courses	Major Required Courses	Major Foundational Courses	18.5
		Major Core Courses	21
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	18
	Major Elective Courses	Major Elective Courses	Specialty Tracks-Restricted Electives Courses: 20 Electives Courses: 6
Total			163.5
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	None	Department of Mathematics
	MA127	Calculus II	4	1 Spring	Calculus I	
	MA113	Linear Algebra	4	1 Spring & Fall	None	
Physics	PHY105	College Physics I	4	1 Fall	None	Department of Physics
	PHY106	College Physics II	4	1 Spring	College Physics I	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	
Chemistry	CH103	General Chemistry	4	1-2 Spring & Fall	None	Department of Chemistry
Geoscience + Life Science	Complete any one of the following courses					
	BIO102B	Introduction to Life Science	3	1-2 Spring & Fall	None	Department of Biology
	EOE100	Introduction to Earth Sciences	3	1-2 Spring & Fall	None	ESS, OCE, ESE
Computer Programming	Complete any one of the following courses					
	CS109	Introduction to Computer Programming	3	1-2 Spring & Fall	None	Dept. of Computer Science and Engineering
	CS110	Introduction to Java Programming	3	1-2 Spring & Fall	None	
	CS111	Introduction to C programming	3	1-2 Spring & Fall	None	
	CS112	Introduction to Python Programming	3	1-2 Spring & Fall	None	
	CS113	Introduction to Matlab Programming	3	1-2 Spring & Fall	None	
Note: 1. Calculus I and Calculus II can be replaced by Mathematical Analysis I and Mathematical Analysis II; 2. Linear Algebra can be replaced by Advanced Linear Algebra I; 3. College Physics I and College Physics II can be replaced by General Physics I and General Physics II; 4. Introduction to Life Science can be replaced by Principles of Biology; 5. The above alternative courses are also applicable to V.						

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	None
	MA127	Calculus II	Calculus I
	PHY105	College Physics I	None
	CH103	General Chemistry	None
Declare major at the end of the second academic year	MA117	Calculus I	None
	MA127	Calculus II	Calculus I
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	College Physics I
	PHY104B	Experiments of Fundamental Physics	None
	CH103	General Chemistry	None
	Geoscience + Life Science		
	Computer Programming		
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Environmental Science and Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	CH102-15	General Chemistry Laboratory	2	2	1/Spr.	General Chemistry / Chemistry: The Central Science	Department of Chemistry
	ESE202	Introduction to Environmental Sciences	2		Fall/Spr.	None	School of Environment
	ESE203	Fundamentals of Geology	3	0	2/Fall	None	School of Environment
	MA212	Probability and Mathematical Statistics	3		2/Fall	Calculus II	Department of Mathematics
	ESE214	Principles of Environmental Engineering	2		2/Fall	General Chemistry, College Physics II	School of Environment
	MA201b	Ordinary Differential Equations B	4	1	2/Spr.	Calculus II	Department of Mathematics
	ESE205	Physical Chemistry	3		2/Spr.	Calculus II, General Chemistry	School of Environment
	Total		19	3			
Major Core Courses	ESE206	Environmental Chemistry	3	0	2/Spr.	General Chemistry/ Chemistry: The Central Science	School of Environment
	ESE212	Environment Monitoring	2		2/Spr.	General Chemistry Laboratory A, College Physics II	School of Environment
	ESE214	Environment Monitoring Laboratory	1	1	2/Spr.	Environment Monitoring	School of Environment
	ESE303	Water Treatment Engineering	4		3/Fall	Principles of Environmental Engineering, Environmental Chemistry, Environment Monitoring	School of Environment
	ESE305	Environmental Science and Engineering Laboratory I	1	1	3/Fall	Water Treatment Engineering, Environment Monitoring Laboratory	School of Environment
	ESE406	Environmental Transport Process	3	0	3/Fall		School of Environment
	ESE302	Solid Waste Treatment, Disposal and Recycling	3		3/Spr.	Physical Chemistry, Environmental Chemistry	School of Environment
	ESE304	Atmospheric Pollution Prevention and Control	3		3/Spr.	Physical Chemistry, Environmental Chemistry	School of Environment

	ESE310	Environmental Science and Engineering Laboratory II	1	1	3/Spr.	Solid Waste Treatment, Disposal and Recycling, Atmospheric Pollution Prevention and Control	School of Environment
	Total		21	3			
Practice-based Courses	ESE370	Projects of Science and Technology Innovation*	0	0	2/Smr.	None	School of Environment
	ESE470	Cognition Practice	2	2	4/Fall	Environmental Chemistry, Environment Monitoring	School of Environment
	ESE480	Innovative Design	4	4	4/Spr.	Solid Waste Treatment, Disposal and Recycling, Water Treatment Engineering, Atmospheric Pollution Prevention and Control	School of Environment
	ESE491	Degree Thesis (or Design)	12	12			
	Total		18	18			
	Total		57.5	23.5			

Note: Students can choose to carry out this course in any semester after the beginning of the second academic year.

Students should follow the rules below to select the Major Elective Courses. Credits for these courses should be not less than 26.

- Special Track- Restrict Elective Courses

There are two Special Tracks as shown in Table 2. Students are required to select at least one track and complete courses of no less than 20 credits.

- Elective Courses

No less than 6 credits are required.

a. Students may select elective courses from Table 2 that do not belong to Special Track-Restrict Elective courses.

b. Students can select courses from Table 3.

c. Besides the Major Required Courses for Environmental Science and Engineering, students may select course(s) from other majors in the School, such as the degree program of Hydrology and Water Resources Engineering.

Table 2: Major Elective Courses

Program of Environmental Science and Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Track I Environmental Science (Not less than 20 credits are required)						
CH209	Inorganic Chemistry I	4	0	2/Fall	None	Department of Chemistry
CH106	Organic Chemistry B	3	0	2/Spr. / Fall.	General Chemistry	Department of Chemistry
ESE336	Environmental Analytical Chemistry	3	0	2/ Fall	None	School of Environment
ESE207	Environmental Chemistry Laboratory	1	1	2/Spr.	Environmental Chemistry	School of Environment
ESE5095	Atmospheric Chemistry	3	0	3/Fall	None	School of Environment
ESE308	Environmental Economics	3	0	3/Fall	Calculus II	School of Environment
ESE313	Introduction to Ecology	3	0	3/Fall	None	School of Environment
ESE317	Application of GIS & RS	3	0.5	3/Fall		School of Environment
ESE335	Environmental Data	3	0	3/Spr.	None	School of

	Analysis					Environment
ESE332	Soil Science	3	0	3/Spr.	Calculus II, General Chemistry, College Physics II	School of Environment
ESE405	Environmental Impact Assessment	3	0	4/Fall	None	School of Environment
Total		32	1.5			
Track II Environmental Engineering (Not less than 20 credits are required)						
ME102	CAD& Engineering Drawing	3	1.5	1/Spr.	None	Department of Mechanical and Energy Engineering
CH209	Inorganic Chemistry I	4	0	2/Fall	None	Department of Chemistry
CH106	Organic Chemistry B	3	0	2/Spr.	General Chemistry	Department of Chemistry
ESE336	Environmental Analytical Chemistry	3	0	3/Spr.	None	School of Environment
ESE301	Environmental Microbiology	3	0	3/Fall	Introduction to Life Science	School of Environment
ESE309	Environmental Microbiological Experiments	1	1	3/Fall	Introduction to Environmental Sciences, Environmental Microbiology	School of Environment
ESE317	Application of GIS & RS	3	0.5	3/Fall		School of Environment
MAE207	Engineering Fluid Mechanics	3	0	3/Fall	Introduction to Life Science	School of Environment
ESE412	Ecological Restoration	3	0	3/Fall	Environmental Chemistry	School of Environment
ESE306	Soil and Groundwater Contamination	3	0	3/Spr.	None	School of Environment
ESE335	Environmental Data Analysis	3	0	3/Spr.	None	School of Environment
ESE417	Industrial Water Reuse	3	0	3/Spr.	None	School of Environment
ESE405	Environmental Impact Assessment	3	0	4/Fall	None	School of Environment
Total		38	3			

Table 3: Elective Course

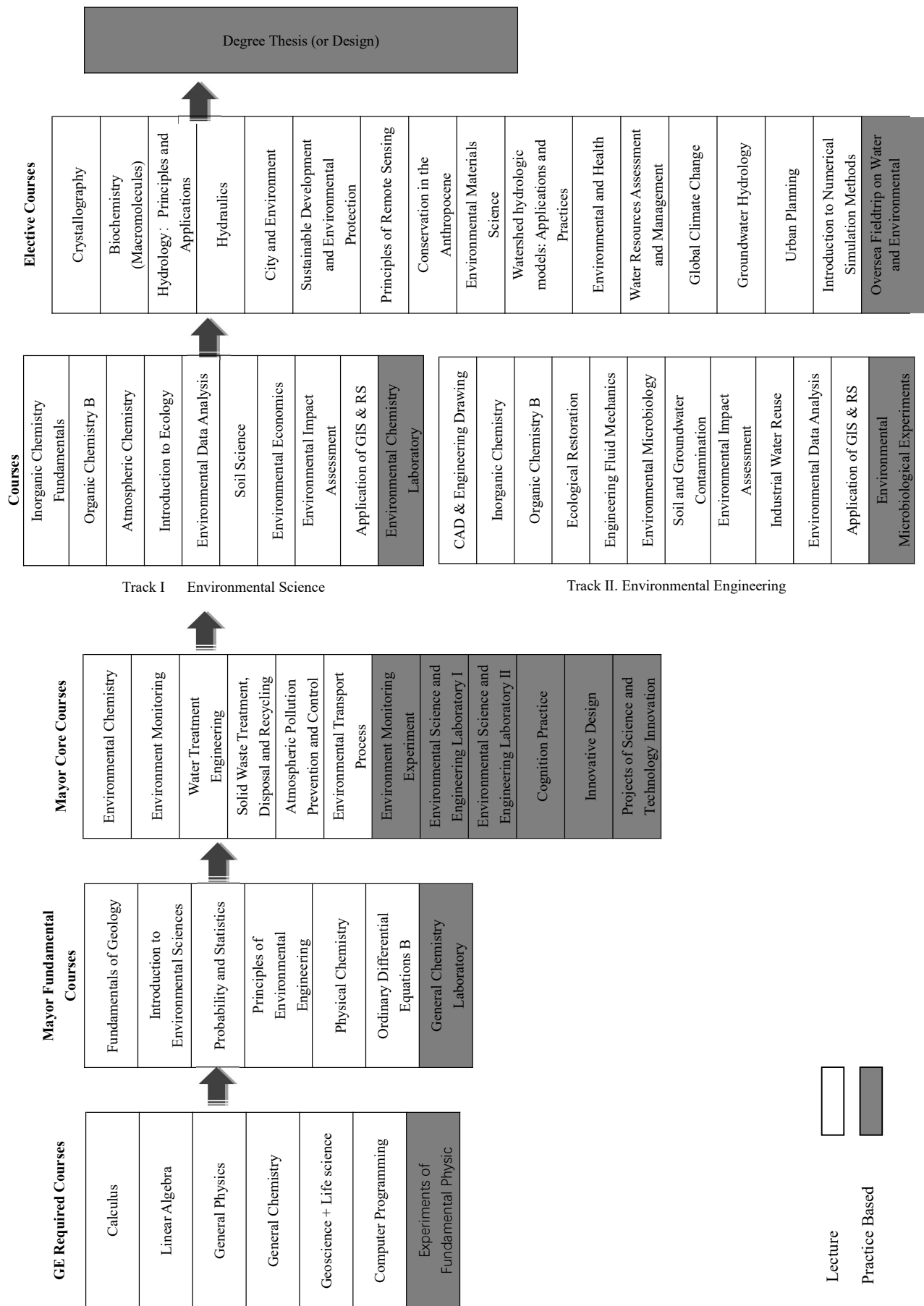
Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
BIO201	Biochemistry (Macromolecules)	3	0	2/Fall	Introduction to Life Science, General Chemistry	Department of Biology
MSE203	Crystallography	2	0	2/Fall	None	Department of Materials Science and Engineering
ESE307	Hydrology: Principles and Applications	3	0	2/Fall	Calculus II	School of Environment
ESE216	Hydraulics	3	0	2/Spr.	Calculus II, College Physics II	School of Environment
ESE223	City and Environment	3	0	2/Spr.	None	School of Environment
ESE224	Sustainable Development and Environmental Protection	1	0	2/Spr.	None	School of Environment
ESE329	Principles of Remote Sensing	3	0	2/Spr.	Calculus II, College Physics II	School of Environment
ESE211	Oversea Fieldtrip on Water and Environmental Management	2	2	2/Smr.	None	School of Environment
ESE322	Environmental and Health	3	0	3/Fall	None	School of Environment
ESE314	Environmental Materials Science	3	0	3/Spr.	None	School of Environment
ESE316	Water Resources Assessment and Management	3	0	3/Spr.	None	School of Environment
ESE318	Groundwater Hydrology	3	0	3/Spr.	Fundamentals of Geology	School of Environment
ESE319	Global Climate Change	3	0	3/Spr.	None	School of Environment
ESE321	Scientific Presentation	2	0	3/Spr.	None	School of Environment
ESE331	Conservation in the Anthropocene	3	0	3/Spr.	None	School of Environment
ESE337	Environmental Psychology and Design Application	3	0	3/Spr.	None	School of Environment
ESE221	Urban Planning	3	0	4/Fall	None	School of Environment
ESE407	Introduction to Numerical Simulation Methods	3	0	4/Fall	Calculus II, Linear Algebra	School of Environment
ESE5016	Environmental Instrument Analysis	2	1	4/Fall	General Chemistry/Chemistry: the Central Science	School of Environment
ESE415	Watershed hydrologic models: Applications and Practices	3	0	4/Fall	Calculus II	School of Environment
Total		54	3			

Table 4: Overview of Practice-based Learning

Program of Environmental Science and Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CH102-15	General Chemistry Laboratory	2	2	1/Spr.	General Chemistry / Chemistry: The Central Science	Department of Chemistry
ME102	CAD & Engineering Drawing	3	1.5	1/Spr.	None	Department of Chemistry
MA201b	Ordinary Differential Equations B	4	1	2/Spr.	Calculus II	Department of Mathematics
ESE207	Environmental Chemistry Laboratory	1	1	2/Spr.	Environmental Chemistry	School of Environment
ESE214	Environment Monitoring Experiment	1	1	2/Spr.	Environment Monitoring	School of Environment
ESE211	Oversea Fieldtrip on Water and Environmental Management	2	2	2/Smr.	None	School of Environment
ESE470	Cognition Practice	2	2	2/Smr.	Environmental Chemistry, Environment Monitoring	School of Environment
ESE305	Environmental Science and Engineering Laboratory I	1	1	3/Fall	Water Treatment Engineering, Environment Monitoring Laboratory	School of Environment
ESE309	Environmental Microbiological Experiments	1	1	3/Fall	Introduction to Environmental Sciences, Environmental Microbiology	School of Environment
ESE317	Application of GIS & RS	3	0.5	3/Fall	Computer Programming	School of Environment
ESE310	Environmental Science and Engineering Laboratory II	1	1	3/Spr.	Solid Waste Treatment, Disposal and Recycling, Atmospheric Pollution Prevention and Control	School of Environment
ESE370	Projects of Science and Technology Innovation	0	0		None	School of Environment
ESE480	Innovative Design	4	4	4/Fall	Solid Waste Treatment, Disposal and Recycling, Water Treatment Engineering, Atmospheric Pollution Prevention and Control	School of Environment
ESE491	Degree Thesis (or Design)	12	12	4/Spr.		School of Environment
Total		37	30			

Curriculum Structure of Environmental Science and Engineering



School of Environmental Science and Engineering

Program of Hydrology and Water Resources Engineering for International Students (2024)

I. Introduction

SUSTech established the School of Environmental Science and Engineering (hereafter referred to as “the School”) in 2015 as a platform to foster top talents in the field of environmental science and engineering in China. The School’s teaching and research mainly focus on the water science and technology, resources circular using, atmospheric environment and earth system science.

At present, the School has 71 full-time faculty members (including 13 professors, 25 associate professors, 31 assistant professors). The faculty has received numerous honors and distinctions. Among them, one is academician of CAS, one is member of the U.S. National Academy of Engineering, one is member of the European Academy of Sciences, seven recipients of Outstanding Young Investigator Award from the National Natural Science Foundation of China (NSFC), four recipient of the State Council Special Allowance, five recipients of Outstanding Young Investigator Award (junior level) from the NSFC. All faculty members have prior experiences studying and/or working abroad. The program will be unique in the following aspects:

- a. Integration of surface water and groundwater protection.
- b. The science of water from molecular to global.
- c. The system coupling of water resources, water environment, and social economy.

Academic subject areas: Water Conservancy

Program code: 801102

II. Objectives and Learning Outcomes

1. Objectives

The major aims to train talents for Hydrology and Water Resources Engineering field with firm fundamental knowledge, broad vision and outstanding innovation. Most students will

continue their education in domestic and overseas famous universities; and other students will enter government and international organizations for work related to environment and water resources management.

2. Learning Outcomes

The School's graduates should have:

- A solid and broad theoretic basis (including mathematics, physics, chemistry, biology, geoscience, et al.) as well as specialized knowledge in hydrology, water resources, and water environment protection.
- Capacity to do research on water resource and water environment. Mastering methods of water resource assessment, planning, management, and protection, and be familiar with the standards, guidelines, policies, laws, and regulations in the field of water resources.
- A rigorous attitude, a desire for excellence, a sense of social responsibility and good communication skills.
- Innovative thinking and capable to solve problems independently.
- An international vision and fluency in at least one foreign language.

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: 158.5 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	15
		Major Core Courses	27.5
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	20
	Major Elective Courses	Major Elective Courses	17
Total			158.5
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	None	Department of Mathematics
	MA127	Calculus II	4	1 Spring	Calculus I	
	MA113	Linear Algebra	4	1 Spring & Fall	None	
Physics	PHY105	College Physics I	4	1 Fall	None	Department of Physics
	PHY106	College Physics II	4	1 Spring	College Physics I	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	
Chemistry	CH105	Chemistry: The Central Science	3	1-2 Spring & Fall	None	Department of Chemistry
Geoscience + Life Science	Complete any one of the following courses					
	BIO102B	Introduction to Life Science	3	1-2 Spring & Fall	None	Department of Biology
	EOE100	Introduction to Earth Sciences	3	1-2 Spring & Fall	None	ESS, OCE, ESE
Computer Programming	Complete any one of the following courses					
	CS109	Introduction to Computer Programming	3	1-2 Spring & Fall	None	Dept. of Computer Science and Engineering
	CS110	Introduction to Java Programming	3	1-2 Spring & Fall	None	
	CS111	Introduction to C programming	3	1-2 Spring & Fall	None	
	CS112	Introduction to Python Programming	3	1-2 Spring & Fall	None	
	CS113	Introduction to Matlab Programming	3	1-2 Spring & Fall	None	
Note: 1. Calculus I and Calculus II can be replaced by Mathematical Analysis I and Mathematical Analysis II ; 2. Linear Algebra can be replaced by Advanced Linear Algebra I ; 3. College Physics I and College Physics II can be replaced by General Physics I and General Physics II ; 4. Chemistry: The Central Science can be replaced by General Chemistry ; 5. Introduction to Life Science can be replaced by Principles of Biology ; 6. The above alternative courses are also applicable to V.						

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	None
	MA127	Calculus II	Calculus I
	PHY105	College Physics I	None
	CH105	Chemistry: The Central Science	None
Declare major at the end of the second academic year	MA117	Calculus I	None
	MA127	Calculus II	Calculus I
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	College Physics I
	PHY104B	Experiments of Fundamental Physics	None
	CH105	Chemistry: The Central Science	None
	Geoscience + Life science		
	Computer Programming		
Note:			
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.			
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.			
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).			
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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Hydrology and Water Resources Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	ME102	CAD & Engineering Drawing	3	1.5	1/Spr.	None	Department of Mechanical and Energy Engineering
	ESE203	Fundamentals of Geology	3	0	2/Fall.	None	School of Environment
	ESE202	Introduction to Environmental Sciences	2	0	Spr./Fall.	None	School of Environment
	MA212	Probability and Statistics	3	0	2/Fall.	Calculus II	Department of Mathematics
	MA201b	Ordinary Differential Equations B	4	1	2/Spr.	Calculus II	Department of Mathematics
	Total		15	2.5			
Major Core Courses	ESE307	Hydrology: Principles and Applications	3	0	2/Fall	Calculus II	School of Environment
	ESE206	Environmental Chemistry	3	0	2/Spr..	General Chemistry/ Chemistry: The Central Science	School of Environment
	ESE216	Hydraulics	3	0	2/Spr.	Calculus II, College Physics II	School of Environment
	ESE218	Hydraulics Basic Experiment	0.5	0.5	2/Spr.	Hydraulics	School of Environment
	ESE315	Meteorology and Climatology	3	0	3/Fall	Calculus II, College Physics II, Fundamentals of Geology	School of Environment
	ESE313	Introduction to Ecology	3	0	3/Fall	None	School of Environment
	ESE317	Application of GIS & RS	3	0.5	3/Fall	Computer Programming	School of Environment
	ESE316	Water Resources Assessment and Management	3	0	3/Spr.	None	School of Environment
	ESE318	Groundwater Hydrology	3	0	3/Spr.	Fundamentals of Geology	School of Environment
	ESE332	Soil Science	3	0	3/Spr.	Calculus II, College Physics II, Chemistry: The Central Science	School of Environment
	Total		27.5	1			
Practice-based Courses	ESE471	Earth Science Practice	2	2	3/Smr.	Fundamentals of Geology, Hydraulics	School of Environment
	ESE472	Hydrology and Water Resources Practice	2	2	4/Fall	Hydrology: Principles and Applications, Groundwater Hydrology	School of Environment
	ESE481	Innovative Design (Water Resources)	4	4	4/Spr.	Hydrology: Principles and Applications,	School of Environment

						Groundwater Hydrology	
	ESE491	Degree Thesis (or Design)	12	12			
	Total		20	20			
Total			62.5	23.5			

To choose Major Elective Courses, students should follow the rules below:

a. The credits of Major Elective Courses should not be less than 17. Besides the Major Elective Courses, students may select courses from other majors in the school, such as the degree program of Environmental Science and Engineering.

b. Students can also select courses from other departments. However, an approval from the School is needed. In addition, for the 2019 class, such credits should be no more than 6.

Table 2: Major Elective Courses

Program of Hydrology and Water Resources Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CH102-15	General Chemistry Laboratory	2	2	1/Spr.	General Chemistry / Chemistry: The Central Science	Department of Chemistry
PHY203-15	Mathematical Methods in Physics	4	0	2/Fall	Calculus II, College Physics II, Linear Algebra	Department of Physics
ESE221	Urban Planning	3	0	2/Fall	None	School of Environment
ESE220	Physical Geography	3	0	2/Spr.	None	School of Environment
ESE212	Environment Monitoring	2	0	2/Spr.	General Chemistry Laboratory , College Physics II	School of Environment
ESE214	Environment Monitoring Experiment	1	1	2/Spr.	Environment Monitoring	School of Environment
ESE329	Principles of Remote Sensing	3	0	2/Spr.	Calculus II, College Physics II	School of Environment
ESE223	City and Environment	3	0	2/Spr.	None	School of Environment
ESE224	Sustainable Development and Environmental Protection	1	0	2/Spr.	None	School of Environment
ESE211	Oversea Fieldtrip on Water and Environmental Management	2	2	2/Smr.	None	School of Environment
ESS303	Fundamentals of Space Geodetics	3	0	3/Fall	Calculus II, Linear Algebra	ESS
ESE308	Environmental Economics	3	0	3/Fall	Calculus II	School of Environment
ESE412	Ecological Restoration	3	0	3/Fall	Environmental Chemistry	School of Environment
ESE303	Water Treatment	4	0	3/Fall	Principles of	School of

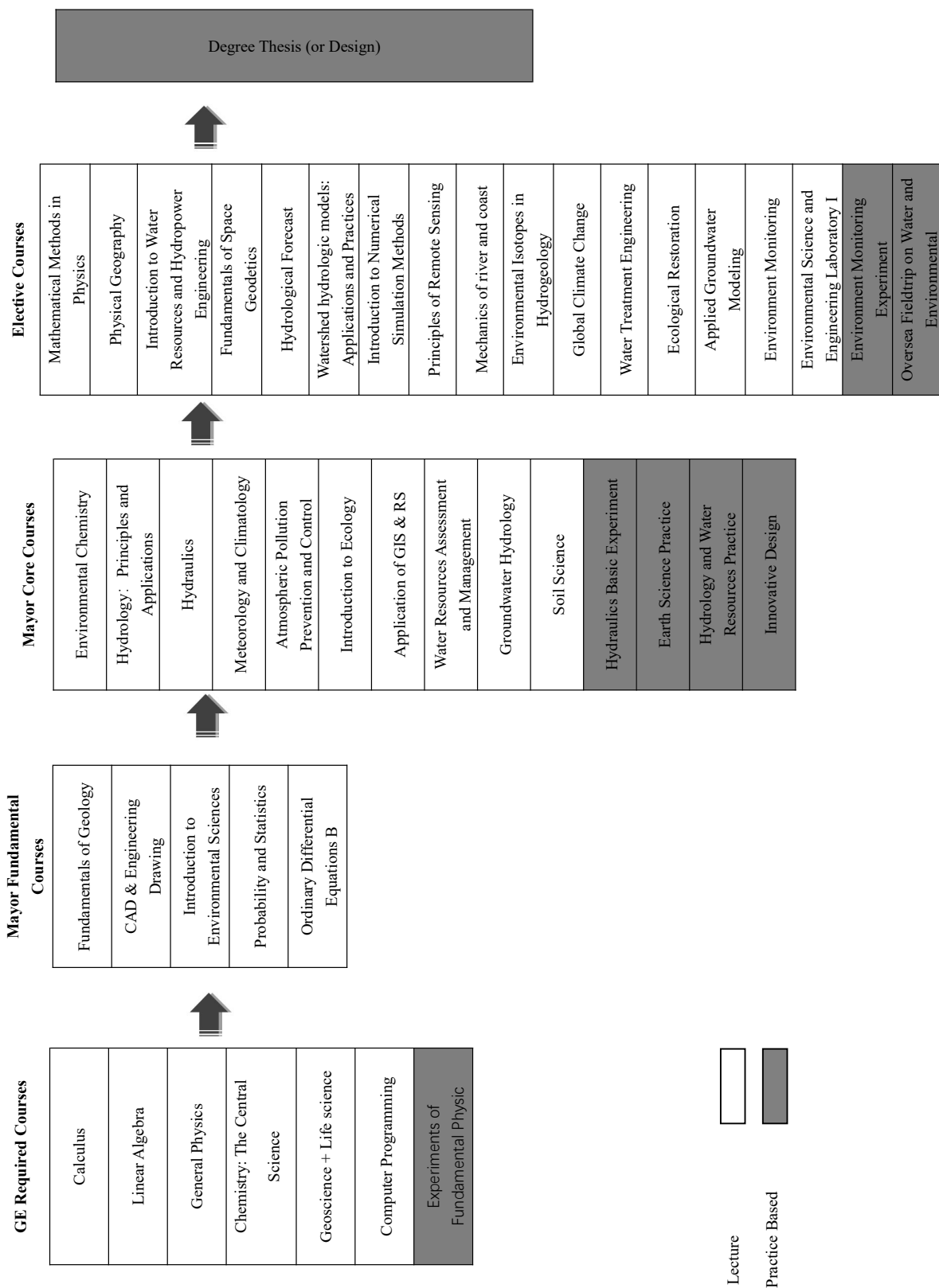
	Engineering				Environmental Engineering, Environmental Chemistry, Environment Monitoring	Environment
ESE305	Environmental Science and Engineering Laboratory I	1	1	3/Fall	Water Treatment Engineering, Environment Monitoring Laboratory	School of Environment
ESE323	Introduction to Water Resources and Hydropower Engineering	3	0	3/Fall	None	School of Environment
ESE306	Soil and Groundwater Contamination	3	0	3/Spr.	None	School of Environment
ESE335	Environmental Data Analysis	3	0	3/Spr.	None	School of Environment
ESE319	Global Climate Change	3	0	3/Spr.	None	School of Environment
ESE321	Scientific Presentation	2	0	3/Spr.	None	School of Environment
ESE326	Hydrological Forecast	3	0	3/Spr..	None	School of Environment
ESE331	Conservation in the Anthropocene	3	0	3/Spr	None	School of Environment
ESE338	Mechanics of river and coast	3	0	3/Spr	None	School of Environment
ESS202	Scientific Computing and Programming	3	0	3/Spr	None	ESS
ESE402	Lake & Wetland Hydrology	3	0	4/Fall		School of Environment
ESE407	Introduction to Numerical Simulation Methods	3	0	4/Fall	Calculus II, Linear Algebra	School of Environment
ESE409	Environmental Isotopes in Hydrogeology	3	0	4/Fall		School of Environment
ESE415	Watershed hydrologic models: Applications and Practices	3	0	4/Fall	Calculus II	School of Environment
ESE418	Applied Groundwater Modeling	3	0	4/Fall		School of Environment
Total		79	6			

Table 3: Overview of Practice-based Learning

Program of Hydrology and Water Resources Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CH102-15	General Chemistry Laboratory	2	2	1/Spr.	General Chemistry / Chemistry: The Central Science	Department of Chemistry
ME102	CAD & Engineering Drawing	3	1.5	1/Spr.	None	Department of Mechanical and Energy Engineering
MA201b	Ordinary Differential Equations B	4	1	2/Spr.	Calculus II	Department of Mathematics
ESE218	Hydraulics Basic Experiment	0.5	0.5	2/Spr.	Calculus II, College Physics II	School of Environment
ESE214	Environment Monitoring Laboratory	1	1	2/Spr.	Environment Monitoring	School of Environment
ESE471	Earth Sciences Practice	2	2	2/Smr.	Fundamentals of Geology, Hydraulics	School of Environment
ESE211	Oversea Fieldtrip on Water and Environmental Management	2	2	2/Smr.	None	School of Environment
ESE317	Application of GIS & RS	3	0.5	3/Fall	Computer Programming	School of Environment
ESE305	Environmental Science and Engineering Laboratory I	1	1	3/Fall	Water Treatment Engineering, Environment Monitoring Laboratory	School of Environment
ESE472	Hydrology and Water Resources Practice	2	2	3/Smr.	Hydrology: Principles and Applications, Groundwater Hydrology	School of Environment
ESE481	Innovative Design (Water Resources)	4	4	4/Fall	Hydrology: Principles and Applications, Groundwater Hydrology	School of Environment
ESE491	Degree Thesis (or Design)	12	12	4/Spr.		School of Environment
Total		36.5	29.5			

Curriculum Structure of Hydrology and Water Resources Engineering



School of Microelectronics

Program of Microelectronics Science and Engineering for International Students (2024)

I. Introduction

Academic subject areas:

The main objective of the School of Microelectronics is in the direction of integrated circuit chip design and manufacturing, and fosters innovative leading talents oriented to internationalization and industrialization. This discipline is a new engineering discipline developed on many basic disciplines. It is the pioneer and foundation of electronic science and information technology in the 21st century. It is also an important foundation for the development of modern high-tech and national economic modernization. Mainly researching the design and manufacturing technology of semiconductor devices and VLSI, and closely integrating with the industry. The School of Microelectronics will closely cooperate with the electronic engineering departments of famous universities in the Great Bay Area, as well as many leading enterprises in Shenzhen's local electronic information direction. Also will cooperate with the four research directions of EDA, VLSI-SoC, wide WBG semiconductor, and future communication. Therefore, the project is different from the existing microelectronics disciplines, and will further explore new engineering construction oriented by internationalization and industrialization.

Program code: 080704

II. Objectives and Learning Outcomes

1. Objectives

The Microelectronics Science and Engineering major aims to provide students not only solid theoretical knowledge in semiconductor materials and devices, but also intends to cultivate innovative leading talents capable of manufacturing and designing integrated circuit chips.

2. Learning Outcomes

The students can participate in microelectronics science and engineering courses offered by university teachers in Hong Kong and Macau at SUSTech, as well as internship courses. After graduating, the students can work in the design of electronic components manufacturing, integrated circuits and systems in various related enterprises, or they can continue their studies or research in famous universities in the Great Bay Area.

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: 156 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	22
		Major Core Courses	22
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	14
	Major Elective Courses	Major Elective Courses	19

Total	156
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	1Fall	NA	MATH
	MA127	Calculus II	4	1Spr	Ma117	MATH
	MA113	Linear Algebra	4	1Spr/Fall	NA	MATH
Physics	PHY105	College Physics I	4	1Fall	NA	PHY
	PHY106	College Physics II	4	1Spr	PHY105	PHY
	PHY104B	Experiments of Fundamental Physics	2	1-2Spr /Fall	NA	PHY
Chemistry	CH105	Chemistry: The Central Science	3	1-2Spr /Fall	NA	CH
Geoscience + Life Science	BIO102B	Introduction to Life Science	3	1-2Spr /Fall	NA	BIO
	EOE100	Introduction to Earth Sciences	3	1-2Spr /Fall	NA	ESS/O CE/ES E
Computer Programming	CS109	Introduction to Computer Programming	3	1-2Spr /Fall	NA	CSE
	CS110	Introduction to Java Programming	3	1-2Spr /Fall		
	CS111	Introduction to C Programming	3	1-2Spr /Fall		
	CS112	Introduction to Python Programming	3	1-2Spr /Fall		
	CS113	Introduction to Matlab Programming	3	1-2Spr /Fall		

Note:

1. Mathematics: MA101a Mathematical Analysis I and MA102a Mathematical Analysis II can replace MA117 Calculus I and MA127 Calculus II; MA118 Single-variable Calculus can replace MA113 Linear Algebra.
2. Physics: PHY101 General Physics I and PHY102 General Physics II can replace PHY105 College Physics I and PHY106 College Physics II.
3. Chemistry: CH103 General Chemistry can replace CH105 Chemistry: The Central Science.
4. Biology: Choose either BIO102B or EOE100 to complete. BIO103 Principles of Biology can replace BIO102B Introduction to Life Science.
5. computer: At least complete one of CS109/CS110/CS111/CS112/CS113.
6. The replace courses above also applicable to the " Prerequisites for Major Declaration ".

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
	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
	CS109/CS110/CS111/CS112/CS113	Introduction to Computer Programming Introduction to Java Programming Introduction to C programming Introduction to Python Programming Introduction to Matlab Programming	NA
	Note: 1. At least complete two of “MA113,PHY104B,CS111”. 2. Choose either BIO102B or EOE100 to complete. 3. At least complete one of CS109/CS110/CS111/CS112/CS113.		
	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
	CS109/CS110/CS111/CS112/CS113	Introduction to Computer Programming Introduction to Java Programming Introduction to C programming Introduction to Python Programming Introduction to Matlab Programming	NA
	CH105	Chemistry: The Central Science	NA
	BIO102B EOE100	Introduction to Life Science Introduction to Earth Sciences	NA
Note: 1. Choose either BIO102B or EOE100 to complete. 2. At least complete one of CS109/CS110/CS111/CS112/CS113 .			
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Microelectronics Science and Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	SME103	Fundamentals of Circuit Analysis	2		1Spr	MA117	SME
	SME211	Analog Integrated Circuit	4	1	2 Fall/Spr	SME102 SME103	SME
	SME212	Digital Integrated Circuit	4	1	2 Fall/Spr	SME102 SME103 PHY106	SME
	SME213	Semiconductor Material Physics	3		2 Fall/Spr	SME102 SME103 PHY106	SME
	SME214	Semiconductor Device Physics	3	1	2 Fall/Spr	SME213	SME
	SME205	Electromagnetic Field and Electromagnetic Wave	3		2 Fall/Spr	PHY106	SME
	SME206	Signals and Systems	3	1	2 Fall/Spr	MA117	SME
	Total		22				
Major Core Courses	SME303	Advanced Microelectronics Experiment I	1	1	2Fall	NA	SME
	SME305	VLSI Fabrication Technology	3	1	3 Fall/Spr	SME214	SME
	SME306	Advanced Digital CMOS IC Design	3	2	3 Spr	SME212 SME214	SME
	SME307	CMOS Analog Integrated Circuit Design	3	1	3 Fall	SME211 SME214	SME
	SME309	Microprocessor Design	3	1	3 Fall	SME212	SME
	SME318	Micro and Nano Electromechanical Systems	3	1	3 Spr	PHY106	SME
	SME319	Fundamentals of Semiconductor Devices and Packaging	3		3 Spr	SME214	SME
	SME321	Introduction to GaN Semiconductor Materials and Devices	3		3 Fall	NA	SME
	Total		22				
Practice-based Courses	SME470	Internship	2	2	3Smr	NA	SME
	SME491	Graduation Projects/Thesis	12	12	4Spr	NA	SME
	Total		14				
Total			58	25			

Note:

1.The SME103 can be substituted with the EE104 .

2.The SME206 can be substituted with the EE205 .

3.One of the SME303,304,403 should be counted as core course credit, while major elective course others;

4.Students who have completed Comprehensive DesignI&II(COE491&COE492) are not required to take the Graduation Projects/Thesis (SME491).

Table 2: Major Elective Courses**Program of Microelectronics Science and Engineering**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
SME301	Frontier Seminars in Microelectronics and IC Designs I	1		3Fall	NA	SME
SME302	Frontier Seminars in Microelectronics and IC Designs II	1		3Spr	NA	SME
SME304	Advanced Microelectronics Experiment II	1	1	2Fall/Spr	NA	SME
SME308	Advanced Semiconductor Fabrication Laboratory	3	1.5	3Fall/Spr	SME214	SME
SME310	Deep Learning on Chip	3	1	3Spr	SME212	SME
SME311	The Foundation of IC Layout Design	1	1	3Spr	SME306	SME
SME312	Electronic Design Automation (EDA) Basics	3	1	3Spr	SME103	SME
SME313	Design of CMOS Radio Frequency Integrated Circuits	3	1	3Spr	SME307	SME
SME314	Biosensor Basics and DNA Sequencing Application	3		3Spr	SME214 or CH105	SME
SME315	Design of Micro and Nano Sensors	3		3Fall	PHY106	SME
SME317	System-on-a-Chip Design	3	1	3Fall	SME212	SME
SME323	Principle of Nano-optics	3		3Fall	NA	SME
SME325	Introduction to Power Electronics	3		3Fall	SME211	SME
SME327	Introduction to Si Based Quantum Computing (QC) Devices	1		3Fall	PHY206-15 or SME214	SME
SME401	Frontier Seminars in Microelectronics and IC Designs III	1		4Fall	NA	SME
SME402	Frontier Seminars in Microelectronics and IC Designs IV	1		4Spr	NA	SME
SME403	Advanced Microelectronics Experiment III	1	1	4Fall	NA	SME
SME405	Advances in Micro Energy and Micro Sensing	2	1	3Fall	NA	SME
SME480	Projects of Science and Technology Innovation	2	2	4Fall	NA	SME
SMES201	An Introduction of Machine Learning and EDA	2		2Smr	NA	SME
SMES202	Patent Basics for Scientists and Engineers	1		2Fall	NA	SME
SMES203	Fundamentals of Power IC Design	3		2Smr	NA	SME
SMES204	Introduction to Nanoelectronics	2		2Smr	NA	SME
SMES205	Fundamentals of Semiconductor Materials	2		2Smr	NA	SME
SMES206	Selected Small Size Integrated Circuit Devices	1		2Smr	SME214	SME
SMES207	Microelectronics Technology, Industry and Policy Strategy	1		2Smr	NA	SME
SMES208	Analysis Practice of Integrated Circuit Dissection	1		2Smr	SME214	SME
EE313	Wireless Communications	3	1	3Fall	EE206	EE
EE316	Microwave Engineering	3	1	3Fall	EE104 EE201-17 EE208	EE
EE322	Optoelectronic Devices Fabrication	2	1	3Spr	EE204	EE

EE323	Digital Signal Processing	3	1	3Fall	EE205	EE
EE326	Digital Image Processing	3	1	3Spr	EE205	EE
EE332	Digital System Design	3	1	3Spr	EE202-17	EE
EE345	Introduction of Wide Bandgap Semiconductors	3		3Fall	EE203 or EE204	EE
EE404	Organic Electronics	2		4Spr	NA	EE
EE411	Information Theory and Coding	2		4Fall	MA212	EE
MSE334	Introduction to Energy Materials	2		3Spr	PHY106 PHY104B MSE001	MSE
MSE320	Introduction to Photovoltaic Thermal Technology	3		3Spr	PHY106 EE201-17 EE204	MSE
MSE413	3D Printing and Laser-based Advanced Manufacturing	3		3Fall	NA	MSE
CH212-16	Advanced Instrumentation Systems I	4	2	2-3Spr	CH103	CH
CH304	Nanomaterials Synthesis and Nanotechnology	2		3Spr	CH202 CH302	CH
CH306	Laboratory for Micro-Nano Synthesis, Technology and Application	2	2	3Spr	CH202 CH302	CH
ESE212	Environment Monitoring	2		2Spr	NA	ESE
ME102	CAD and Engineering Drawing	3	1.5	1Fall/Spr	NA	ME
ME310	Fundamentals of Measurement Technology	3		3Spr	EE205 ME307	ME
CS205	C/C++Program Design	3	1	2Fall	NA	CS
CS203B	Data Structures and Algorithm Analysis B	3	1	2Fall	CS109 or CS110	CS
CS401	Intelligent Robot	3	1	3Spr	CS109 CS203BB MA212	CS
MAE202	Mechanics of Materials	3		2Spr	MAE203	MAE
MAE303	Fluid Mechanics	4		3Fall	MAE204	MAE
MAE305	Engineering Thermodynamics	3		3Fall	NA	MAE
BMEB131	Introduction to Biomedical Engineering	2		1Fall	NA	BMEB
MA233	Introduction to MATLAB	4	1	1Spr	MA113	MA
MA201b	Ordinary Differential Equations B	4		2Fall	MA102B	MA
MA202	Complex Analysis	3		2Spr	MA203a or MA213	MA
MA206	Mathematical Modelling	3	1	2Spr	MA203a or MA213	MA
MA212	Probability Theory and Statistics	3		2Spr	MA127 or MA117	MA
MA303	Partial Differential Equations	3		3Fall	MA201A	MA
MA305	Numerical Analysis	3		3Fall	MA203a or MA213	MA
PHY206-15	Quantum Mechanics I	3		2Spr	PHY205-15 PHY203-15	PHY
Total		147	28			

Notes:

1.Required to complete 19 credits for the major elective courses;

2.Courses set up beyond the program from SME can be recognized as elective credits.Other professional courses similar to microelectronics can be recognized as professional electives by the teaching working group of the College with the consent of the academic supervisor.

Table 3: Overview of Practice-based Learning

Program of Microelectronics Science and Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
SME211	Analog Integrated Circuit	4	1	2 Fall/Spr	SME103 PHY106	SME
SME212	Digital Integrated Circuit	4	1	2 Fall/Spr	SME103 PHY106	SME
SME214	Semiconductor Device Physics	3	1	2 Fall/Spr	SME213	SME
SME206	Circuits and Systems	3	1	2 Fall/Spr	MA127 MA113 SME103	SME
SME303	Advanced Microelectronics Experiment I	1	1	2Fall	NA	SME
SME304	Advanced Microelectronics Experiment II	1	1	2Fall/Spr	NA	SME
SME305	VLSI Fabrication Technology	3	1	3 Fall/Spr	无	SME
SME306	Advanced Digital CMOS IC Design	3	2	3 Spr	SME212 SME214	SME
SME307	CMOS Analog Integrated Circuit Design	3	1	3 Fall	SME211 SME214	SME
SME308	Advanced Semiconductor Fabrication Laboratory	3	1.5	3Fall/Spr	SME214	SME
SME309	Microprocessor Design	3	1	3 Fall	SME212	SME
SME310	Deep learning on chip	3	1	3Spr	SME212	SME
SME311	The Foundation of IC Layout Design	1	1	3Spr	SME306	SME
SME312	Electronic Design Automation (EDA) Basics	3	1	3Spr	SME103	SME
SME313	Design of CMOS Radio Frequency Integrated Circuits	3	1	3Spr	SME307	SME
SME317	System-on-a-Chip Design	3	1	3Fall	SME212	SME
SME318	Micro and Nano Electromechanical Systems	3	1	3 Spr	PHY106	SME
SME403	Advanced Microelectronics Experiment III	1	1	4Fall	NA	SME
SME405	Advances in Micro Energy and Micro Sensing	2	1	3Fall	NA	SME
SME470	Internship	2	2	3Smr	NA	SME
SME480	Projects of Science and Technology Innovation	2	2	4Fall	NA	SME
SME491	Graduation Projects/Thesis	12	12	4Spr	NA	SME
SMES208	Analysis Practice of Integrated Circuit Dissection	1	1	2Smr	SME214	SME
EE313	Wireless Communications	3	1	3Fall	EE206	EE
EE316	Microwave Engineering	3	1	3Fall	EE104 EE201-17 EE208	EE
EE322	Optoelectronic Devices Fabrication	2	1	3Spr	EE204	EE
EE323	Digital Signal Processing	3	1	3Fall	EE205	EE
EE326	Digital Image Processing	3	1	3Spr	EE205	EE
EE332	Digital System Design	3	1	3Spr	EE202-17	EE
EES202	Design based on LabVIEW Programming	1	1	2 Spr	无	EE
CH212-16	Advanced Instrumentation Systems I	4	2	2-3Spr	CH103	CH
ME102	CAD and Engineering Drawing	3	1.5	1Fall/Spr	NA	ME
CS205	C/C++Program Design	3	1	2Fall	NA	CS
CS203B	Data Structures and Algorithm Analysis B	3	1	2Fall	CS109 or CS110	CS
CS401	Intelligent Robot	3	1	3Spr	CS109 CS203BB MA212	CS

MA233	Introduction to MATLAB	4	1	1Spr	MA113	MA
MA206	Mathematical Modelling	3	1	2Spr	MA203a or MA213	MA
Total		108	52			

The curriculum map is organized into four main sections corresponding to the years of study:

- First Year:** Includes Calculus I & II, Linear Algebra, College Physics I & II, Fundamentals of Circuit Analysis, Introduction to Integrated Circuits, Fundamentals of Microelectronics and Integrated Circuit, Introduction to Life Science, and Experiments of Fundamental Physics.
- Second Year:** Features Circuits and Systems, Analog and Digital Integrated Circuits, Semiconductor Material Physics, Electromagnetic Field and Electromagnetic Wave, Analysis Practice of Integrated Circuit Division, Advanced Microelectronics Experiment I, and Frontier Seminars in Microelectronics and IC Design.
- Third Year:** Focuses on Deep Learning on Chip, Electronic Design Automation (EDA) Basics, The Foundation of IC Layout Design, CMOS Analog Integrated Circuit Design, Microprocessor Design, Advanced Digital CMOS IC Design, System-on-a-Chip Design, VLSI Fabrication Technology, Sensor Basics and DNA Sequencing Application, Design of Micro and Nano Sensors, Introduction to GaN Semiconductor Materials and Devices, and Advanced Semiconductor Fabrication Laboratory.
- Fourth Year:** Culminates in Graduation Projects/Thesis, Projects of Science and Technology Innovation, Introduction to SI Based Quantum Computing (QC) Devices, Required Practice-based Courses, Major Foundational Courses, Major Core Courses, and Major Elective Courses.

A central vertical bar labeled "Internship" spans across the Third and Fourth Years, indicating its placement during the final stages of the undergraduate program.

School of System Design and Intelligent Manufacturing

Program of Industrial Design for International Students (2024)

I. Introduction

The bachelor's degree program in Industrial Design (ID) offered by Southern University of Science and Technology (SUSTech) serves Shenzhen, and cultivates high-level and international innovative industrial design leaders nationwide to meet the demand for high-end innovative and creative design talents in the Guangdong-Hong Kong-Macao Greater Bay Area, help improve the urban cultural soft power and industrial core competitiveness, promote the high-quality development of the innovative industrial design industry, and build an internationally leading cultural innovation and creative city.

This program makes full use of the characteristics of SUSTech and the advantages of the new engineering education (NEE) model developed by the School of System Design and Intelligent Manufacturing (SDIM), to cultivate high-level, international, and wide-ranging industrial design professionals. SDIM emphasizes student-centered, project-based teaching and learning, multi-disciplinary integration, learning by doing, and focuses on cultivating students' self-learning ability, interdisciplinary knowledge application ability and teamwork ability. Guided by this, the constructions of the curriculum, the professional team for teaching, the professional practice teaching conditions, and the professional teaching management system are carried out to promote the coordinated development of professional construction, fully utilize social resources to improve students' practical ability.

The ID program includes the study of product design theory and method, design thinking and system thinking, art and aesthetics, materials and manufacturing process, intelligent manufacturing and advanced design technology and tools, human-computer engineering, interaction and experience design, computing design and design methods. The content covers the training of students' common design thinking in different industries after taking office in the future, as well as

the training of corresponding design technologies for different industries. Learning and creation will explore design themes including but not limited to: life aesthetics and culture, smart home, health care, smart equipment and fashion, etc. Academic subject areas: Mechanical.

Program code: 080205

II. Objectives and Learning Outcomes

1. Objectives

The ID program is oriented towards the future development of innovative industrial design, with a focus on national strategic development in intelligent manufacturing and other fields. It aims to cultivate a solid theoretical foundation of industrial design, along with distinctive professional knowledge encompassing an international vision, design thinking ability, and systems thinking ability. The program aims to develop multidisciplinary knowledge application ability, user and market research skills, proficiency in product development processes and methods, familiarity with project management and system operation, a sense of social responsibility, teamwork spirit, and the ability to engage in innovative design of industrial products in enterprises and institutions. Additionally, graduates will be equipped to undertake professional design in design institutions, scientific research units, and related service and business model design fields. They will also possess expertise in human-computer interaction design, sustainable development design, and other areas related to the development, research, planning, education, and management of composite industrial design.

2. Learning Outcomes

Graduates from this program will be able to systematically master the principles, procedures, modern design expression methods, forms, structures, and material selection in industrial design. They will possess the ability to use professional knowledge and tools to address the relationship between industrial design and the environment, users, market, functions, shapes, colors, structures, materials, and processes. Graduates will be capable of engaging in various product development and design endeavors, with strong practical abilities in high-end equipment, intelligent products and interaction, healthcare, cultural creativity, and social innovation.

Upon completion of the program, graduates should possess the following knowledge and abilities:

- (1) Demonstrate strong professional ethics in ID, maintaining a rigorous and realistic scientific attitude, a firm pursuit of innovation and excellence, a strong sense of patriotism and professionalism, social responsibility, and rich humanistic and artistic literacy.
- (2) Possess the necessary knowledge of natural and social sciences relevant to ID, and understand the corresponding technical and social development trends.
- (3) Systematically master a broad range of basic theoretical knowledge, including mathematics, physics, machinery, automation, electronics, computers, etc., as well as professional knowledge in ID. This primarily includes design thinking and engineering, fundamentals of ID, product design visualization, industrial design history, ergonomics, advanced material technology, computer simulation and design, aesthetics and design psychology, system design and management, etc.
- (4) Possess a well-rounded engineering knowledge base and disciplinary expertise.
- (5) Demonstrate strong design performance skills, hands-on ability, aesthetic appreciation, creativity, and proficiency in computer, Internet, multimedia, and foreign language applications.
- (6) Possess the ability to analyze, identify, and solve problems based on an understanding of societal and consumer needs. Graduates should be able to participate in the planning, design, operation, and maintenance of the entire life cycle of products or services.
- (7) Possess strong information acquisition and career development learning abilities, and be aware of the development trends and theoretical frontiers in ID.
- (8) Possess effective design and management abilities, interdisciplinary communication skills, teamwork abilities, and the capacity to handle crises and emergencies.
- (9) Possess a certain level of international vision and preliminary abilities to communicate, compete, and cooperate in a cross-cultural environment.

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: 164 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	24
		Major Core Courses	30
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	15
	Major Elective Courses	Major Elective Courses	15
Total			164
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	None	MA
	MA127	Calculus II	4	1 Spring	MA117	
	MA113	Linear Algebra	4	1 Spring & Fall	None	
Physics	PHY105	College Physics I	4	1 Fall	None	PHY
	PHY106	College Physics II	4	1 Spring	PHY105	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	
Chemistry	CH105	Chemistry: The Central Science	3	1-2 Spring & Fall	None	CH
Geoscience + Life Science	BIO102B	Introduction to Life Science	3	1-2 Spring & Fall	None	BIO
	EOE100	Introduction to Earth Sciences	3	1-2 Spr. & Fall	NA	ESS, OCE, ESE
Computer Programming	CS112	Introduction to Python Programming	3	1-2 Spring & Fall	None	CS
Note: 1. Calculus I and II can be replaced by Mathematical Analysis I and II. 2. Linear Algebra can be replaced by Advanced Linear Algebra I. 3. College Physics I and II can be replaced by General Physics I and II. 4. The Central Science can be replaced by General Chemistry. 5. Introduction to life sciences can be replaced by Principles of Biology. 6. Students are required to choose one course from the Geoscience + Life Science Category. 7. Introduction to Python Programming can be replaced by Introduction to Computer Programming. 8. The above alternative courses are also applicable to the " Prerequisites for Major Declaration ". 9. The above alternative courses also apply to the prerequisite course requirements.						

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	None
	MA127	Calculus II	MA117
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	PHY105
	CS112	Introduction to Python Programming	None
Declare major at the end of the second academic year	MA117	Calculus I	None
	MA127	Calculus II	MA117
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	PHY105
	CS112	Introduction to Python Programming	None
	PHY104B	Experiments of Fundamental Physics	None
	CH105	Chemistry: The Central Science	None
	BIO102B/E OE100	Introduction to Life Science/Introduction to Earth Sciences	None
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Industrial Design

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	SDM216	CAD:3D Modeling and Programming	3	3	2 Fall	None	SDIM
	SDM214	Fundamentals of Industrial Design	3	1	2 Fall	None	SDIM
	SDM213	Industrial Design History	3	1	2 Fall	None	SDIM
	SDM283	Mechanics for Design	3	1	2 Fall	MA127	SDIM
	SDM241	Electronic System Design	3	1	2 Spring	PHY106	SDIM
	SDM262	Fundamentals of Materials Engineering	3	1	2 Spring	None	SDIM
	SDM275	Rapid Prototyping for Product Development	3	1	2 Spring	None	SDIM
	SDM322	Product Quality Management	3	1	3 Fall	None	SDIM
	Total		24	10			
Major Core Courses	SDM212	Design Thinking and Engineering	3	1	2 Spring	None	SDIM
	SDM232	Mechanical Design and Manufacturing I	3	1	2 Spring	None	SDIM
	SDM218	Design Psychology and Aesthetics	3	1	2 Fall	None	SDIM
	SDM224	Fundamentals of System Engineering	3	1	2 Fall	None	SDIM
	SDM352	Computer Simulation and Design	3	1	3 Spring	None	SDIM
	SDM311	Thematic Product Design	3	1	3 Spring	SDM216 SDM114	SDIM
	SDM314	Fundamentals of Control Engineering and Design	3	1	3 Spring	SDM283	SDIM
	SDM354	Human Factors	3	1	3 Spring	CS112	SDIM

Practice-based Courses		Engineering					
	SDM313	Design for Intelligent Manufacturing	3	1	3 Fall	None	SDIM
	SDM315	Computational Design	3	1	3 Fall	None	SDIM
	Total		30	10			
	SDM406	Innovation Design Practice	3	3	3 Summer & 4 Fall	None	SDIM
	SDM491	Capstone	12	12	3 Spring	None	SDIM
	Total		15	15			
Total			69	35			
Note: Students who have completed COE491 Comprehensive Design I and COE492 Comprehensive Design II are not required to take theSDM491 Capstone.							

Table 2: Major Elective Courses

Program of Industrial Design

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
SDM102	Integrative System Design	3	3	1 Summer	None	SDIM
SDM116	Experience Design	3	1	1 Spring	None	SDIM
SDM316	Product Function and Mechanism	3	1	3 Fall	None	SDIM
SDM318	Interactive Media Design	3	1	3 Fall	None	SDIM
SDM392	Virtual Product Design and Analysis	3	1	3 Fall	None	SDIM
SDM394	Information Design	3	1	3 Fall	None	SDIM
SDM396	Product Innovation Design	3	1	3 Fall	SDM114	SDIM
SDM414	Industrial Design Professional Practices	3	1	3-4 Fall	Had got 100 credits and had finished at least 2 design stream major elective courses.	SDIM
SDM391	Interactive Design	3	1	3 Spring	SDM114	SDIM
SDM395	Product System Design	3	1	3 Spring	SDM114	SDIM
SDM317	Product Packaging and Advertising Design	3	1	3 Spring	SDM114	SDIM
SDM319	Product Branding and Entrepreneurship	3	1	3 Spring	SDM114	SDIM
SDM393	New Product Development and Design	3	1	3 Spring	None	SDIM
SDM412	Wearable Technology and Design	3	1	3-4 Spring	SDM212	SDIM
ME313	Product Design Practice	2	2	3 Spring & Summer	SDM232	ME

DS363	Design and Learning with Data	3	0	3 Spring	None	DS
ME405	Innovative Design Theory and Practice	3	1	4 Fall	ME313	ME
Above courses are the Design stream major elective courses.		50	19			
SDM372	Intelligent Manufacturing and Equipment	3	1	3 Fall	SDM232	SDIM
SDM371	Big Data ²	3	1	3 Fall	MA113	SDIM
SDM376	Introduction to Internet of Things ³	3	1	3 Fall	CS112 MA127 MA113	SDIM
SDM5002	Intelligent Sensing Systems in Mobile Robots ⁴	3	1	3 Fall	EE104 CS112	SDIM
SDM374	Machine Learning System Design ¹	3	1	3 Spring	MA113	SDIM
SDM378	Computer Vision and Application ⁵	3	1	3 Spring	CS112 MA127 MA113	SDIM
SDM375	Intelligent Robot Design ⁶	3	1	3 Spring	CS112	SDIM
SDM373	Sensor and Intelligent Detection Technology	3	1	3 Spring	None	SDIM
SDM472	Additive Manufacturing Technology	3	1	4 Fall	SDM232	SDIM
SDM474	Advanced Design-Manufacture Integrated Technique	3	1	3-4 Fall	SDM262 SDM283	SDIM
SDM5001	Failure Mechanisms of Polymers in Microelectronic Packages	3	1	3-4 Fall	SDM262	SDIM
SDM471	AR / VR and Its Application	3	1	4 Spring	CS112	SDIM
Above courses are the Intelligent Manufacturing stream major elective courses.		36	12			
MA212	Probability and Statistics	3	0	2 Fall	MA127	ME
SDM274	AI and Machine Learning ⁷	3	0	2 Fall	MA127 MA113	SDIM
CS203	Data Structures and Algorithm Analysis	3	1	2 Fall	CS109	CS
CS303	Artificial Intelligence	3	1	3 Fall	CS109 CS203 MA212	CS
CS324	Deep Learning	3	1	3 Spring	CS303	CS
Above courses are the Artificial Intelligence stream major elective courses.		18	4			
ME331	Robot Modeling and Control	3	0	3 Fall	MAE203B	ME
ME322	Robotic Actuation System	3	1	3 Fall	MA127	ME
SDM357	Computer Networking and its Industrial Application	3	0.5	3 Fall	None	SDIM
ME336	Collaborative Robot Learning	3	1	3 Spring	ME331	ME
SDM365	Robot Motion Control	3	1	3 Spring	MA127 MA113	SDIM
SDM358	Microcomputer and	3	1	3 Spring	SDM244	SDIM

	Embedded Systems					
SDM5008	Advanced Robot Control	3	1	4 Fall	SDM271 SDM263	SDIM
Above courses are the Robotic stream major elective courses.		21	5.5			
Total		125	40.5			

Note:

[1] SDM374 Machine Learning System Design can be used as an elective course for Artificial Intelligence stream at the same time.

[2] SDM371 Big Data can be used as an elective course for Artificial Intelligence stream at the same time.

[3] SDM376 Introduction to Internet of Things can be replaced by course CS314 Internet of Things.

[4] SDM5002 Intelligent Sensing Systems in Mobile Robots can be used as an elective course for Robotic stream at the same time.

[5] SDM378 Computer Vision and Application can be used as an elective course for Robotic stream and Artificial Intelligence stream at the same time.

[6] SDM375 Intelligent Robot Design can be used as an elective course for Robotic stream at the same time.

[7] SDM274 AI and Machine Learning can be used as an elective course for Robotic stream at the same time.

Table 3: Overview of Practice-based Learning

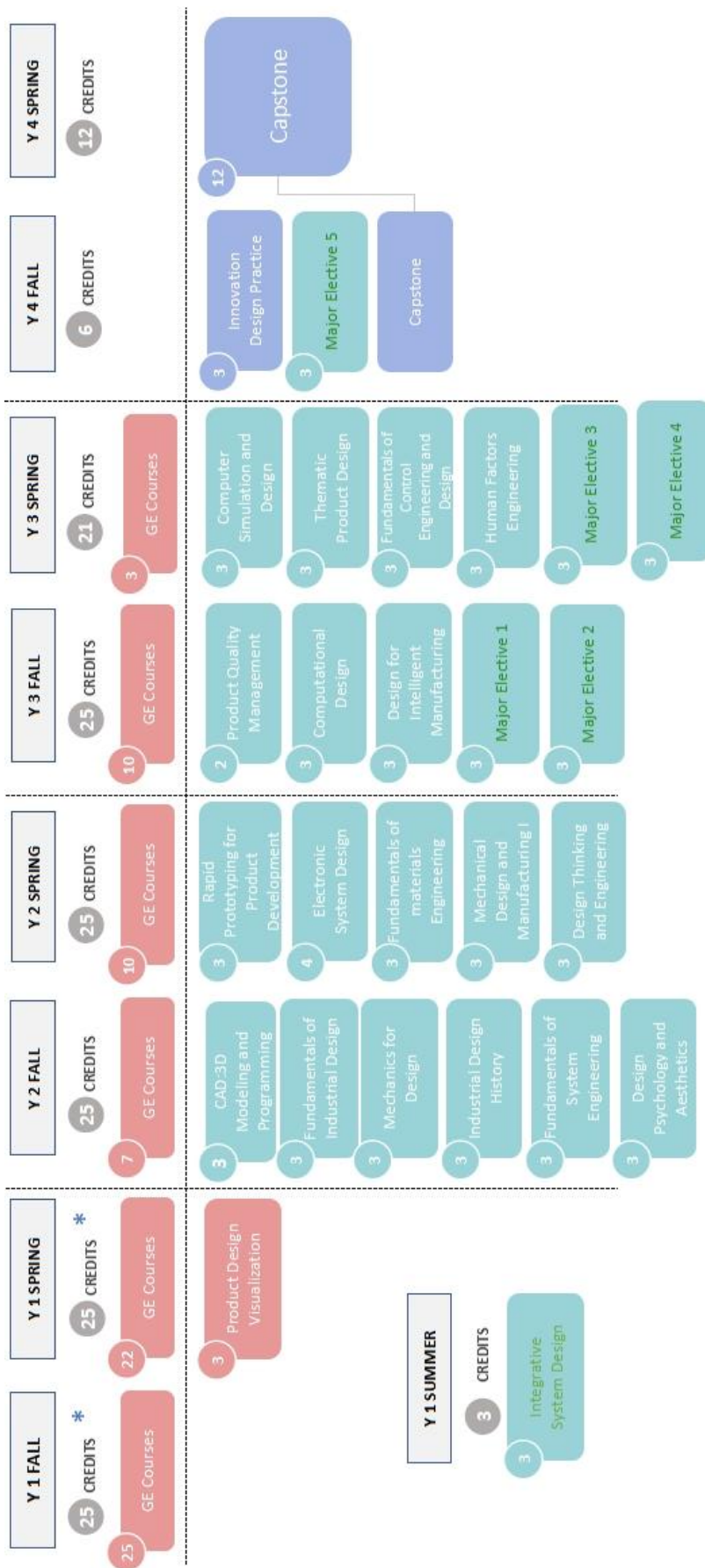
Program of Industrial Design

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
SDM102	Integrative System Design	3	3	1 Summer	None	
SDM114	Product Design Visualization	3	1	1 Spring & Fall	None	SDIM
SDM116	Experience Design	3	1	1 Spring	None	SDIM
SDM216	CAD:3D Modeling and Programming	3	3	2 Fall	None	SDIM
CS203	Data Structures and Algorithm Analysis	3	1	2 Fall	CS109	CS
CS203B	Data Structures and Algorithm Analysis B	3	1	2 Fall	CS109	CS
SDM283	Mechanics for Design	3	1	2 Fall	MA127	SDIM
SDM218	Design Psychology and Aesthetics	3	1	2 Fall	None	SDIM
SDM213	Industrial Design History	3	1	2 Fall	None	SDIM
SDM214	Fundamentals of Industrial Design	3	1	2 Fall	None	SDIM
SDM224	Fundamentals of System Engineering	3	1	2 Fall	None	SDIM
SDM212	Design Thinking and Engineering	3	1	2 Spring	None	SDIM
SDM232	Mechanical Design and Manufacturing I	3	1	2 Spring	None	SDIM
SDM241	Electronic System Design	3	1	2 Spring	PHY106	SDIM
SDM262	Fundamentals of Materials Engineering	3	1	2 Spring	None	SDIM
SDM275	Rapid Prototyping for Product Development	3	1	2 Spring	None	SDIM

SDM318	Interactive Media Design	3	1	3 Fall	None	SDIM
SDM392	Virtual Product Design and Analysis	3	1	3 Fall	None	SDIM
SDM396	Product Innovation Design	3	1	3 Fall	SDM114	SDIM
SDM316	Product Function and Mechanism	3	1	3 Fall	None	SDIM
SDM394	Information Design	3	1	3 Fall	None	SDIM
SDM372	Intelligent Manufacturing and Equipment	3	1	3 Fall	SDM232	SDIM
SDM376	Introduction to Internet of Things	3	1	3 Fall	CS112 MA127 MA113	SDIM
SDM371	Big Data	3	1	3 Fall	MA113	SDIM
SDM313	Design for Intelligent Manufacturing	3	1	3 Fall	None	SDIM
SDM322	Product Quality Management	3	1	3 Fall	None	SDIM
SDM5002	Intelligent Sensing Systems in Mobile Robots	3	1	3 Fall	EE104 CS112	SDIM
CS303	Artificial Intelligence	3	1	3 Fall	CS109 CS203 MA212	CS
CS324	Deep Learning	3	1	3 Spring	CS303	CS
SDM315	Computational Design	3	1	3 Fall	None	SDIM
SDM357	Computer Networking and its Industrial Application	3	0.5	3 Fall	None	SDIM
SDM365	Robot Motion Control	3	1	3 Spring	MA127 MA113	SDIM
SDM358	Microcomputer and Embedded Systems	3	1	3 Spring	SDM244	SDIM
SDM314	Fundamentals of Control Engineering and Design	3	1	3 Spring	SDM283	SDIM
SDM354	Human Factors Engineering	3	1	3 Spring	CS112	SDIM
SDM352	Computer Simulation and Design	3	1	3 Spring	None	SDIM
SDM374	Machine Learning System Design	3	1	3 Spring	MA113	SDIM
SDM378	Computer Vision and Application	3	1	3 Spring	CS112 MA127 MA113	SDIM
SDM391	Interactive Design	3	1	3 Spring	SDM114	SDIM
SDM375	Intelligent Robot Design	3	1	3 Spring	CS112	SDIM
SDM373	Sensor and Intelligent Detection Technology	3	1	3 Spring	None	SDIM
SDM395	Product System Design	3	1	3 Spring	SDM114	SDIM
SDM317	Product Packaging and Advertising Design	3	1	3 Spring	SDM114	SDIM
SDM319	Product Branding and Entrepreneurship	3	1	3 Spring	SDM114	SDIM
ME313	Product Design Practice	2	2	3 Spring & Summer	SDM232	SDIM
ME336	Collaborative Robot Learning	3	1	3 Spring	ME331	SDIM
SDM393	New Product Development and Design	3	1	3 Spring	None	SDIM
SDM412	Wearable Technology and Design	3	1	3-4 Fall	SDM212	SDIM

SDM414	Industrial Design Professional Practices	3	1	3-4 Fall	Had got 100 credits and had finished at least 2 design stream major elective courses.	SDIM
SDM474	Advanced Design-Manufacture Integrated Technique	3	1	3-4 Fall	SDM262 SDM283	SDIM
SDM5001	Failure Mechanisms of Polymers in Microelectronic Packages	3	1	3-4 Fall	SDM262	SDIM
SDM472	Additive Manufacturing Technology	3	1	4 Fall	SDM232	SDIM
ME405	Innovative Design Theory and Practice	3	1	4 Fall	ME313	ME
SDM5008	Advanced Robot Control	3	1	4 Fall	SDM271 SDM263	SDIM
SDM471	AR / VR and Its Application	3	1	4 Spring	CS112	SDIM
SDM406	Innovation Design Practice	3	3	3 Summer & 4 Fall	None	SDIM
SDM491	Capstone	12	12	4 Spring	None	SDIM
Total		179	74.5			

Curriculum Structure of Industrial Design



School of System Design and Intelligent Manufacturing

Program of Automation for International Students (2024)

I. Introduction

Automation is an inter-disciplinary major that integrates automatic control, electronic engineering, computer technology, and artificial intelligence. It takes mathematics, information theory, control theory, system theory and other knowledge as the core, and aims to realize digitization, automation and intelligence of systems and management. The aim is to cultivate compound talents with international vision and competitiveness with equal emphasis on scientific innovation and engineering practice. As an important direction of information science, Automation focuses on intelligent systems and is widely used in the areas of national strategic development to promote the rapid development of society and economy. With the boost of modern science, the application field of automation technology will expand day by day, and the demand for automation professionals will continue to increase in the future. Graduates of automation will also take advantage of extensive applications of this cutting-edge technology to give full play to their professional advantages.

Academic subject areas: Automation

Program code: 080801

II. Objectives and Learning Outcomes

1. Objectives

Cultivate outstanding talents in automation and related fields with "international vision and native land emotion", who can abide by engineering ethics and professional ethics, and have a solid theoretical foundation and outstanding practical innovation ability.

Alumni of Automation (5 years after graduation) should demonstrate:

Technical Skills: technically competent to conduct research and development in industry and universities in Automation and related fields and able to discover new theories, new knowledge,

and new technologies to solve complex engineering problems.

Engineering Ethos: able to think critically and creatively, able to use engineering principles to embrace challenging engineering and non-engineering problems encountered at work, able to apply an analytic mindset, make informed decisions and able to provide innovative solutions.

Attitude: self-motivated with a desire for lifelong learning to adapt to the fast changing environment, able to operate with integrity and responsibility, having optimism and composure under tight schedule, and committed to make a positive impact on society locally and globally.

Leadership: well-prepared to advance towards leadership positions with a good teamwork ability, able to capitalize the individual strengths of team members, and able to nurture the team to achieve goals.

2. Learning Outcomes

Student Outcomes (SOs) that prepare graduates to enter the professional practice of engineering:

1. Engineering knowledge: an ability to apply knowledge of mathematics, natural science, automation, and other related engineering to solve complex engineering problems.
2. Problem analysis: an ability to identify, formulate and analyze complex engineering problems through literature research in order to obtain effective solutions.
3. Design/development solutions: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
4. Research: an ability to conduct research on complex engineering problems in automation-related fields based on scientific principles, including designing experiments, analyzing data, and obtaining reasonable conclusions.
5. Up-to-date techniques: an ability to develop and use appropriate techniques, resources, and information technology tools for control engineering problems, including prediction and simulation of engineering problems.
6. Environment and sustainability: an ability to understand and evaluate the impact of engineering practices in the field of automation on environmental and social sustainability.
7. Professional: an ability to recognize ethical and professional responsibilities in engineering situations.

8. Teamwork: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
9. Communication: an ability to effectively communicate with industry peers and the public on engineering issues in the field of automation, including writing reports and design manuscripts, making presentations, and expressing or responding to instructions.
10. Project Management: an ability to apply the principles of project management and decision-making methods in a multidisciplinary environment.
11. Life-long learning: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

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: 154 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	22
		Major Core Courses	12
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	17
	Major Elective Courses	Major Elective Courses	24
Total			154
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	None	MA
	MA127	Calculus II	4	1 Spring	MA117	
	MA113	Linear Algebra	4	1 Spring & Fall	None	
Physics	PHY105	College Physics I	4	1 Fall	None	PHY
	PHY106	College Physics II	4	1 Spring	PHY105	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	
Chemistry	CH105	Chemistry: The Central Science	3	1-2 Spring & Fall	None	CH
Geoscience + Life Science	BIO102B	Introduction to Life Science	3	1-2 Spring & Fall	None	BIO
	EOE100	Introduction to Earth Sciences	3	1-2 Spring & Fall	None	ESS, OCE, ESE
Computer Programming	CS111	Introduction to C programming	3	1-2 Spring & Fall	None	CS
Note: 1. The course of Calculus I and II can be replaced by Mathematical Analysis I and II. 2. The course of College Physics I and II can be replaced by General Physics I and II 3. The course of Linear Algebra can be replaced by Advanced Linear Algebra I. 4. The course of Chemistry: The Central Science can be replaced by General Chemistry 5. The course of Introduction to Life Science can be replaced by Principles of Biology. 6. Students are required to choose one course from the Geoscience + Life Science Category. 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	None
	MA127	Calculus II	MA117
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	PHY105
	PHY104B	Experiments of Fundamental Physics	None
	CS111	Introduction to C programming	None
Declare major at the end of the second academic year	MA117	Calculus I	None
	MA127	Calculus II	MA117
	MA113	Linear Algebra	None
	PHY105	College Physics I	None
	PHY106	College Physics II	PHY105
	PHY104B	Experiments of Fundamental Physics	None
	CS111	Introduction to C programming	None
	CH105	Chemistry: The Central Science	None
	BIO102B/E OE100	Introduction to Life Science/Introduction to Earth Sciences	None

Note:

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.
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.
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).
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).

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Automation

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	EE104	Fundamentals of Electric Circuits	2	0	1 Spring	MA117 MA113	EE
	SDM244	Electronic Circuit Principles and Design	4	1	2 Fall	PHY106 EE104	SDIM
	SDM252	Introduction to C++ Programming	3	1	2 Fall	None	SDIM
	SDM246	Signals and Linear System Analysis	3	0	2 Fall	MA127 EE104	SDIM
	SDM234	Mathematical Foundations of Control Engineering	4	0	2 Fall	MA127 PHY106 MA113	SDIM
	MA212	Probability and Statistics	3	0	2 Spring	MA127	MA
	SDM358	Microcomputer and Embedded Systems	3	1	3 Spring	SDM244	SDIM
	Total		22	3			
	SDM271	System Modeling and Simulation	3	1	2 Spring	SDM234	SDIM
	SDM263	Feedback Control Theory	3	0	2 Spring	EE104	SDIM
	SDM274	AI and Machine Learning	3	0	3 Fall	MA127 MA113	SDIM
	SDM364	Multi-variable Control and Applications	3	0	3 Fall	SDM234 SDM246 SDM263	SDIM
	Total		12	1			
Practice-based Courses	SDM301	Innovative Practice for Intelligent Control Science I	1	1	2 Spring	None	SDIM
	SDM302	Innovative Practice for Intelligent Control Science II	1	1	3 Fall	None	SDIM
	SDM303	Innovative Practice for Intelligent Control Science III	1	1	3 Spring	None	SDIM
	SDM403	Internship	2	2	3 Summer	None	SDIM
	SDM492	Thesis (Graduation Project)	12	12	4 Spring	None	SDIM
	Total		17	17			
Total			51	21			
Note: Students who have completed COE491 Comprehensive Design I and COE492 Comprehensive Design II are not required to take theSDM492 Thesis (Graduation Project).							

Table 2: Major Elective Courses

Program of Automation

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Module A	EE211	Robotic Perception and Intelligence	3	1	2 Fall	None	EE
	SDM273	Intelligent Sensors and Signal Processing	3	1	2 Spring	EE104	SDIM
	EE326	Digital Image Processing	3	1	2 Spring	SDM246/EE205	EE
	SDM359	Advanced Machine Learning	3	0	2 Spring	MA113	SDIM
	SDM5006	System Identification and Adaptive Control	3	0	3 Fall	SDM263	SDIM
	SDM357	Computer Networking and its Industrial Application	3	0.5	3 Fall	None	SDIM
	SDM5007	Engineering Optimization Methods	3	0	3 Fall	MA127 MA113 MA212	SDIM
	SDM371	Big Data	3	1	3 Fall	Linear Algebra	SDIM
	SDM5002	Intelligent Sensing Systems in Mobile Robots	3	1	3 Fall	Introduction to Python Programming, Fundamental of Electric Circuits	SDIM
	EE346	Mobile Robot Navigation and Control	3	1	3 Fall	SDM246/EE205 MA212	EE
	ME336	Collaborative Robot Learning	3	1	3 Spring	ME306/ME331	ME
	CS314	Internet of Things	3	1	3 Spring	CS305	CS
	EE332	Digital System Design	3	1	3 Spring	EE202-17	EE
	SDM365	Robot Motion Control	3	1	3 Spring	MA127 MA113	SDIM
	EE368	Robotic Motion and Control	3	1	3 Spring	SDM246/EE205	EE
	SDM5009	Discrete Time System Control	3	0	3 Spring	SDM271 SDM263	SDIM
	SDM366	Optimal Control and Estimation	3	0	3 Spring	SDM263	SDIM
	SDM374	Machine Learning System Design	3	1	3 Spring	Linear Algebra	SDIM
	SDM378	Computer Vision and Application	3	1	3 Spring	Introduction to Python Programming, Calculus II, Linear Algebra	SDIM
	SDM375	Intelligent Robot Design	3	1	3 Spring	Introduction to Python Programming	SDIM
	SDM373	Sensor and Intelligent Detection Technology	3	1	3 Spring	None	SDIM
	SDM5008	Advanced Robot Control	3	1	4 Fall	SDM271 SDM263	SDIM
	SDM471	AR / VR and Its	3	1	4 Spring	Introduction to	SDIM

		Application				Python Programming	
Module B	CS203B	Data Structures and Algorithm Analysis B	3	1	2 Fall	CS102A	CS
	EE206	Communication Principles	3	1	2 Spring	SDM246/EE205	EE
	CS208	Algorithm Design and Analysis	3	1	2 Spring	CS109 CS203B	CS
	EE313	Wireless Communications	3	1	3 Fall	EE206	EE
	EE323	Digital Signal Processing	3	1	3 Fall	SDM246/EE205	EE
	EE342	Sensors and Applications	3	0	3 Fall	None	EE
	CS303B	Artificial Intelligence B	3	1	3 Fall	CS203B CS109 MA212	CS
	CS307	Principles of Database Systems	3	1	3 Fall	None	CS
	MA305	Numerical Analysis	3	0	3 Fall	MA203A/MA213	MA
	CS405	Machine Learning	3	1	4 Fall	MA212 MA113	CS
	Total		99	25.5			
Note: At least 24 credits are required , and at least five courses from Module A are required.							

Table 3: Overview of Practice-based Learning

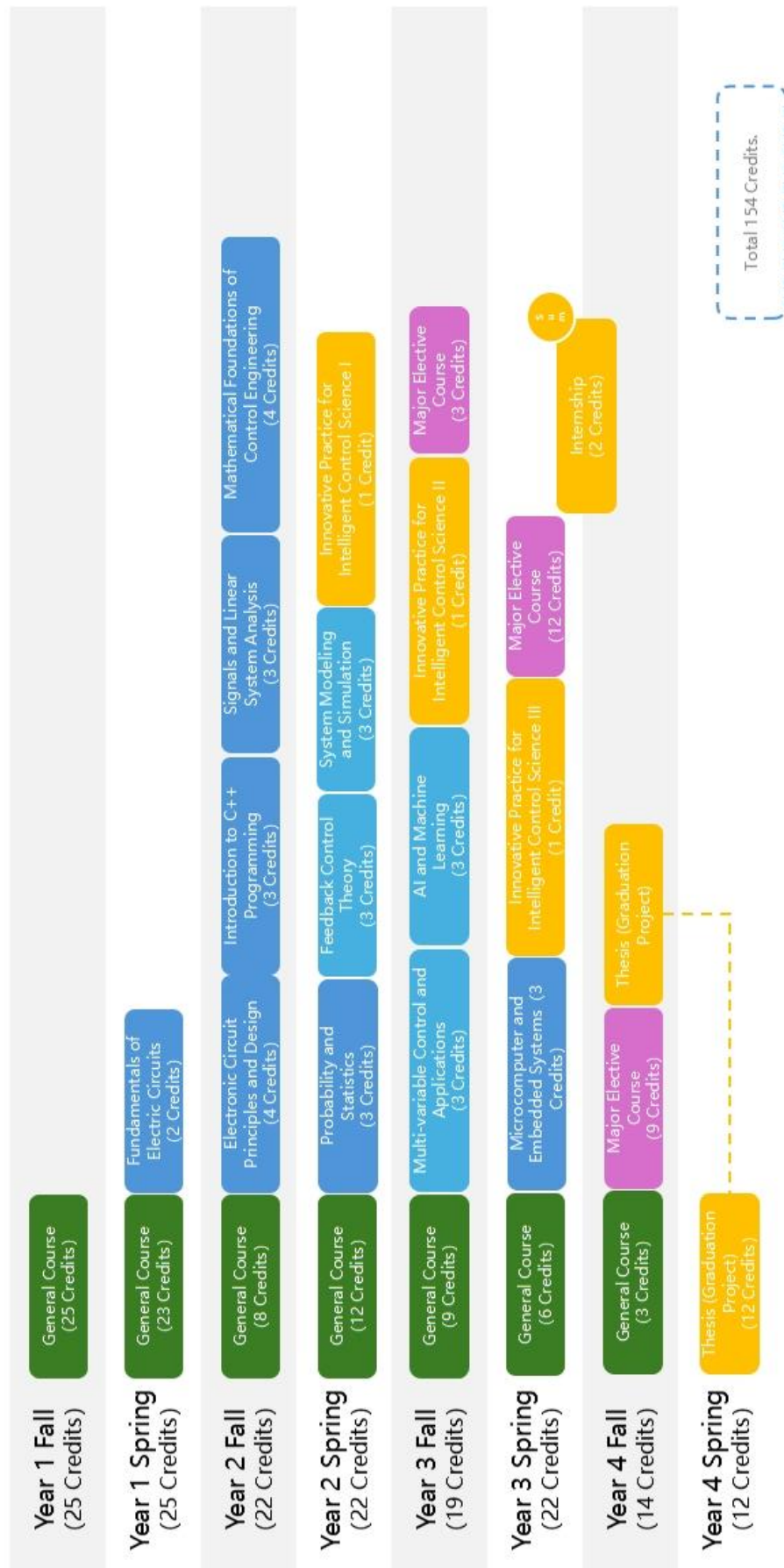
Program of Automation

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
SDM244	Electronic Circuit Principles and Design	4	1	2 Fall	PHY106 EE104	SDIM
SDM252	Introduction to C++ Programming	3	1	2 Fall	None	SDIM
EE211	Robotic Perception and Intelligence	3	1	2 Fall	E	EE
CS203B	Data Structures and Algorithm Analysis B	3	1	2 Fall	CS102A	CS
EE206	Communication Principles	3	1	2 Spring	SDM246/EE205	EE
SDM271	System Modeling and Simulation	3	1	2 Spring	SDM234	EE
SDM273	Intelligent Sensors and Signal Processing	3	1	2 Spring	EE104	SDIM
SDM301	Innovative Practice for Intelligent Control Science I	1	1	2 Spring	None	SDIM
CS208	Algorithm Design and Analysis	3	1	2 Spring	CS109 CS203B	CS
EE313	Wireless Communications	3	1	3 Fall	EE206	EE
SDM302	Innovative Practice for Intelligent Control Science II	1	1	3 Fall	None	EE
EE323	Digital Signal Processing	3	1	3 Fall	SDM246/EE205	EE

CS303B	Artificial Intelligence B	3	1	3 Fall	CS203B CS109 MA212	CS
CS307	Principles of Database Systems	3	1	3 Fall	None	CS
SDM357	Computer Networking and its Industrial Application	3	0.5	3 Fall	None	SDIM
EE346	Mobile Robot Navigation and Control	3	1	3 Fall	SDM246/EE205 MA212	EE
SDM5002	Intelligent Sensing Systems in Mobile Robots	3	1	3 Fall	Introduction to Python Programming, Fundamental of Electric Circuits	SDIM
SDM371	Big Data	3	1	3 Fall	Linear Algebra	SDIM
SDM374	Machine Learning System Design	3	1	3 Spring	Linear Algebra	SDIM
SDM378	Computer Vision and Application	3	1	3 Spring	Introduction to Python Programming, Calculus II, Linear Algebra	SDIM
SDM375	Intelligent Robot Design	3	1	3 Spring	Introduction to Python Programming	SDIM
SDM373	Sensor and Intelligent Detection Technology	3	1	3 Spring	None	SDIM
SDM358	Microcomputer and Embedded Systems	3	1	3 Spring	SDM244	SDIM
ME336	Collaborative Robot Learning	3	1	3 Spring	ME306 或 ME331	ME
CS314	Internet of Things	3	1	3 Spring	CS305	CS
EE326	Digital Image Processing	3	1	3 Spring	SDM246/EE205	EE
EE332	Digital System Design	3	1	3 Spring	EE202-17	EE
SDM365	Robot Motion Control	3	1	3 Spring	MA127 MA113	SDIM
EE368	Robotic Motion and Control	3	1	3 Spring	SDM246/EE205	EE
SDM303	Innovative Practice for Intelligent Control Science III	1	1	3 Spring	None	SDIM
SDM403	Internship	2	2	3 Summer	None	SDIM
SDM5008	Advanced Robot Control	3	1	4 Fall	SDM271 SDM263	SDIM
CS405	Machine Learning	3	1	4 Fall	MA212 MA113	CS
SDM492	Thesis (Graduation Project)	12	12	4 Spring	None	SDIM
SDM471	AR / VR and Its Application	3	1	4 Spring	Introduction to Python Programming	SDIM
Total		105	45.5			

■ General Course
 ■ Major Foundational Course
 ■ Major Core Course
 ■ Practice-based Course
 ■ Major Elective Course

Curriculum Structure of Automation



School of Life Sciences

Program of Biological Sciences for International Students (2024)

I. Introduction

Life science has been central to the development of the 21st century natural sciences, and its development is related to people's health and well-being. Today, life and health industry has become a new driving force to promote the development of the world economy. Therefore, the central and local governments set the strategic priorities to foster advancing emerging life science related industries.

Life science is one of the key disciplines of the Southern University of Science and Technology (SUSTech). Founded in 2012, the Department of Biology is among the first established academic departments in the university. The College of Life Sciences was established in 2020. Since its founding, the school has assembled groups of faculty members with diverse research interests and expertise to tackle fundamental problems of life science. All of the faculty members had prior research experience at top internationally-acclaimed universities before joining SUSTech and some of them had been awarded tenures in these universities or research institutions worldwide.

The faculty of the school are supported by the state-of-the-art scientific research platform facilities and talent recruitment programs, such as the Guangdong Provincial Key Laboratory of Cellular Microenvironment and Disease Research, Key Laboratory of Molecular Design for Plant Cell Factory of Guangdong Higher Education Institutes, Guangdong Provincial "Pearl River Talent Program" for Innovation and Entrepreneurship, Cryo-EM Center, Plant and Food Research Institute, SUSTech-UQ Joint Centre for Neuroscience and Neural Engineering and Experimental Animal Center. Concentrated on a number of major areas, namely molecular cell biology, neurobiology, plant biology, systems biology and structural biology, chemical biology, immunology and microbiology, their research focuses on the frontiers of life science and high-impact human health issues, with cross-disciplinary approaches.

The life science program in the school was approved as a key discipline at the provincial level (Guangdong) in 2016. In 2018, the school was authorized to confer doctorate and master's degrees to graduate students, and was designated as a postdoctoral workstation in 2019. These developments set the school on track to be developed as a top-tier academic institution of

Guangdong province.

On this basis, we established a major in Biological Sciences, aiming to inspire students to understand the nature of life at different levels, such as molecules, cells, individuals, etc., through extensive basic training in modern biology and a research-oriented learning environment, while improving students' ability to solve problems by means of scientific methods. What's more, the major of Biological Sciences was approved as a national first-class undergraduate major construction site in 2022.

Academic subject areas: Biological Sciences

Program code: 071001

II. Objectives and Learning Outcomes

1. Objectives

In teaching, the major emphasizes the core basic concept of biological science and the concept of applied science, and applies modern scientific methods to encourage students to study biochemistry, microbiology, molecular biology, cell biology, genetics, and animal physiology through theoretical courses, experiments and seminars. Meanwhile, students will learn how to critically evaluate original research literature by means of paper reading and class discussion. Through various ways of learning, students will master valuable analytical, organizational, and communication skills to become professionals who will be competent in a variety of careers or continue their studies.

2. Learning Outcomes

- (1) Mastering the basic theoretical knowledge of mathematics, physics, chemistry and life science, and forming a relatively systematic scientific world view and methodology.
- (2) Having the ability to write scientific and technological papers in English and to do academic presentations in English.
- (3) Understanding the latest developments in the biological science and carrying out scientific research in the laboratory.
- (4) Having the comprehensive ability to apply the theoretical knowledge and skills and engaging in research in biological science and related sciences.

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 Science

3 . The minimum credit requirement for graduation: 151 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	4
		Geoscience + Life Science	3
	GE to Majors Bridging Module	Introduction to Majors	2
Major Courses	Major Required Courses	Major Foundational Courses	19
		Major Core Courses	14
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	12
	Major Elective Courses	Major Elective Courses	26
Total			151
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		Requirement	Credits	Terms	Prerequisite	Dept.
Mathematics	MA101a	Mathematical Analysis I	Category A	Required Choose one set from three sets	5	1/Fall	None	Department of Mathematics
	MA102a	Mathematical Analysis II			5	1/Spr	Mathematical Analysis I	
	MA117	Calculus I	Category B		4	1/Fall	None	
	MA127	Calculus II			4	1/Spr	Calculus I	
	MA118	Single-variable Calculus	Category C		4	1/Fall	None	
	MA128	Multivariable Calculus			4	1/Spr	Single-variable Calculus	
	MA107	Advanced Linear Algebra I		Required Choose one from two	4	2/Fall	None	
	MA113	Linear Algebra			4	2/Fall	None	
Physics	PHY101	General Physics I	Category A	Required Choose one set from two sets	5	1/Fall	None	Department of Physics
	PHY102	General Physics II			5	1/Spr	General Physics I	
	PHY105	College Physics I	Category B		4	1/Fall	None	
	PHY106	College Physics II			4	1/Spr	College Physics I	
	PHY104B	Experiments of Fundamental Physics		Required	2	2/Spr	None	
Chemistry	CH103	General Chemistry		Required	4	1/Fall	None	Department of Chemistry
Geoscience + Life Science	BIO103	Principles of Biology		Required	3	1/Fall	None	Department of Biology
Computer Programming	CS109	Introduction to Computer Programming		Required Choose one from five	3	1/Fall	None	Dept. of Computer Science and Engineering
	CS110	Introduction to Java Programming			3	1/Fall	None	
	CS111	Introduction to C programming			3	1/Fall	None	
	CS112	Introduction to Python Programming Python			3	1/Fall	None	
	CS113	Introduction to Matlab Programming			3	1/Fall	None	

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name		Prerequisite
Declare major at the end of the first academic year	MA101a	Mathematical Analysis I	Choose one from three	None
	MA117	Calculus I		None
	MA118	Single-variable Calculus		None
	MA102a	Mathematical Analysis II	Choose one from three	Mathematical Analysis I
	MA127	Calculus II		Calculus I
	MA128	Multivariable Calculus		Single-variable Calculus
	CH103	General Chemistry		None
	BIO103	Principles of Biology		None
Declare major at the end of the second academic year	MA101a	Mathematical Analysis I	Choose one from three	None
	MA117	Calculus I		None
	MA118	Single-variable Calculus		None
	MA102a	Mathematical Analysis II	Choose one from three	Mathematical Analysis I
	MA127	Calculus II		Calculus I
	MA128	Multivariable Calculus		Single-variable Calculus
	CH103	General Chemistry		None
	BIO103	Principles of Biology		None
	PHY101	General Physics I	Choose one from two	None
	PHY105	College Physics I		None
	PHY102	General Physics II	Choose one from two	General Physics I
	PHY106	College Physics II		College Physics I
Note:				
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.				
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.				
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).				
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).				

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Biological Sciences

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	BIO104	General Biology Laboratory	2	2	1/Spr	Principles of Biology	BIO
	CH106	Organic Chemistry B	3		1/Spr	General Chemistry	CH
	BIO201	Biochemistry (Macromolecules)	3		2/Fall	Principles of Biology, General Chemistry	BIO
	BIO203	Microbiology	3		2/Fall	None	BIO
	BIO202	Biochemistry II (Metabolism)	3		2/Spr	Biochemistry (Macromolecules)	BIO
	BIO222	Biochemistry and Molecular Biology Laboratory	2	2	2/Spr	General Biology Laboratory, Biochemistry (Macromolecules)	BIO
	BIO210	Biostatistics	3		2/Spr	Mathematical Analysis I or Calculus I or Single-variable Calculus	BIO
	Total		19	4			
Major Core Courses	BIO301	Genetics	3		2/Spr	None	BIO
	BIO206	Cell Biology	3		3/Fall	Principles of Biology	BIO
	BIO208	Cell Biology Laboratory	2	2	3/Fall	Cell Biology	BIO
	BIO 311-14	Animal Physiology	3		3/Fall	None	BIO
	BIO320	Molecular Biology	3		3/Spr	Biochemistry (Macromolecules)	BIO
	Total		14	2			
Practice-based Courses	BIO492	Thesis	12	12	4/Fall-Spr.	Integrated Laboratory Research Training	SLS
	Total		12	12			
Total			45	18			
Note: CH106 Organic Chemistry I can be equivalent to CH 203 Organic Chemistry B.							

Table 2: Major Elective Courses**Program of Biological Sciences-Restricted, 6 credits**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
BIO481	Integrated Laboratory Research Training--Plant Biology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO482	Integrated Laboratory Research Training--Immunology & Microbiology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO483	Integrated Laboratory Research Training--Systems Biology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO484	Integrated Laboratory Research Training--Chemical Biology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO485	Integrated Laboratory Research Training--Neuroscience	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
Total		30	30			

Note:

Only after passing the course of “Biological Integrated Laboratory Research Training”, students can choose BIO492 “Thesis”.

Program of Biological Sciences-Elective, 20 credits

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Elective Courses offered by Department of Non-Biology						
CH102-15	General Chemistry Laboratory	2	2	1/Spr	General Chemistry	CHEM
CH208	Organic Chemistry Laboratory	2	2	2/Fall	General Chemistry Laboratory	CHEM
CH216	Analytical Chemistry I	3		2/Fall	General Chemistry	CHEM
CH217	Analytical Chemistry Laboratory I	2	2	2/Fall	General Chemistry	CHEM
CH313	Chemical Biology	3		3/Fall	General Chemistry	CHEM
CH317	Medicinal Chemistry	3		4/Fall	None	CHEM
ESE313	Introduction to Ecology	3		3/Fall	None	ESE
OCE203	Marine Biology	3		2/Spr	None	OCE
Major Elective Courses offered by Department of Biology, School of Life Sciences						
BIO205	Microbiology Laboratory	2	2	2/Fall	General Biology Laboratory	BIO
BIO207-15	Plant Physiology	3		2/Fall	Principles of Biology	BIO
BIO209-15	Plant Physiology Laboratory	2	2	2/Fall	General Biology Laboratory	BIO

BIO217	Biological Psychology	3		2/Fall	Principles of Biology	BIO
BIO224	Basic Synthetic Biology	3		2/Spr	Principles of Biology Or Introduction to Life Science	SLS
BIO226	Introduction to Species Evolution and Ecology	3		2/Spr	Principles of Biology	SLS
BIO303	Genetics Laboratory	2	2	2/Spr	Genetics, Biochemistry and Molecular Biology Laboratory	BIO
BIO308	Frontier in Life Sciences Seminar and Journal Club	2		2/Spr	None	BIO
BIO309	Computational Biology	3	1	3/Fall	None	BIO
BIO313-15	Animal Physiology Laboratory	2	2	3/Fall	General Biology Laboratory	BIO
BIO336	The Biology of Cancer	3		3/Fall	None	BIO
BIO340	Protein Engineering	3		3/Fall	Biochemistry (Macromolecules)	BIO
BIO347	Basic Principles of Biophysics	3		3/Fall	Biochemistry (Macromolecules)	BIO
BIO401-16	Genetic Engineering	3		3/Fall	Biochemistry (Macromolecules)	BIO
BIO302	Modern Biotechnology	3		3/Spr	Biochemistry (Macromolecules)	BIO
BIO304	Systems Biology	3		3/Spr	Principles of Biology, Biostatistics or Probability and Statistics	BIO
BIO305	Model Organism and Developmental Biology	3		3/Spr	Principles of Biology	BIO
BIO306	Bioinformatics	4	2	3/Spr	None	BIO
BIO307	Model organism and Developmental Biology Laboratory	1	1	3/Spr	General Biology Laboratory	BIO
BIO310	Neurobiology	3		3/Spr	Biochemistry (Macromolecules)	BIO
BIO331	Protein Structure and Function	3	1	3/Spr	Biochemistry (Macromolecules)	BIO
BIO332	Stem Cell and Regenerative Medicine	2		3/Spr	Cell Biology	BIO
BIO344	Modern Biotechnology Laboratory	2	2	3/Spr	General Biology Laboratory	BIO
BIO346	Bioseparations	3	1	3/Spr	Biochemistry II (Metabolism)	BIO
BIO350	Genomics	3		3/Spr	Principles of Biology	BIO
BIO405	Immunology	3		4/Fall	Cell Biology	BIO
BIO348	Scientific Writing and Communication	1		4/Spr	None	BIO
BIO470	Summer Off-Campus Internship	2	2	1,2,3/Smr	None	BIO
BIO471	Field Trips I	1	1	1/Smr	None	BIO

BIO472	Field Trips II	1	1	2,3/Smr	None	BIO
BIO473	Field Trips III	1	1	3/Smr	None	BIO
Total		97	27			

Note:
A minimum of 20 credits (include at least 4 lab credits) MUST be taken to fulfill Major Requirements.

Table 3: Overview of Practice-based Learning

Program of Biological Sciences

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CS109	Introduction to Computer Programming	3	1	1/Fall	None	CSE
CS110	Introduction to Java Programming	3	1	1/Fall	None	CSE
CS111	Introduction to C programming	3	1	1/Fall	None	CSE
CS112	Introduction to Python Programming	3	1	1/Fall	None	CSE
CS113	Introduction to Matlab Programming	3	1	1/Fall	None	CSE
CH102-15	General Chemistry Laboratory A	2	2	1/Spr	General Chemistry	CHEM
CH208	Organic Chemistry Laboratory	2	2	2/Fall	General Chemistry Laboratory A, Organic Chemistry B	CHEM
CH217	Analytical Chemistry Laboratory I	2	2	2/Fall	Analytical ChemistryI	CHEM
PHY104B	Experiments of Fundamental Physics	2	2	2/Spr	None	PHY
BIO104	General Biology Laboratory	2	2	1/Spr	Principles of Biology	BIO
BIO205	Microbiology Laboratory	2	2	2/Fall	General Biology Laboratory	BIO
BIO209-15	Plant Physiology Laboratory	2	2	2/Fall	General Biology Laboratory	BIO
BIO222	Biochemistry and Molecular Biology Laboratory	2	2	2/Spr	General Biology Laboratory, Biochemistry (Macromolecules)	BIO
BIO303	Genetics Laboratory	2	2	2/Spr	Genetics, Biochemistry and Molecular Biology Laboratory	BIO
BIO208	Cell Biology Laboratory	2	2	3/Fall	Cell Biology	BIO
BIO309	Computational Biology	3	1	3/Fall	None	BIO
BIO313-15	Animal Physiology Laboratory	2	2	3/Fall	General Biology Laboratory	BIO
BIO306	Bioinformatics	4	2	3/Spr	None	BIO

BIO307	Model organism and Developmental Biology Laboratory	1	1	3/Spr	General Biology Laboratory	BIO
BIO331	Protein Structure and Function	3	1	3/Spr	Biochemistry (Macromolecules)	BIO
BIO344	Modern Biotechnology Laboratory	2	2	3/Spr	General Biology Laboratory	BIO
BIO346	Bioseparations	3	1	3/Spr	Biochemistry II (Metabolism)	BIO
BIO470	Summer Off-Campus Internship	2	2	1,2,3/Smr	None	BIO
BIO471	Field Trips I	1	1	1/Smr	None	BIO
BIO472	Field Trips II	1	1	2,3/Smr	None	BIO
BIO473	Field Trips III	1	1	3/Smr	None	BIO
BIO481	Integrated Laboratory Research Training--Plant Biology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO482	Integrated Laboratory Research Training--Immunology & Microbiology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO483	Integrated Laboratory Research Training--Systems Biology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO484	Integrated Laboratory Research Training--Chemical Biology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO485	Integrated Laboratory Research Training--Neuroscience	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO492	Thesis	12	12	4/Fall-Spr.	Integrated Laboratory Research Training	SLS
Total		100	82			

Curriculum Structure of Biological Sciences

Curriculum Structure – Biological Sciences

Thesis/Projects

Major Elective

Major Required

Required GE

Spring/Year 4	Scientific Writing and Communication (BIO348)	Thesis (BIO490)									
Fall/Year 4	Immunology (BIO405)	Medical Chemistry (CH317)	Biological Integrated Laboratory Research Training (BIO481-495)								
Spring/Year 3	Molecular Biology (BIO320)	Modern Biotechnology (BIO302)	Systems Biology (BIO304)	Model Organism and Developmental Biology (BIO305)	Biometrics (BIO306)	Model organism and Developmental Biology Laboratory (BIO307)	Neurobiology (BIO310)	Protein Structure and Function (BIO331)	Stem Cell and Regenerative Medicine (BIO332)	Modern Biotechnology Laboratory (BIO344)	Genomics (BIO350)
Fall/Year 3	Cell Biology (BIO206)	Cell Biology Laboratory (BIO208)	Animal Physiology (BIO311-14)	Computational Biology (BIO309)	Animal Physiology Laboratory (BIO313-15)	The Biology of Cancer (BIO336)	Protein Engineering (BIO340)	Basic Principles of Biophysics (BIO347)	Genetic Engineering (BIO401-16)	Chemical Biology (CH313)	Introduction to Ecology (ESE313)
Spring/Year 2	Experiment of Fundamental Physics (PHY104)	Biochemistry II (Metabolism) (BIO202)	Biochemistry and Molecular Biology Laboratory (BIO222)	Biostatistics (BIO210)	Genetics (BIO301)	Basic Synthetic Biology (BIO224)	Introduction to Species Evolution and Ecology (BIO226)	Frontier in Life Sciences Seminar and Journal Club (BIO308)	Marine Biology (OCE203)	Chinese Language and Culture	Physical Education
Fall/Year 2	Linear Algebra Category choose one from two	Biochemistry (Macromolecules) (BIO201)	Microbiology (BIO203)	Microbiology Laboratory (BIO205)	Plant Physiology (BIO207-15)	Plant Physiology Laboratory (BIO209-15)	Biological psychology (BIO217)	Organic Chemistry Laboratory (CH208)	Analytical Chemistry I (CH216)	Arts	Writing
Spring/Year 1	Category of Calculus I,II; choose one set from three sets	Category of Physics I,II; choose one set from two sets	General Biology Laboratory BIO104	Organic Chemistry B (CH106)	General Chemistry Laboratory A I (CH102-17)						
Fall/Year 1			Principles of Biology (BIO103)	General Chemistry (CH103)	Category of Computer Programming; choose one from five						

School of Life Sciences

Program of Bioinformatics for International Students (2024)

I. Introduction

Life science has been central to the development of the 21st century natural sciences, and its development is related to people's health and well-being. Today, life and health industry has become a new driving force to promote the development of the world economy. Therefore, the central and local governments set the strategic priorities to foster advancing emerging life science related industries.

Life science is one of the key disciplines of the Southern University of Science and Technology (SUSTech). Founded in 2012, the Department of Biology is among the first established academic departments in the university. The College of Life Sciences was established in 2020. Since its founding, the school has assembled groups of faculty members with diverse research interests and expertise to tackle fundamental problems of life science. All of the faculty members had prior research experience at top internationally-acclaimed universities before joining SUSTech and some of them had been awarded tenures in these universities or research institutions worldwide.

The faculty of the school are supported by the state-of-the-art scientific research platform facilities and talent recruitment programs, such as the Guangdong Provincial Key Laboratory of Cellular Microenvironment and Disease Research, Key Laboratory of Molecular Design for Plant Cell Factory of Guangdong Higher Education Institutes, Guangdong Provincial "Pearl River Talent Program" for Innovation and Entrepreneurship, Cryo-EM Center, Plant and Food Research Institute, SUSTech-UQ Joint Centre for Neuroscience and Neural Engineering and Experimental Animal Center. Concentrated on a number of major areas, namely molecular cell biology, neurobiology, plant biology, systems biology and structural biology, chemical biology, immunology and microbiology, their research focuses on the frontiers of life science and high-impact human health issues, with cross-disciplinary approaches.

The life science program in the school was approved as a key discipline at the provincial level (Guangdong) in 2016. In 2018, the school was authorized to confer doctorate and master's degrees to graduate students, and was designated as a postdoctoral workstation in 2019. These developments set the school on track to be developed as a top-tier academic institution of Guangdong province.

On this basis, we set up a special major in Bioinformatics to meet the urgent needs of the society for talents in this field. With the strength of its excellent basis and faculty in bioinformatics research, the School of Life Sciences is committed to cultivating excellent comprehensive and innovative talents with strong biological information research and practical abilities.

Academic subject areas: Biological Sciences

Program code: 071003

II. Objectives and Learning Outcomes

1. Objectives

It aims to cultivate high-level comprehensive and innovative talents with complete moral, intellectual and physical development, who master the basic knowledge of biological science, systematically master the basic theory, knowledge and skills of computer science and biological information, and have strong practical and research ability in the acquisition, processing, development and utilization of biological information. We focus on developing students' creative ability, independent thinking and scientific research capabilities, so that students will become scientists in the field of bioinformatics in the future, or core technology developers in enterprises.

2. Learning Outcomes

- (1) Mastering the basic theoretical knowledge of mathematics, physics and life science.
- (2) Mastering the basic theories, knowledge and skills of computer science and biological information; understanding the frontiers and latest developments in bioinformatics.
- (3) Having the ability to independently design experiments, conduct experiments, collect and analyze experimental results, and write reports; having internationalized version with the ability to write, communicate and present scientific results in English.

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 Science

3 . The minimum credit requirement for graduation: 151 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	14
		Major Core Courses	19
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	12
	Major Elective Courses	Major Elective Courses	27
Total			151
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

Category	Course Code	Course Name	Requirement	Credits	Terms	Prerequisite	Dept.
Mathematics	MA101a	Mathematical Analysis I	Category A	5	1/Fall	None	Department of Mathematics
	MA102a	Mathematical Analysis II		5	1/Spr	Mathematical Analysis I	
	MA117	Calculus I	Category B	4	1/Fall	None	
	MA127	Calculus II		4	1/Spr	Calculus I	
	MA107	Advanced Linear Algebra I	Required Choose one from two	4	1/Spr	None	
	MA113	Linear Algebra		4	1/Fall Spr	None	
Physics	PHY101	General Physics I	Category A	5	1/Fall	None	Department of Physics
	PHY102	General Physics II		5	1/Spr	General Physics I	
	PHY105	College Physics I	Category B	4	1/Fall	None	
	PHY106	College Physics II		4	1/Spr	College Physics I	
	PHY104B	Experiments of Fundamental Physics	Required	2	2/Fall	None	
Chemistry	CH103	General Chemistry	Required	4	1/Fall	None	Department of Chemistry
	CH105	Chemistry: The Central Science	Choose one from two	3	1/Fall	None	
Geoscience + Life Science	BIO103	Principles of Biology	Required	3	1/Fall	None	Department of Biology
Computer Programming	CS109	Introduction to Computer Programming	Required Choose one from five	3	1/Fall	None	Dept. of Computer Science and Engineering
	CS110	Introduction to Java Programming		3	1/Fall	None	
	CS111	Introduction to C programming		3	1/Fall	None	
	CS112	Introduction to Python Programming Python		3	1/Fall	None	
	CS113	Introduction to Matlab Programming		3	1/Fall	None	

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name		Prerequisite
Declare major at the end of the first academic year	MA101a	Mathematical Analysis I	Choose one from two	None
	MA117	Calculus I		None
	MA102a	Mathematical Analysis II	Choose one from two	Mathematical Analysis I
	MA127	Calculus II		Calculus I
	CS109	Introduction to Computer Programming	Choose one from five	None
	CS110	Introduction to Java Programming		None
	CS111	Introduction to C programming		None
	CS112	Introduction to Python Programming Python		None
	CS113	Introduction to Matlab Programming		None
	BIO103	Principles of Biology		None
Declare major at the end of the second academic year	MA101a	Mathematical Analysis I	Choose one from two	None
	MA117	Calculus I		None
	MA102a	Mathematical Analysis II	Choose one from two	Mathematical Analysis I
	MA127	Calculus II		Calculus I
	CS109	Introduction to Computer Programming	Choose one from five	None
	CS110	Introduction to Java Programming		None
	CS111	Introduction to C programming		None
	CS112	Introduction to Python Programming Python		None
	CS113	Introduction to Matlab Programming		None
	BIO103	Principles of Biology		None
	PHY101	General Physics I	Choose one from two	None
	PHY105	College Physics I		None
	PHY102	General Physics II	Choose one from two	General Physics I
	PHY106	College Physics II		College Physics I
Note:				
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.				
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.				
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).							
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).						

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Bioinformatics

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	BIO104	General Biology Laboratory	2	2	1/Spr	Principles of Biology	BIO
	BIO201	Biochemistry (Macromolecules)	3		2/Fall	Principles of Biology, General Chemistry or Chemistry: The Central Science	BIO
	MA212	Probability and Statistics	3		2/Fall	Mathematical Analysis II or Calculus II	MATH
	BIO202	Biochemistry I (Metabolism)	3		2/Spr	Biochemistry (Macromolecules)	BIO
	BIO301	Genetics	3		2/Spr	None	BIO
	Total		14	2			
Major Core Courses	BIO206	Cell Biology	3		3/Fall	Principles of Biology	BIO
	BIO309	Computational Biology	3	1	3/Fall	None	BIO
	BIO304	Systems Biology	3		3/Spr	Principles of Biology, Probability and Statistics	BIO
	BIO306	Bioinformatics	4	2	3/Spr	None	BIO
	BIO320	Molecular Biology	3		3/Spr	Biochemistry (Macromolecules)	BIO
	BIO350	Genomics	3		3/Spr	Principles of Biology	BIO
	Total		19	3			
Practice-based Courses	BIO492	Thesis	12	12	4/Fall-Spr	Integrated Laboratory Research Training	SLS
	Total		12	12			
Total			45	17			

Table 2: Major Elective Courses**Program of Bioinformatics, 27 credits**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
“Biological Integrated Laboratory Research Training” Module, choose one from five, 6 credits.						
BIO481	Integrated Laboratory Research Training--Plant Biology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO482	Integrated Laboratory Research Training--Immunology & Microbiology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO483	Integrated Laboratory Research Training--Systems Biology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO484	Integrated Laboratory Research Training--Chemical Biology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO485	Integrated Laboratory Research Training--Neuroscience	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
Total		30	30			
“Computer science and technology” Module, choose 3 from 9, 9 credits.						
CS203B	Data Structures and Algorithm Analysis B	3	1	2/Fall	Introduction to Computer Programming or Introduction to Java Programming	CSE
CS205	C/C++ Program Design	3	1	2/Fall	None	CSE
CS307	Principles of Database Systems	3	1	2/Fall	Introduction to Computer Programming	CSE
CS201	Discrete Mathematics	3		2/Spr	Calculus II, Linear Algebra	CSE
CS208	Algorithm Design and Analysis	3	1	2/Spr	Introduction to Computer Programming, Data Structures and Algorithm Analysis	CSE
CS303B	Artificial Intelligence B	3	1	3/Fall	Data Structures and Algorithm Analysis B, Probability and Statistics	CSE
CS306	Data Mining	3	1	3/Spr	Data Structures and Algorithm Analysis B	CSE
CS324	Deep Learning	3	1	3/Spr	Artificial Intelligence	CSE

CS332	Information Retrieval	3	1	3/Spr	Data Structures and Algorithm Analysis	CSE
Total		27	8			
“Mathematics and Statistics” Module, choose one from six, 3 credits						
STA217	Introduction to Data Science	3		2/Fall	Calculus II or Mathematical Analysis II	STA
MA201b	Ordinary Differential Equations B	4		2/Spr	Calculus II or Mathematical Analysis II	MATH
MA329	Statistical Linear Models	3		3/Fall	Probability and Statistics	STA
MA206	Mathematical Modeling	3		3/Spr	Ordinary Differential Equations B	MATH
MA234	Introduction to Theoretical and Practical Data Science	4	1	3/Spr	Probability and Statistics	MATH
MA405	Survival Analysis	3		4/Fall	Statistical Linear Models	STA
Total		20	1			
“Life Sciences” Module, 15 credits						
BIO203	Microbiology	3		2/Fall	None	BIO
BIO205	Microbiology Laboratory	2	2	2/Fall	General Biology Laboratory	BIO
BIO207-15	Plant Physiology	3		2/Fall	Principles of Biology	BIO
BIO217	Biological Psychology	3		2/Fall	Principles of Biology	BIO
BIO222	Biochemistry and Molecular Biology Laboratory	2	2	2/Spr	General Biology Laboratory, Biochemistry (Macromolecules)	BIO
BIO224	Basic Synthetic Biology	3		2/Spr	Principles of Biology Or Introduction to Life Science	SLS
BIO226	Introduction to Species Evolution and Ecology	3		2/Spr	Principles of Biology	SLS
BIO303	Genetics Laboratory	2	2	2/Spr	Genetics, Biochemistry and Molecular Biology Laboratory	BIO
BIO308	Frontier in Life Sciences Seminar and Journal Club	2		2/Spr	None	BIO
BIO471	Field Trips I	1	1	1/Smr	None	BIO
BIO208	Cell Biology Laboratory	2	2	3/Fall	Cell Biology	BIO
BIO311-14	Animal Physiology	3		3/Fall	None	BIO
BIO336	The Biology of Cancer	3		3/Fall	None	BIO
BIO340	Protein Engineering	3		3/Fall	Biochemistry (Macromolecules)	BIO
BIO347	Basic Principles of Biophysics	3		3/Fall	Biochemistry (Macromolecules)	BIO
BIO401-16	Genetic Engineering	3		3/Fall	Biochemistry (Macromolecules) or Genetics	BIO

BIO302	Modern Biotechnology	3		3/Spr	Biochemistry (Macromolecules)	BIO
BIO305	Model Organism and Developmental Biology	3		3/Spr	Principles of Biology	BIO
BIO310	Neurobiology	3		3/Spr	Biochemistry (Macromolecules)	BIO
BIO331	Protein Structure and Function	3	1	3/Spr	Biochemistry (Macromolecules)	BIO
BIO332	Stem Cell and Regenerative Medicine	2		3/Spr	Cell Biology	BIO
BIO344	Modern Biotechnology Laboratory	2	2	3/Spr	General Biology Laboratory	BIO
BIO405	Immunology	3		4/Fall	Cell Biology	BIO
BIO348	Scientific Writing and Communication	1		4/Spr	None	BIO
BIO470	Summer Off-Campus Internship	2	2	1,2,3/Smr	None	BIO
Total		63	14			

Note:

1. Only after passing the course of “Biological Integrated Laboratory Research Training”, students can choose BIO492 “Thesis”.
2. CS203B“Data Structures and Algorithm Analysis B” could be replaced by CS203“Data Structures and Algorithm Analysis “
3. CS303B“Artificial Intelligence B” could be replaced by CS303“Artificial Intelligence” or STA303“Artificial Intelligence B”.

Table 3: Overview of Practice-based Learning

Program of Bioinformatics

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CS109	Introduction to Computer Programming	3	1	1/Fall	None	CSE
CS110	Introduction to Java Programming	3	1	1/Fall	None	CSE
CS111	Introduction to C programming	3	1	1/Fall	None	CSE
CS112	Introduction to Python Programming Python	3	1	1/Fall	None	CSE
CS113	Introduction to Matlab Programming	3	1	1/Fall	None	CSE
CS203B	Data Structures and Algorithm Analysis B	3	1	2/Fall	Introduction to Computer Programming Introduction to Java Programming	CSE
CS205	C/C++ Program Design	3	1	2/Fall	None	CSE
CS307	Principles of Database Systems	3	1	2/Fall	Introduction to Computer Programming	CSE
CS208	Algorithm Design and Analysis	3	1	2/Spr	Introduction to Computer Programming, Data Structures and Algorithm Analysis	CSE
CS303B	Artificial Intelligence B	3	1	3/Fall	Data Structures and Algorithm Analysis B, Probability and Statistics	CSE
CS306	Data Mining	3	1	3/Spr	Data Structures and Algorithm Analysis B	CSE
CS324	Deep Learning	3	1	3/Spr	Artificial Intelligence	CSE
CS332	Information Retrieval	3	1	3/Spr	Data Structures and Algorithm Analysis	CSE
MA234	Introduction to Theoretical and Practical Data Science	4	1	3/Spr	Probability and Statistics	MATH
PHY104B	Experiments of Fundamental Physics	2	2	2/Spr	None	PHY
BIO104	General Biology Laboratory	2	2	1/Spr	Principles of Biology	BIO

BIO205	Microbiology Laboratory	2	2	2/Fall	General Biology Laboratory	BIO
BIO222	Biochemistry and Molecular Biology Laboratory	2	2	2/Spr	General Biology Laboratory, Biochemistry (Macromolecules)	BIO
BIO303	Genetics Laboratory	2	2	2/Spr	Genetics, Biochemistry and Molecular Biology Laboratory	BIO
BIO471	Field Trips I	1	1	2/Smr	None	BIO
BIO208	Cell Biology Laboratory	2	2	3/Fall	Cell Biology	BIO
BIO309	Computational Biology	3	1	3/Fall	None	BIO
BIO306	Bioinformatics	4	2	3/Spr	None	BIO
BIO331	Protein Structure and Function	3	1	3/Spr	Biochemistry (Macromolecules)	BIO
BIO344	Modern Biotechnology Laboratory	2	2	3/Spr	General Biology Laboratory	BIO
BIO470	Summer Off-Campus Internship	2	2	1,2,3/Smr	None	BIO
BIO481	Integrated Laboratory Research Training--Plant Biology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO482	Integrated Laboratory Research Training--Immunology & Microbiology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO483	Integrated Laboratory Research Training--Systems Biology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO484	Integrated Laboratory Research Training--Chemical Biology	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO485	Integrated Laboratory Research Training--Neuroscience	6	6	2,3/Fall-Spr.	Principles of Biology General Biology Laboratory	SLS
BIO492	Thesis	12	12	4/Fall-Spr.	Integrated Laboratory Research Training	SLS
Total		112	77			

Curriculum Structure – Bioinformatics

Spring/Year 4		"Computer science and technology" Module, choose 3 from 9, 9 credits.	"Mathematics and Statistics" Module, choose one from six, 3 credits	"Life Science" Module, 15 credits	Scientific Writing and Communication (BIO348)	Thesis (BIO490)
Fall/Year 4			Survival Analysis (MA405)		Immunology (BIO405)	
Spring/Year 3		Systems Biology (BIO304)	Bioinformatics (BIO306)	Molecular Biology (BIO320)	Genomics (BIO350)	Biological Integrated Laboratory Research Training (BIO481-485)
Fall/Year 3		Cell Biology (BIO206)	Computational Biology (BIO309)			
Spring/Year 2	Chinese Language and Culture Physical Education	Genetics (BIO301)	Biochemistry I (Metabolism) (BIO202)	Discrete Mathematics (CS201)	Algorithm Design and Analysis (CS208)	
Fall/Year 2	Arts Writing Chinese Studies	Experiment of Fundamental Physics (PHY104)	Probability and Statistics (MA212)	Data Structures and Algorithm Analysis B (CS203B)	C/C++ Program Design (CS205)	
Spring/Year 1	Foreign Languages Humanities	Category of Calculus I;I; choose one set from two sets	Linear Algebra Category choose one from two	General Biology Laboratory BIO104	Introduction to Data Science (STA217)	Field Trips I-III (BIO471-473)
Fall/Year 1	Social Sciences GE to Majors Bridging	Category of Calculus I;I; choose one set from two sets	Principles of Biology (BIO103)	Category of Chemistry; choose one from two	Category of Computer Programming; choose one from five	

School of Medicine

Program of Biomedical Sciences for International Students (2024)

I. Introduction

Biomedical science is a frontier interdisciplinary subject that integrates the theories and methods of basic medicine and life science. The School of Medicine is staffed with the world's top scientists in the fields of biomedicine, including oncology, drug research and development, nervous system diseases, aging related diseases, pathogenic microorganisms, cardiovascular diseases, public health, precision medicine and big data analyses, intelligent medicine. The School of Medicine provides the students with the world's leading teaching and research resources. Students will carry out pioneering scientific research projects independently with the guidance of professors. Students from this major will go to one of the affiliated hospitals for an introductory training in clinical medicine in their senior year. The program provides an internationally competitive curriculum and one-to-one guidance to cultivate students' solid basic biomedical knowledge and innovative skills.

Academic subject areas: Preclinical Medicine (1001) ; Program code: Basic Medicine 100103T

II. Objectives and Learning Outcomes

1. Objectives

This program aims to train innovative research talents with knowledge of basic medicine and life sciences, aiming for developing strong experimental skills, ability of problem-solving, teamwork, lifelong learning to achieve international competitiveness by systematic learning and training.

2. Learning Outcomes

1. Master the biomedical knowledge in natural science, humanity, and social science.
2. Master the basic knowledge of basic medicine (e.g. physiology and pathophysiology, pathology, histology and embryology, medical immunology, etc.). Be familiar with the morphological and functional changes of human body in regard to molecules, cells and tissues, and the principles of these changes.

3. Master the basic scientific thinking and experimental techniques, with data analysis, literature retrieval, information acquisition and analysis.

4. Communicate effectively in both Chinese and English. Be able to read English academic literature, and have strong academic communication ability.

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 Science.

3. The minimum credit requirement for graduation: 157 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	4
		Geoscience + Life Science	3
	GE to Majors Bridging Module	Introduction to Majors	2
Major Courses	Major Required Courses	Major Foundational Courses	19
		Major Core Courses	30
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	18
	Major Elective Courses	Major Elective Courses	10
Total			157
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 Introduction to Majors 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	None	Department of Mathematics
	MA127	Calculus II	4	1 Spring	Calculus I	
	MA113	Linear Algebra	4	1 Spring & Fall	None	
Physics	PHY105	College Physics I	4	1 Fall	None	Department of Physics
	PHY106	College Physics II	4	1 Spring	College Physics I	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	
Chemistry	CH103	General Chemistry	4	1-2 Spring & Fall	None	Department of Chemistry
Life Science	BIO103	Principles of Biology	3	1-2 Spring & Fall	None	Department of Biology
Computer Programming	CS112	Introduction to Python Programming	3	1-2 Spring & Fall	None	Dept. of Computer Science and Engineering
Note: - For Mathematics Category, students can take Mathematical Analysis I and II, or Single-variable Calculus and Multivariable Calculus as alternatives to Calculus I and II; Advanced Linear Algebra I as an alternative to Linear Algebra. - For Physics Category, students can take General Physics I and II as alternatives to College Physics I and II. - For Computer Programming Category, students can choose any one of the five computer programming courses. - The above alternative courses 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	CH103	General Chemistry	
	BIO103	Principles of Biology	
Declare major at the end of the second academic year	MA117	Calculus I	
	PHY105	College Physics I	
	CH103	General Chemistry	
	BIO103	Principles of Biology	
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Biomedical Sciences

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	MED105	Medical Organic Chemistry	4		2/Fall		MED
	MED221	Molecular Microbiology	3		2/Fall		MED
	MED219	Advanced Molecular Biology	3		2/Fall		MED
	MED205	Medical Cell Biology	3		2/Spring		MED
	MED203	Medical Biochemistry	3		2/Spring		MED
	MED206	Basic Biomedical Laboratory	2	2	2/Spring		MED
	MED216	Medical Microbiology Laboratory	1	1	3/Fall		MED
	Total		19	3			
Major Core Courses	MED306	Histology & Embryology	3	1	2/Fall		MED
	MED304	Physiology & Pathophysiology I	3		2/Fall		MED
	MED305	Physiology & Pathophysiology II	3		2/Spring	MED304	MED
	MED339	Human Function & Pharmacology Laboratory	2	2	3/Fall		MED
	MED405	Medical Immunology	3		3/Fall		MED
	MED307	Pathology	3	1	3/Spring	MED306	MED
	MED404	Medical Genetics	3		3/Spring		MED
	MED301	Biomedical Ethics	2		3/Spring		MED
	MED340	Biomedical Laboratory A	2	2	3/Spring		MED
	MED309	Medical Neurobiology	3		4/Fall		MED
	MED226	Experimental Methodology and Application of Molecular Biology	3		4/Spring		MED
	Total		30	6			
Practice-based Courses	MED481	Projects of Science and Technology Innovation I	2	2	3/Fall		MED
	MED482	Projects of Science and	2	2	3/Spring		MED

		Technology Innovation II					
	MED483	Projects of Science and Technology Innovation III	2	2	4/Fall		MED
	MED491	Thesis of Biomedical Sciences	12	12	4/Spring		MED
	Total		18	18			
Total			67	27			

Note: The Projects of Science and Technology Innovation starts from the 3rd year. The project must be conducted under the supervision of a professor from School of Medicine.

Table 2: Major Elective Courses

Program of Biomedical Sciences

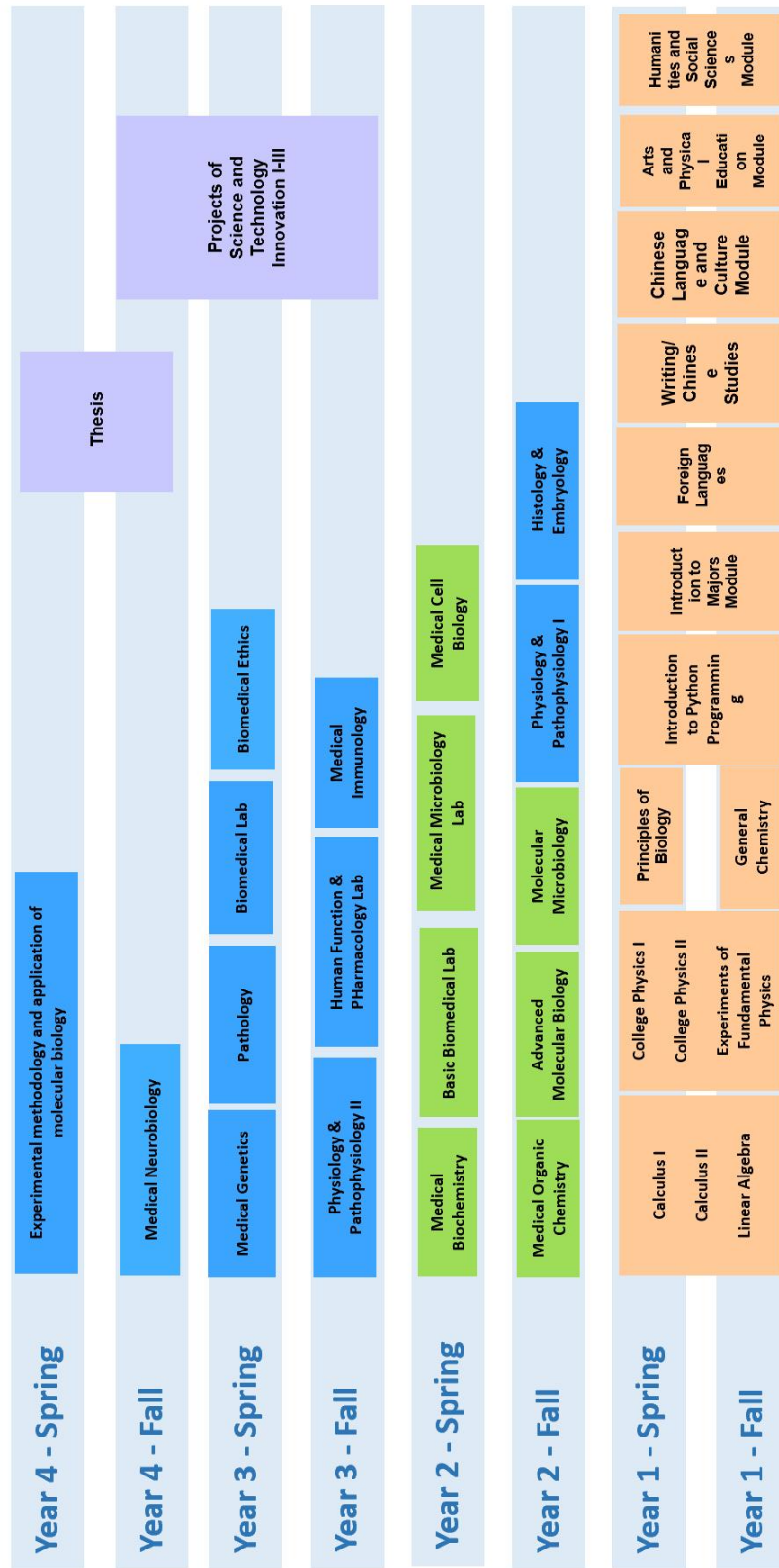
Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
MED103	History of Medicine	2		2/Fall		MED
MED107	Medical Economics	2		2/Spring		MED
MED111	Introduction to Hospital Administration	2		2/Spring		MED
MED102	Medical English	2		2/Spring		MED
MED215	Medical Literature Retrieval and Writing	1		2/Spring		MED
MED224	Big Data and Precision Medicine	3		2/Spring		MED
MED230	Modern Vaccinology	3		2/Spring		MED
MED222	Probability & Statistics for the Biosciences	3		2/Spring		MED
MED233	Medical Synthetic Biology	3		2/Spring		MED
MED234	Carbohydrate and Lipid Metabolism in Health	3		2/Spring		MED
MED235	Medical Genomics - From Theory to Practice	3		2/Spring		MED
MED227	Introduction to Modern Virology	3		3/Fall		MED
MED333	Cancer Biology Principles	3		3/Fall		MED
MED218	Medical Epigenetics	3		3/Fall		MED
MED217	Evidence based medicine methodology and clinical trial	2		3/Spring		MED
MED302	Preventive Medicine	2		3/Spring		MED
MED342	The principle and practice of clinical study	3		3/Spring	MED222	MED
MED403	Pharmacology	2		4/Fall		MED
MED232	Medical Bioinformatics	3		4/Spring		MED
Total		48				

Note: Minimum credits requirement of the above elective courses is **10** credits.

Table 3: Overview of Practice-based Learning**Program of Biomedical Sciences**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
MED206	Basic Biomedical Laboratory	2	2	2/Spring		MED
MED216	Medical Microbiology Laboratory	1	1	2/Spring		MED
MED306	Histology & Embryology	3	1	2/Fall		MED
MED339	Human Function & Pharmacology Laboratory	2	2	3/Fall		MED
MED307	Pathology	3	1	3/Spring	MED306	MED
MED340	Biomedical Laboratory A	2	2	3/Spring		MED
MED481	Projects of Science and Technology Innovation I	2	2	3/Fall		MED
MED482	Projects of Science and Technology Innovation II	2	2	3/Spring		MED
MED483	Projects of Science and Technology Innovation III	2	2	4/Fall		MED
MED491	Thesis of Biomedical Sciences	12	12	4/Spring		MED
Total		31	27			

Curriculum Structure of Biomedical Sciences



College of Business

Program of Finance for International Students (2024)

I. Introduction

Academic subject areas: The Department of Finance is one of the first five departments of SUSTC founded in 2011. Our department aims to build a strong, domestically, and internationally recognized finance discipline. Our department adheres to the SUSTC's motto of "Research, Innovation and Entrepreneurship" in research. We strive to contribute our research to the national strategic plans and the regional development in the Pearl River Delta and Shenzhen. The research projects undertaken by the department in financial asset pricing theory and empirical analysis, Chinese finance theory and practice, E-finance trades and mechanism, risk measurement and monitoring in E-finance, and quantitative finance are all driven by the important issues in today's economy. Our department is committed to educating students with the most contemporary financial knowledge, critical thinking, entrepreneurship, and global vision so that they are ready to solve practical and challenging problems in China's finance and economy.

Program code: 020301K

II. Objectives and Learning Outcomes

1. Objectives

The Finance program is committed to educating students with a solid foundation of financial and economics knowledge, skills, methodology and theory. The program also aims to train students to be professional in the most contemporary forms of finance, which prepares them to pursue challenging careers in the financial sector as investment bankers, financial engineers, hedge fund managers, policy advisors for China's financial reforms and innovative entrepreneurs in the finance industry. This program not only provides a strong foundation for critical thinking, entrepreneurship, and global vision, but also develops innovative and visionary talents to solve the practical problems of China's financial reforms.

2. Learning Outcomes

1) Have a basic understanding of classic theory, growth theory and business cycles theory, should be able to employ qualitative and quantitative methods to analyze and explain to others how various behaviors of economic agents and government policies can be explained by economics.

2) Students will be able to explain basic Corporate Finance concepts, such as time value of money and risk-return trade-off, evaluate firms' capital budgeting projects, dividend policy and capital structure, Read and analyse financial statements. Evaluate financial statements of a listed company.

3) You need to be familiar with commonly used financial database such as WIND (China) and WRDS (Global data), and master some statistical packages such as SAS, Matlab , Python or R. You will be required to apply methods to do your own empirical work. To learn hands-on skills in investment. Econometrically model the real economic problems and interpret empirical findings.

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 Economics.

3. The minimum credit requirement for graduation: 152 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	Introduction to Majors	2

	Module		
Major Courses	Major Required Courses	Major Foundational Courses	21
		Major Core Courses	27
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	17
	Major Elective Courses	Major Elective Courses	8
Total			152
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		Department of Mathematics
	MA127	Calculus II	4	1 Spring	Calculus I	
	MA113	Linear Algebra	4	1 Spring & Fall		
Physics	PHY105	College Physics I	4	1 Fall		Department of Physics
	PHY106	College Physics II	4	1 Spring	College Physics I	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall		
Chemistry	CH105	Chemistry: The Central Science	3	1-2 Spring & Fall		Department of Chemistry
Geoscience + Life Science	BIO102B	Introduction to Life Science	3	1-2 Spring & Fall		Department of Biology
Computer Programming	CS112	Introduction to Python Programming	3	1-2 Spring & Fall		Dept. of Computer Science and Engineering

Note:

1. Mathematics: MA101a Mathematical Analysis I and MA102a Mathematical Analysis II can replace MA117 Calculus I and MA127 Calculus II; MA107 Advanced Linear Algebra I can replace MA113 Linear Algebra.
2. Physics: PHY101 General Physics I and PHY102 General Physics II can replace PHY105 College Physics I and PHY106 College Physics II.
3. Chemistry: CH103 General Chemistry can replace CH105 Chemistry: The Central Science.
4. Geoscience + Life Science: BIO103 Principles of Biology / EOE 100 Introduction to Earth Sciences can replace BIO102B Introduction to Life Science.
5. Computer Programming: CS109 Introduction to Computer Programming / CS110 Introduction to Java Programming / CS111 Introduction to C Programming / CS113 Introduction to Matlab Programming can replace CS112 Introduction to Python Programming.

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA117/MA101a	Calculus I/Mathematical Analysis I	
	MA127/MA102a	Calculus II/Mathematical Analysis II	Calculus I/Mathematical Analysis I
	MA113/MA107	Linear Algebra/Advanced Linear Algebra I	
	Note: The students who had completed above two prerequisites can take the rest of prerequisites after declaring the major		
Declare major at the end of the second academic year	MA117/MA101a	Calculus I/Mathematical Analysis I	
	MA127/MA102a	Calculus II/Mathematical Analysis II	Calculus I/Mathematical Analysis I
	MA113/MA107	Linear Algebra/Advanced Linear Algebra I	
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Finance

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	FIN201	Microeconomics	3	0	1-2 Fall & Spring		Dept. of Finance
	FIN204	Macroeconomics	3	0	1-2 Fall & Spring		
	MA212	Probability and Statistics	3	0	2 Fall & Spring	Calculus II	Dept. of Mathematics
	FIN203	Financial Accounting	3	0	2 Fall		Dept. of Finance
	FIN215	Political Economics	3	0	2 Fall		
	MIS204	Prescriptive Decision Analytics	3	1	2 Spring		
	FIN303	Econometrics	3	0	3 Fall	Microeconomics, Macroeconomics ,Probability and Statistics	
	Total		21	1			
Major Core Courses	FET204	Commercial Bank	3	0	2 Fall		Dept. of Finance
	FIN206	Corporate Finance	3	0	2 Fall	Financial Accounting	
	FIN210	Economics of Money and Banking	3	0	2 Spring		
	MIS202	Marketing	3	0	2 Spring		
	FIN301	Financial Investments	3	0	3 Fall	Microeconomics/ Macroeconomics /Economics, Probability and Statistics	
	FIN417	Corporate Finance Case analysis	3	0	3 Fall	Microeconomics, Macroeconomics ,Corporate Finance	
	FET303	Financial Risk Management	3	0	3 Spring	Corporate Finance,Probabil ity and Statistics	
	FIN305	Options, Futures and Financial Derivatives	3	0	3 Spring	Corporate Finance,Financial Investments	
	FIN310	China Economics and Finance	3	0	3 Spring	Microeconomics, Macroeconomics ,Financial Investments	
	Total		27	0			
Practice-based Courses	FETS301	Internship	3	3	3 Summer		Dept. of Finance
	FIN480	Projects of Science and Technology Innovation	2	2	ANY		
	FIN491	Thesis	12	12	4 Spring		
	Total		17	17			

Total	65	18	
Note: FMA301 Econometrics can replace FIN 303 Econometrics; FMA304 Asset Pricing and Risk Management can replace FET 303 Financial Risk Management EBA208 Economics of Money and Finance can replace FIN210 Economics of Money and Bank			

Table 2: Major Elective Courses

Program of Finance

	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Elective Courses in Finance	FET102	Principles of Fintech	3	0	2 Fall		
	MA201b	Ordinary Differential Equations B	4	0	2 Fall	Calculus II	Dept. of Mathematics
	FIN213	Financial Markets and Institutions	3	0	2 Fall		Dept. of Finance, Dept. of MIS
	FIN209	Entrepreneurial Finance and Innovation I	3	0	2 Fall		
	FET219	Life Contingencies Practicum	1	1	2 Fall		
	FIN217	Investment and Risk Management	1	1	2 Fall		
	FET202	Cases in FinTech I	1.5	0	2 Fall		
	FIN218	Managerial Accounting	3	0	2 Fall		
	FIN205	Special Topics in Finance and Entrepreneurship I	1.5	0	2 Fall		
	FIN202	Special Topics in Finance and Entrepreneurship II	1.5	0	2 Spring		
	FET301	Cases in FinTech II	1.5	0	2 Spring		
	FIN214	Securities Investment Practicum	1	1	2 Spring		
	FET206	Data Structures and Financial Applications	3	0	2 Spring	Introduction to Python Programming	
	FIN212	Financial Statement Analysis	3	0	2 Spring	Microeconomics, Macroeconomics, Corporate Finance	
	MA208	Applied Stochastic Processes	3	0	2 Spring	Probability and Statistics	
	MIS205	Data Management and Databases	3	1	2 Spring	Introduction to Python Programming	
	EBA301	Data analysis and Data Mining	3	1	3 Fall	Data Management and Databases	
	FIN411	International Finance	2	0	3 Spring	Corporate Finance, Financial Investments	

	FIN409	Financial Modeling and Analysis	3	0	3 Fall	Probability and Statistics	
	FIN311	Artificial Intelligence and Its Applications in Finance	3	0	3 Fall	Introduction to Python Programming	
	FIN304	Financial Time Series	3	0	3 Fall	Microeconomics, Macroeconomics, Probability and Statistics	
	FIN314	Frontier and Practice of Securities Market	1	1	3 Fall	Microeconomics, Macroeconomics	
	MA228	Nonlife Actuarial Models	3	0	3 Fall	Probability and Statistics	Dept. of Mathematics
	MA303	Partial Differential Equations	3	0	3 Fall	Ordinary Differential Equations B	
	FMA303	Security Investments	3	0	3 Fall	Probability and Statistics	
	MA322	Life Insurance Actuarial Science	3	0	3 Spring	Probability and Statistics	
	FIN312	Actuarial Modelling with Applications in Insurance	3	0	3 Spring	Econometrics, Probability and Statistics	Dept. of Finance, Dept. of MIS
	FIN313	Strategic Behavior	3	0	3 Spring		
	FIN302	Empirical Methods in Finance	3	0	3 Spring	Financial Investments, Econometrics	
	FET306	Business Analytics with Big Data	3	1	3 Spring		
	FIN407	Investment Banking	3	0	3 Spring	Corporate Finance	
	FIN306	Fixed Income: Models and Applications	2	0	3 Spring	Options, Futures and Financial Derivatives	
	FIN308	Financial Economics	3	0	3 Spring	Corporate Finance, Probability and Statistics	
	MA308	Statistical Computation and Software	3	0	3 Spring	Probability and Statistics	Dept. of Statistics and Data Science
	MA304	Multivariate Statistical Analysis	3	0	3 Spring	Probability and Statistics	
	FIN403	Cases in Financial Innovations	3	0	4 Fall		Dept. of Finance
	FIN413	Quantitative Investment Analysis	3	0	4 Fall	Financial Investments, Econometrics	
Total			96	7			
Elective Courses in Management	EBA103	Lectures on the Frontiers of Big Data Management and Applications	2	0	1 Spring		Dept. of MIS
	EBA105	Business Communication and Protocol	2	0	1 Spring		
	EBA203	Management Information System	3	1	2 Fall	Introduction to Computer Programming/ Introduction to Java Programming/	

						Introduction to C programming/ Introduction to Python Programming	
	EBA207	Management System Analysis and Design	3	1	3 Spring	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	
	EBA420	Management Frontiers and Practices I	3	1	4 Fall		
	EBA421	Management Frontiers and Practices II	3	1	4 Spring		
	MIS104	Business Model Research	2	0	1 Fall		
	MIS208	Behavioral and Experimental Economics	3	1	2 Spring		
	MIS212	Business Negotiations	3	1	2 Spring		
	MIS223	Social Media and Digital Marketing	3	1	2 Fall		
	MIS301	Big Data Analysis and Application	3	1	3 Spring	Probability and Statistics	
	MIS302	Big Data Management and ERP	3	1	4 Fall	Management Information System/ Data Management and Databases	
	MIS303	Big Data Governance and Business Model	3	1	4 Fall	Management Information System/ Data Management and Databases	
	MIS305	Data Intelligence and Decision Analytics	3	1	3 Spring	Probability and Statistics	
	MIS308	Empirical Methods in Economics and Management	3	1	4 Fall	Data Statistics and Econometrics	
	MIS309	Business History and Economic Development Model in China and Overseas	3	0	3 Spring		
	MIS310	Social Network Models and Applications	3	1	4 Fall		
	MIS312	Entrepreneurial Thinking and Management	3	0	3 Fall		
	MIS316	Fundamentals and Methods of Deep Learning	3	1	3 Spring	Data Mining and Business Applications	
	MIS317	Data Statistics and Econometrics	3	1	3 Spring	Probability and Statistics	

MIS321	Consumer Behavior	3	0	2 Fall	
MIS322	International Business	3	0	2 Fall	
MIS323	Marketing Research	3	0	2 Spring	
MIS401	Advanced Marketing	3	1	3 Spring	Marketing
MIS403	Big Data and Cluster Project Management	3	0	3 Spring	
MIS407	Data Modeling and Analysis in Production Operations	3	1	3 Spring	
MIS404	Operations Management	3	0	3 Fall	Prescriptive Decision Analytics
MIS332	Blockchain Essentials and Practices	3	1	3 Fall	
MIS405	Advanced E-commerce and Management	3	0	4 Spring	
MIS406	Judgment and Decision Making	3	0	4 Fall	
MIS408	Advanced Operations Research	3	0	3 Spring	
MIS411	Digital Marketing Analytics	3	1	4 Fall	
Total		93	19		
Note: A minimum of 8 credits MUST be taken to fulfill Major Elective Courses MA201a Ordinary Differential Equations A can replace MA201b Ordinary Differential Equations B; MIS206 Business Data Structures and Algorithms/MA211 Data structure and Algorithms / CS203B Data Structures and Algorithm Analysis B /CS203 Data Structures and Algorithm Analysis can replace FET206 Data Structures and Financial Applications; CS303B Artificial Intelligence B can replace FIN311 Artificial Intelligence and Its Applications in Finance; MA309 Time Series Analysis can replace FIN304 Financial Time Series; CS307 Principles of Database Systems can replace MIS205 Data Management and Databases					

Table 3: Overview of Practice-based Learning

Program of Finance

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CS112	Introduction to Python Programming	3	1	1-2 Spring & Fall		Dept. of Computer Science and Engineering
PHY104B	Experiments of Fundamental Physics	2	2	1-2 Spring & Fall		Dept. of Physics
FET219	Life Contingencies Practicum	1	1	2 Fall		Dept. of Finance
FIN217	Investment and Risk Management	1	1	2 Fall		
FIN214	Securities Investment Practicum	1	1	2 Spring		
MIS204	Prescriptive Decision Analytics	3	1	2 Spring		Dept. of MIS
MIS205	Data Management and Databases	3	1	2 Spring	Introduction to Python Programming	
EBA301	Data analysis and Data Mining	3	1	3 Fall	Data Management and Databases	
FIN314	Frontier and Practice of Securities Market	1	1	3 Fall	Microeconomic s,Macroeconomics	Dept. of Finance
FET306	Business Analytics with Big Data	3	1	3 Spring		
FETS301	Internship	3	3	3 Summer		
FIN480	Projects of Science and Technology Innovation	2	2	ANY		
FIN491	Thesis	12	12	4 Spring		
Total		38	28			

Curriculum Structure of Finance

Freshman	Sophomore	Junior	Senior
General Education Courses	General Education Courses	General Education Courses	General Education Courses
Microeconomics	Political Economics	Financial Investments	Projects of Science and Technology Innovation
Macroeconomics	Commercial Bank	Options, Futures and Financial Derivatives	Thesis
Probability and Statistics	Corporate Finance	China Economics and Finance	Major Elective Courses
	Financial Accounting	Corporate Finance Case analysis	
	Economics of Money and Finance	Econometrics	
	Prescriptive Decision Analytics	Financial Risk Management	
	Marketing	Internship	
	Major Elective Courses	Major Elective Courses	
Note: The above is the recommended semester. Students can make adjustments according to their own academic plans.			

College of Business

Program of Financial Engineering for International Students (2024)

I. Introduction

Academic subject areas: The rapid development of financial technology has changed the existing financial ecosystem. It is affecting, in every way, the payment method, financial innovation, market operation, service providing, and regulation rules. As a cross-sectional discipline, financial technology is innovating global financial industry. By combining the information science and data science, this new discipline is implementing cutting edge achievements of those areas and will make a big difference in improving the efficiency of the finance market. With this background, SUSTC creatively launches the major of Financial Technology to fit this big environment.

The graduates from this major will have excellent quantitative and technical skills to meet the requirements of the diversified roles in the financial industry, such as in the field of investment banks, commercial banks, asset management, government regulation, Internet finance, and etc. Graduates will also be prepared to continue with a further study in the area of, but not limited to, finance, business analysis, computer science and information engineering.

Following SUSTC's philosophy, "innovative, high-end, cutting-edge, international", this major will fit to the reality of China's finance reform and development. At the same time, the major will also meet to the needs of the latest research dynamic, nation's development strategy, and the development of Pearl River Delta and Shenzhen City. With the strong supports from our excellent faculties, facilities, and research achievements, the major's main teaching and research interests will focus on electronic currency technology, finance information science, internet finance, intelligent investment, financial big data and etc. These achievements will make a contribution to China's finance reform and development, as well as to financial innovation in Pearl River Delta and Shenzhen City.

Program code: 020302

II. Objectives and Learning Outcomes

1. Objectives

The target of the major is to provide the excellent education to financial technology talents. With well-designed text books and curriculums, the major will efficiently help the students develop core skills to apply to the real problems with the professional knowledge that they have learned in the classes. The students in the major will: meet the needs of socialist market economic construction; comprehensively develop in moral, intellectual, physical and aesthetic aspects; adapt to the open economic environment, and build solid foundations in economics, finance, computer technology and English; master the basic theory and method of financial technology; have a good ideological, business, cultural and psychological quality; have a strong practical, innovation and application ability; be able to work in the frontier areas of innovation such as digital currency, electronic payment, intelligent investment, financial big data and etc.

2. Learning Outcomes

1) Have a basic understanding of classic theory, growth theory and business cycles theory, should be able to employ qualitative and quantitative methods to analyze and explain to others how various behaviors of economic agents and government policies can be explained by economics. Understand the challenges, practical significance and future impact of financial technology on the traditional financial industry. Understand the major areas of financial technology, the developments in various fields and their application scenarios. Understand the possibilities and opportunities that financial technology provides for the future development of the financial industry. Implement the key technologies of existing financial technology from the perspective of different financial industry.

2) Students will be able to explain basic Corporate Finance concepts, such as time value of money and risk-return trade-off, evaluate firms' capital budgeting projects, dividend policy and capital structure, Read and analysis financial statements. Evaluate financial statements of a listed company. Students should master basic data structures and algorithms. In addition, they should be also to choose reasonable data structures according to practical demand of algorithms. Students should master basic data structures and algorithms. In addition, they should be also to choose reasonable data structures according to practical demand of algorithms.

3) Students should master basic theories and technologies of artificial intelligence. In addition, they should be also to apply such theories and technologies to develop simple financial

intelligent systems. Describe the target and requirements for a spectrum of business data analysis and data mining problems in finance, marketing, etc. Develop the ability to employ data mining algorithms to discover patterns in data to address the selected problems. Creatively apply and adapt the introduced modeling techniques to propose original findings for practical organizational data analysis problems. Creatively communicate analytic procedure and results effectively in presentations with oral, written, and electronic formats.

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 Economics.
3. The minimum credit requirement for graduation: 152 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	27
		Major Core Courses	21
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	17
	Major Elective Courses	Major Elective Courses	8
Total			152
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		Department of Mathematics
	MA127	Calculus II	4	1 Spring	Calculus I	
	MA113	Linear Algebra	4	1 Spring & Fall		
Physics	PHY105	College Physics I	4	1 Fall		Department of Physics
	PHY106	College Physics II	4	1 Spring	College Physics I	
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall		
Chemistry	CH105	Chemistry: The Central Science	3	1-2 Spring & Fall		Department of Chemistry
Geoscience + Life Science	BIO102B	Introduction to Life Science	3	1-2 Spring & Fall		Department of Biology
Computer Programming	CS112	Introduction to Python Programming	3	1-2 Spring & Fall		Dept. of Computer Science and Engineering

Note:

1. Mathematics: MA101a Mathematical Analysis I and MA102a Mathematical Analysis II can replace MA117 Calculus I and MA127 Calculus II; MA107 Advanced Linear Algebra I can replace MA113 Linear Algebra.
2. Physics: PHY101 General Physics I and PHY102 General Physics II can replace PHY105 College Physics I and PHY106 College Physics II.
3. Chemistry: CH103 General Chemistry can replace CH105 Chemistry: The Central Science.
4. Geoscience + Life science: BIO103 Principles of Biology / EOE 100 Introduction to Earth Sciences can replace BIO102B Introduction to Life Science
5. Computer Programming: CS109 Introduction to Computer Programming / CS110 Introduction to Java Programming / CS111 Introduction to C Programming / CS113 Introduction to Matlab Programming can replace CS112 Introduction to Python Programming.

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA117/MA101a	Calculus I/Mathematical Analysis I	
	MA127/MA102a	Calculus II/Mathematical Analysis II	Calculus I/Mathematical Analysis I
	MA113/MA107	Linear Algebra/Advanced Linear Algebra I	
	Note: The students who had completed above two prerequisites can take the rest of prerequisites after declaring the major		
Declare major at the end of the second academic year	MA117/MA101a	Calculus I/Mathematical Analysis I	
	MA127/MA102a	Calculus II/Mathematical Analysis II	Calculus I/Mathematical Analysis I
	MA113/MA107	Linear Algebra/Advanced Linear Algebra I	
	CS109/CS110/CS111/CS112/CS113	Introduction to Computer Programming / Introduction to Java Programming / Introduction to C Programming / Introduction to Python Programming/ Introduction to Matlab Programming	
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Financial Engineering

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	FIN201	Microeconomics	3	0	1-2 Fall & Spring		Dept. of Finance
	FIN204	Macroeconomics	3	0	1-2 Fall & Spring		
	MA212	Probability and Statistics	3	0	2 Fall & Spring	Calculus II	Dept. of Mathematics
	FIN203	Financial Accounting	3	0	2 Fall		Dept. of Finance, Dept. of ISME
	FIN215	Political Economics	3	0	2 Fall		
	MIS205	Data Management and Databases	3	1	2 Spring	Introduction to Python Programming	
	MIS204	Prescriptive Decision Analytics	3	1	2 Spring		
	FIN303	Econometrics	3	0	3 Fall	Microeconomics, Macroeconomics ,Probability and Statistics	
	EBA301	Data analysis and Data Mining	3	1	3 Fall	Data Management and Databases	
	Total		27	3			
	FIN206	Corporate Finance	3	0	2 Fall		
	FET206	Data Structures and Financial Applications	3	0	2 Spring	Introduction to Python Programming	
	FIN301	Financial Investments	3	0	3 Fall	Microeconomics/Macroeconomics /Economics, Probability and Statistics	
	FIN311	Artificial Intelligence and Its Applications in Finance	3	0	3 Fall	Introduction to Python Programming	
	FIN409	Financial Modeling and Analysis	3	0	3 Fall	Probability and Statistics	
	FET303	Financial Risk Management	3	0	3 Spring	Corporate Finance,Probabil ity and Statistics	
	FIN305	Options, Futures and Financial Derivatives	3	0	3 Spring	Corporate Finance,Financia l Investments	
	Total		21	0			
Elective	FETS301	Internship	3	3	3 Summer		Dept. of

	FET470	Practice of Financial Theory	2	2	ANY		Finance
	FIN491	Thesis	12	12	4 Spring		
	Total		17	17			
Total			65	20			
Note: MIS206 Business Data Structures and Algorithms/ MA211 Data structure and Algorithms / CS203B Data Structures and Algorithm Analysis B /CS203 Data Structures and Algorithm Analysis can replace FET206 Data Structures and Financial Applications; FMA301 Econometrics can replace FIN 303 Econometrics; FMA304 Asset Pricing and Risk Management can replace FET 303 Financial Risk Management; CS303B Artificial Intelligence B can replace FIN311 Artificial Intelligence and Its Applications in Finance CS307 Principles of Database Systems can replace MIS205 Data Management and Databases							

Table 2: Major Elective Courses

Program of Financial Engineering

Elective Courses in Finance	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
	FET102	Principles of FinTech	3	0	2 Fall		
	MA201b	Ordinary Differential Equations B	4	0	2 Fall	Calculus II	Dept. of Mathematics
	FIN213	Financial Markets and Institutions	3	0	2 Fall		Dept. of Finance
	FIN209	Entrepreneurial Finance and Innovation I	3	0	2 Fall		
	FET219	Life Contingencies Practicum	1	1	2 Fall		
	FIN217	Investment and Risk Management	1	1	2 Fall		
	FET202	Cases in FinTech I	1.5	0	2 Fall		
	FIN218	Managerial Accounting	3	0	2 Fall	Financial Accounting	
	FIN205	Special Topics in Finance and Entrepreneurship I	1.5	0	2 Fall		
	FET204	Commercial Bank	3	0	2 Fall		
	FIN210	Economics of Money and Banking	3	0	2 Spring		
	MIS202	Marketing	3	0	2 Spring		
	FIN202	Special Topics in Finance and Entrepreneurship II	1.5	0	2 Spring		
	FET301	Cases in FinTech II	1.5	0	2 Spring		
	FIN214	Securities Investment Practicum	1	1	2 Spring		
	FIN212	Financial Statement Analysis	3	0	2 Spring	Microeconomics, Macroeconomics	

						s,Corporate Finance	
	MA208	Applied Stochastic Processes	3	0	2 Spring	Probability and Statistics	
	FIN411	International Finance	2	0	3 Spring	Corporate Finance,Financial Investments	
	FET306	Business Analytics with Big Data	3	1	3 Spring		
	FIN417	Corporate Finance Case analysis	3	0	3 Fall	Microeconomics,Macroeconomics,Corporate Finance	
	FIN304	Financial Time Series	3	0	3 Fall	Microeconomics,Macroeconomics,Probability and Statistics	
	FIN314	Frontier and Practice of Securities Market	1	1	3 Fall	Microeconomics,Macroeconomics	
	MA228	Nonlife Actuarial Models	3	0	3 Fall	Probability and Statistics	
	MA303	Partial Differential Equations	3	0	3 Fall	Ordinary Differential Equations B	Dept. of Mathematics
	FMA303	Security Investments	3	0	3 Fall	Probability and Statistics	
	MA322	Life Insurance Actuarial Science	3	0	3 Spring	Probability and Statistics	
	FIN312	Actuarial Modelling with Applications in Insurance	3	0	3 Spring	Econometrics,Probability and Statistics	
	FIN302	Empirical Methods in Finance	3	0	3 Spring	Financial Investments,Econometrics	
	FIN313	Strategic Behavior	3	0	3 Spring		
	FIN407	Investment Banking	3	0	3 Spring	Corporate Finance	Dept. of Finance
	FIN306	Fixed Income: Models and Applications	2	0	3 Spring	Options, Futures and Financial Derivatives	
	FIN310	China Economics and Finance	3	0	3 Spring	Microeconomics,Macroeconomics,Financial Investments	
	FIN308	Financial Economics	3	0	3 Spring	Corporate Finance,Probability and Statistics	
	MA308	Statistical Computation and Software	3	0	3 Spring	Probability and Statistics	Dept. of Statistics and Data Science
	MA304	Multivariate Statistical Analysis	3	0	3 Spring	Probability and Statistics	
	FIN403	Cases in Financial Innovations	3	0	4 Fall		Dept. of Finance
	FIN413	Quantitative Investment Analysis	3	0	4 Fall	Financial Investments,Econometrics	
		Total	96	5			
Section	EBA103	Lectures on the	2	0	1 Spring		Dept. of

		Frontiers of Big Data Management and Applications					MIS
EBA105		Business Communication and Protocol	2	0	1 Spring		
EBA203		Management Information System	3	1	2 Fall	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	
EBA207		Management System Analysis and Design	3	1	3 Spring	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	
EBA420		Management Frontiers and Practices I	3	1	4 Fall		
EBA421		Management Frontiers and Practices II	3	1	4 Spring		
MIS104		Business Model Research	2	0	1 Fall		
MIS208		Behavioral and Experimental Economics	3	1	2 Spring		
MIS212		Business Negotiations	3	1	2 Spring		
MIS223		Social Media and Digital Marketing	3	1	2 Fall		
MIS301		Big Data Analysis and Application	3	1	3 Spring	Probability and Statistics	
MIS302		Big Data Management and ERP	3	1	4 Fall	Management Information System/ Data Management and Databases	
MIS303		Big Data Governance and Business Model	3	1	4 Fall	Management Information System/ Data Management and Databases	
MIS305		Data Intelligence and Decision Analytics	3	1	3 Spring	Probability and Statistics	
MIS308		Empirical Methods in Economics and Management	3	1	4 Fall	Data Statistics and Econometrics	
MIS309		Business History and Economic	3	0	3 Spring		

		Development Model in China and Overseas				
	MIS310	Social Network Models and Applications	3	1	4 Fall	
	MIS312	Entrepreneurial Thinking and Management	3	0	3 Fall	
	MIS316	Fundamentals and Methods of Deep Learning	3	1	3 Spring	Data Mining and Business Applications
	MIS407	Data Modeling and Analysis in Production Operations	3	1	3 Spring	
	MIS317	Data Statistics and Econometrics	3	1	3 Spring	Probability and Statistics
	MIS321	Consumer Behavior	3	0	2 Fall	
	MIS322	International Business	3	0	2 Fall	
	MIS323	Marketing Research	3	0	2 Spring	
	MIS332	Blockchain Essentials and Practices	3	1	3 Fall	
	MIS401	Advanced Marketing	3	1	3 Spring	Marketing
	MIS403	Big Data and Cluster Project Management	3	0	3 Spring	
	MIS404	Operations Management	3	0	3 Fall	Prescriptive Decision Analytics
	MIS405	Advanced E-commerce and Management	3	0	4 Spring	
	MIS406	Judgment and Decision Making	3	0	4 Fall	
	MIS408	Advanced Operations Research	3	0	3 Spring	
	MIS411	Digital Marketing Analytics	3	1	4 Fall	
	Total		93	19		
Note: A minimum of 8 credits MUST be taken to fulfill Major Elective Courses MA201a Ordinary Differential Equations A can replace MA201b Ordinary Differential Equations B; MA309 Time Series Analysis can replace FIN5017 Financial Time Series; EBA208 Economics of Money and Finance can replace FIN210 Economics of Money and Bank						

Table 3: Overview of Practice-based Learning

Program of Financial Engineering

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CS112	Introduction to Python Programming	3	1	1-2 Spring & Fall		Dept. of Computer Science and Engineering
PHY104B	Experiments of Fundamental Physics	2	2	1-2 Spring & Fall		Dept. of Physics
FET219	Life Contingencies Practicum	1	1	2 Fall		Dept. of Finance, Dept. of MIS
FIN217	Investment and Risk Management	1	1	2 Fall		
FIN214	Securities Investment Practicum	1	1	2 Spring		
MIS204	Prescriptive Decision Analytics	3	1	2 Spring		
MIS205	Data Management and Databases	3	1	2 Spring	Introduction to Python Programming	
EBA301	Data analysis and Data Mining	3	1	3 Fall	Data Management and Databases	
FIN314	Frontier and Practice of Securities Market	1	1	3 Fall	Microeconomics, Macroeconomics	
FET306	Business Analytics with Big Data	3	1	3 Spring		
FETS301	Internship	3	3	3 Summer		
FET470	Practice of Financial Theory	2	2	ANY		
FIN491	Thesis	12	12	4 Spring		
Total		38	28			

Curriculum Structure of Financial Engineering

Freshman	Sophomore	Junior	Senior
General Education Courses	General Education Courses	General Education Courses	General Education Courses
Microeconomics	Political Economics	Financial Investments	Practice of Financial Theory
Macroeconomics	Financial Accounting	Options, Futures and Financial Derivatives	Thesis
Probability and Statistics	Data Management and Databases	Financial Modeling and Analysis	Thesis
	Prescriptive Decision Analytics	Econometrics	
	Corporate Finance	Data analysis and Data Mining	
	Data Structure and Financial Applications	Artificial Intelligence and Its Applications in Finance	
	Major Elective Courses	Financial Risk Management	
		Internship	
		Major Elective Courses	
Note: The above is the recommended semester. Students can make adjustments according to their own academic plans.			

College of Business

Program of Big Data Management and Applications for International Students (2024)

I. Introduction

Big Data Management and Applications (BDMA) is an undergraduate program offered by the Department of Information Systems and Management Engineering. This program is developed against the backdrop of the era of big data, focusing on big data management and governance and applications of data analysis theories and methods in management. Areas of BDMA include Business Statistical Analysis, Business Intelligence.

Academic subject areas: Management Science and Engineering

Program code: 120108T

II. Objectives and Learning Outcomes

1. Objectives

The curriculum of this program is based on the standard set by the National Education Guidance Committee and refers to similar programs run by leading domestic and foreign higher educational institutions. The curriculum aims to

- 1) cultivate skills that allow students to adapt to a dynamic economy,
- 2) meet the demand for talent in Guangdong, Hong Kong, and the Macao Greater Bay Area,
- 3) train students in evidence-based management and systematic management thinking,
- 4) disseminate interdisciplinary knowledge from Economics, Management, Information Systems, and Management Engineering,
- 5) develop students' capabilities in theoretical and quantitative analysis,
- 6) provide students the opportunity to develop entrepreneurship skills, and
- 7) educate future management talents with professional ethics, modern management knowledge, and international perspectives.

2. Learning Outcomes

Graduates of this program are expected to satisfy requirements in the following three aspects.

1) Knowledge requirements: Master management science and engineering theories; be well informed about various information and engineering technologies; know the fundamentals of science, arts, humanities, and the interlinks among them; understand big data processing, analytic methods, and specialized management science for data management in e-commerce; be skilled in business data modeling and applying various technologies, methods and tools to decision analysis.

2) Capability requirements: Possess the ability to independently acquire and update relevant knowledge in management science and engineering; be competent in comprehensively applying professional knowledge to practice; be skilled at logical thinking and communication; have strong capabilities in organizational coordination; be proficient in applying foreign languages of the trade; be able to make comprehensive use of management science, information technology, and engineering methods to solve business problems; be innovative in applying big data management and application theories; be capable of conducting business analysis of big data and providing support for decision making.

3) Quality Requirements: Have sophisticated ideological and political views and positive outlook on life and values; have strong legal awareness, high sense of social responsibility, professional ethics, teamwork spirit and social adaptability; possess scientific spirit, compassion, and professionalism; have innovative spirit and entrepreneurial consciousness; have healthy psychology and physique.

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 Management

3. The minimum credit requirement for graduation: 153 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
	Chinese Language and Culture Module	Chinese Language and Culture	16
	Arts and Physical Education Module	Physical Education	4
		Arts	2
	Competence Development	Computer Programming	3

General Education Courses	Module	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	24
		Major Core Courses	18
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	17
	Major Elective Courses	Major Elective Courses	15
Total			153
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	None	MATH
	MA127	Calculus II	4	1 Spring	Calculus I	MATH
	MA113	Linear Algebra	4	1 Spring & Fall	None	MATH
Physics	PHY105	College Physics I	4	1 Fall	None	PHY
	PHY106	College Physics II	4	1 Spring	College Physics I	PHY
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	PHY
Chemistry	CH105	Chemistry: The Central Science	3	1-2 Spring & Fall	None	CHEM
Geoscience + Life Science	BIO102B	Introduction to Life Science	3	1-2 Spring & Fall	None	BIO
Computer Programming	CS109/ CS110/ CS111/ CS112	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	3	1-2 Spring & Fall	None	CSE

Note:

1. For Mathematics Category, students can take Mathematical Analysis I and II as alternatives to Calculus I and II; Advanced Linear Algebra I as an alternative to Linear Algebra.
2. For Physics Category, students can take General Physics I and II as alternatives to College Physics I and II.
3. For Chemistry Category, students can take General Chemistry as an alternative to Chemistry: The Central Science.
4. For Geoscience + Life Science Category, students can take Principles of Biology or Introduction to Earth Sciences as an alternative to Introduction to Life Science.
5. For Computer Programming Category, students can choose any one of the four computer programming courses.
6. The above alternative courses 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/ MA101a	Calculus I/ Mathematical Analysis I	None
	MA127/ MA102a	Calculus II/ Mathematical Analysis II	Calculus I/ Mathematical Analysis I
	MA113/ MA107	Linear Algebra/ Advanced Linear Algebra I	None
	Note: The students who had completed above two prerequisites can take the rest of prerequisites after declaring the major		
Declare major at the end of the second academic year	MA117/ MA101a	Calculus I/ Mathematical Analysis I	None
	MA127/ MA102a	Calculus II/ Mathematical Analysis II	Calculus I/ Mathematical Analysis I
	MA113/ MA107	Linear Algebra/ Advanced Linear Algebra I	None
	CS109/ CS110/ CS111/ CS112	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	None
Note: 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. 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. 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). 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).			

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Big Data Management and Applications for International

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	FIN201	Microeconomics	3		1-2 Spring & Fall	None	FIN
	FIN204	Macroeconomics	3		1-2 Spring & Fall	None	FIN
	MA212	Probability and Statistics	3		2 Fall	Calculus II	MATH
	EBA203	Management Information System	3	1	2 Fall	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
	MIS204	Prescriptive Decision Analytics	3	1	2 Spring	None	ISME
	MIS205	Data Management and Databases	3	1	2 Spring	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
	MIS206	Business Data Structures and Algorithms	3	1	2 Spring	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
	EBA301	Data analysis and Data Mining	3	1	3 Fall	Management Information System/ Data Management and Databases	ISME
	Total		24	5			
Major Core Courses	MIS202	Marketing	3		2 Spring	None	ISME
	MIS300	Big Data Ecology and Storage Computing	3	1	3 Fall	Business Data Structures and Algorithms	ISME

	MIS303	Big Data Governance and Business Model	3	1	3 Fall	Management Information System/ Data Management and Databases	ISME
	MIS316	Fundamentals and Methods of Deep Learning	3	1	3 Spring	Data analysis and Data Mining	ISME
	MIS317	Data Statistics and Econometrics	3	1	3 Spring	Probability and Statistics	ISME
	MIS305	Data Intelligence and Decision Analytics	3	1	3 Spring	Probability and Statistics	ISME
	Total		18	5			
Practice-based Courses	MIS370	Internship	3	3	2 or 3 Summer	None	ISME
	MIS480	Science & Technology Innovation Projects	2	2	Any term after the first academic year	None	ISME
	MIS491	Thesis	12	12	4 Spring & Fall	None	ISME
	Total		17	17			
Total			59	27			

Note:

1. Data Structures and Algorithm Analysis (CS203) / Data Structures and Algorithm Analysis B (CS203B) is regarded as equivalent to Business Data Structures and Algorithms (MIS206).

Table 2: Major Elective Courses**Program of Big Data Management and Applications for International**

Course Track	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Data Analytics	MIS302	Big Data Management and ERP	3	1	4 Fall	Management Information System/ Data Management and Databases	ISME
	MIS310	Social Network Models and Applications	3	1	4 Fall	None	ISME
	MIS320	Mining of Network Data	3	1	3 Spring	Business Data Structures and Algorithms	ISME
	MIS400	Data mining and business Insights	3	1	4 Fall	Data Management and Databases	ISME
Decision Analysis	MIS301	Big Data Analysis and Application	3	1	3 Spring	Probability and Statistics	ISME
	MIS404	Operations Management	3		3 Fall	Prescriptive Decision Analytics	ISME
	MIS407	Data Modeling and Analysis in Production Operations	3	1	3 Spring	None	ISME
	MIS408	Advanced Operations Research	3		3 Spring	None	ISME
Business Administration	MIS223	Social Media and Digital Marketing	3	1	2 Fall	None	ISME
	MIS401	Advanced Marketing	3	1	3 Spring	Marketing	ISME
	MIS411	Digital Marketing Analytics	3	1	4 Fall	None	ISME
Other Electives	MIS208	Behavioral and Experimental Economics	3	1	2 Spring	None	ISME
	MIS212	Business Negotiations	3	1	2 Spring	None	ISME
	MIS308	Empirical Methods in Economics and Management	3	1	4 Fall	Data Statistics and Econometrics	ISME
	MIS312	Entrepreneurial Thinking and Management	3		3 Fall	None	ISME
	MIS321	Consumer Behavior	3		2 Fall	None	ISME
	MIS322	International Business	3		2 Fall	None	ISME
	MIS323	Marketing Research	3		2 Spring	None	ISME
	MIS331	Big Data in Finance	3	1	3 Spring	Probability and Statistics	ISME
	MIS332	Blockchain Essentials and Practices	3	1	3 Fall	None	ISME
	MIS333	Blockchain Development and Practices	3	1	3 Spring	None	ISME

MIS334	IT Project Management	3		3 Fall	None	ISME
MIS335	Supply Chain Management	3		3 Spring	Probability and Statistics	ISME
MIS403	Big Data and Cluster Project Management	3		3 Spring	None	ISME
MIS405	Advanced E-commerce and Management	3		4 Spring	None	ISME
MIS406	Judgment and Decision Making	3		4 Fall	None	ISME
EBA207	Management System Analysis and Design	3	1	3 Spring	Introduction to Computer Programming A	ISME
EBA420	Management Frontiers and Practices I	3	1	4 Fall	None	ISME
EBA421	Management Frontiers and Practices II	3	1	4 Spring	None	ISME
FIN203	Financial Accounting	3		2 Fall	None	FIN
FET102	Principles of FinTech	3		2 Fall	None	FIN
FET202	Cases in FinTech I	1.5		2 Fall	None	FIN
FET203	FinTech Mathematics	3		1 Spring	Linear Algebra A	FIN
FET204	Commercial Bank	3		2 Fall	None	FIN
FET219	Life Contingencies Practicum	1	1	2 Fall	None	FIN
FET301	Cases in FinTech II	1.5		2 Spring	None	FIN
FET303	Financial Risk Management	3		3 Spring	Corporate Finance、Probability and Statistics	FIN
FET306	Business Analytics with Big Data	3	1	3 Spring	None	FIN
FIN202	Special Topics in Finance and Entrepreneurship II	1.5		2 Spring	None	FIN
FIN205	Special Topics in Finance and Entrepreneurship I	1.5		2 Fall	None	FIN
FIN206	Corporate Finance	3		2 Spring	Financial Accounting	FIN
FIN209	Entrepreneurial Finance and Innovation I	3		2 Fall	None	FIN
FIN210	Economics of Money and Banking	3		2 Spring	None	FIN
FIN212	Financial Statement Analysis	3		2 Spring	Microeconomics、Macroeconomics、Corporate Finance	FIN
FIN213	Financial Markets and Institutions	3		2 Fall	None	FIN
FIN214	Securities Investment Practicum	1	1	2 Spring	None	FIN
FIN215	Political Economics	3		2 Fall	None	FIN
FIN217	Investment, Financial Management and Risk Control	1	1	2 Fall	None	FIN
FIN218	Managerial Accounting	3		2 Fall	Financial Accounting	FIN
FIN301	Financial Investments	3		3 Fall	Microeconomics/Macroeconomics	FIN

						economics/Economics/Probability and Statistics	
FIN302	Empirical Methods in Finance	3		3 Spring		Financial Investments、Econometrics	FIN
FIN303	Econometrics	3		3 Fall		Microeconomics、Macroeconomics、Probability and Statistics	FIN
FIN304	Financial Time Series	3		3 Fall		Microeconomics、Macroeconomics、Probability and Statistics	FIN
FIN305	Options, Futures and Financial Derivatives	3		3 Spring		Corporate Finance、Financial Investments	FIN
FIN306	Fixed Income: Models and Applications	2		3 Spring		Options, Futures and Financial Derivatives	FIN
FIN308	Financial Economics	3		3 Spring		Corporate Finance、Probability and Statistics	FIN
FIN310	China Economics and Finance	3		3 Spring		Microeconomics、Macroeconomics、Corporate Finance、Financial Investments	FIN
FIN311	Artificial Intelligence and Its Applications in Finance	3		3 Fall		Introduction to Python Programming	FIN
FIN312	Actuarial Modelling with Applications in Insurance	3		3 Spring		Econometrics、Probability and Statistics	FIN
FIN313	Strategic Behavior	3		3 Spring		None	FIN
FIN314	Frontier and Practice of Securities Market	1	1	3 Fall		Microeconomics、Macroeconomics	FIN
FIN340	Investments	3		3Fall		Economics、Finance	EBA
FIN403	Cases in Financial Innovations	3		4 Fall		Options, Futures and Financial Derivatives	FIN
FIN407	Investment Banking	3		3 Spring		Corporate Finance	FIN
FIN409	Financial Modeling and Analysis	3		3 Fall		Probability and Statistics	FIN
FIN411	International Finance	2		3 Spring		Corporate Finance、Financial Investments	FIN
FIN413	Quantitative Investment Analysis	3		4 Fall		Financial Investments、Econometrics	FIN
FIN417	Corporate Finance Case Analysis	3		3 Fall		Microeconomics、Macroeconomics、Corporate Finance	FIN
Total		155	14				

Note:

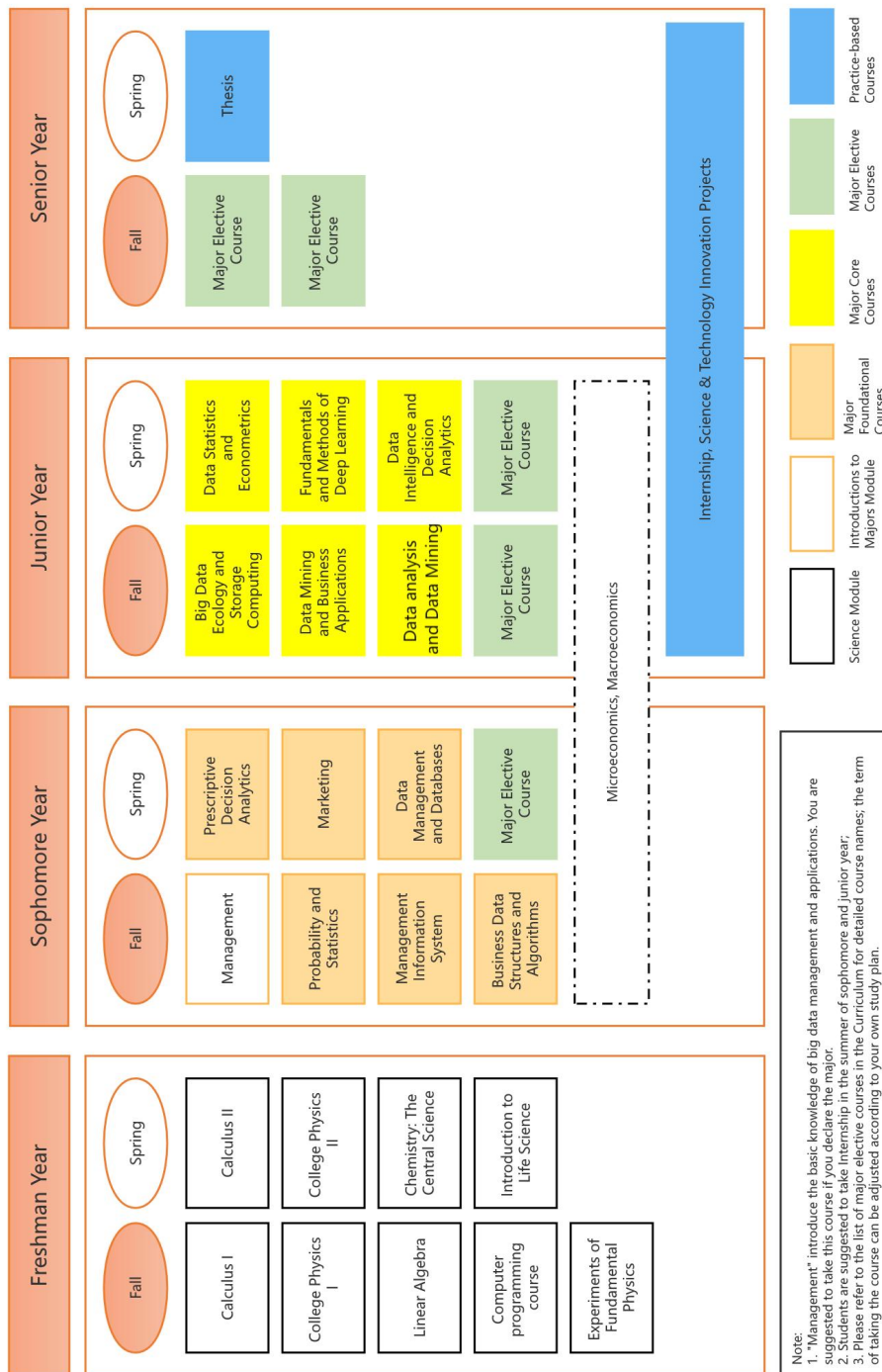
1. After declaring the major of Big Data Management and Applications, students need to choose at least one study track from Data Analytics, Decision Analysis, and Business Administration, and the student's academic advisor should sign for confirmation.
2. After determining the study track of major elective courses, students need to take three courses within three tracks (at least two courses in one specific track);
3. The requirement of total credits for major elective courses is 15 credits.
4. The term of taking the course is not compulsory, and can be adjusted according to student's own study plans.

Table 3: Overview of Practice-based Learning**Program of Big Data Management and Applications for International**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CS110	Introduction to Java Programming	3	1	1-2 Spring & Fall	None	CSE
CS111	Introduction to C programming	3	1	1-2 Spring & Fall	None	CSE
CS112	Introduction to Python Programming Python	3	1	1-2 Spring & Fall	None	CSE
PHY104B	Experiments of Fundamental Physics	2	2	1-2 Spring & Fall	None	PHY
EBA203	Management Information System	3	1	2 Fall	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
MIS204	Prescriptive Decision Analytics	3	1	2 Spring	None	ISME
MIS205	Data Management and Databases	3	1	2 Spring	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
MIS206	Business Data Structures and Algorithms	3	1	2 Spring	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
MIS300	Big Data Ecology and Storage Computing	3	1	3 Fall	Business Data Structures and Algorithms	ISME
MIS303	Big Data Governance and Business Model	3	1	3 Fall	Management Information System/ Data Management and Databases	ISME
EBA301	Data analysis and Data Mining	3	1	3 Fall	Management Information System/ Data Management and Databases	ISME
MIS316	Fundamentals and Methods of Deep Learning	3	1	3 Spring	Data analysis and Data Mining	ISME
MIS317	Data Statistics and Econometrics	3	1	4 Fall	Probability and Statistics	ISME
MIS305	Data Intelligence and Decision Analytics	3	1	3 Spring	Probability and Statistics	ISME

MIS370	Internship	3	3	2 or 3 Summer	None	ISME
MIS480	Science & Technology Innovation Projects	2	2	Any term after the first academic year	None	ISME
MIS491	Thesis	12	12	4 Spring & Fall	None	ISME
MIS302	Big Data Management and ERP	3	1	4 Fall	Management Information System/ Data Management and Databases	ISME
MIS310	Social Media and Digital Marketing	3	1	4 Fall	None	ISME
MIS320	Mining of Network Data	3	1	3 Spring	Business Data Structures and Algorithms	ISME
MIS400	Data mining and business insights	3	1	4 Fall	Data Management and Databases	ISME
MIS301	Big Data Analysis and Application	3	1	3 Spring	Probability and Statistics	ISME
MIS407	Data Modeling and Analysis in Production Operations	3	1	3 Spring	None	ISME
MIS223	Social Media and Digital Marketing	3	1	2 Fall	None	ISME
MIS401	Advanced Marketing	3	1	3 Spring	Marketing	ISME
MIS411	Digital Marketing Analytics	3	1	4 Fall	None	ISME
MIS208	Behavioral and Experimental Economics	3	1	2 Spring	None	ISME
MIS212	Business Negotiations	3	1	2 Spring	None	ISME
MIS308	Empirical Methods in Economics and Management	3	1	4 Fall	Data Statistics and Econometrics	ISME
MIS331	Big Data In Finance	3	1	3 Spring	Probability and Statistics	ISME
MIS332	Blockchain Essentials and Practices	3	1	3 Fall	None	ISME
MIS333	Blockchain Development and Practices	3	1	3 Spring	None	ISME
EBA207	Management System Analysis and Design	3	1	3 Spring	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
EBA420	Management Frontiers and Practices I	3	1	4 Fall	None	ISME
EBA421	Management Frontiers and Practices II	3	1	4 Spring	None	ISME
Total		102	45			

Curriculum Structure of Big Data Management and Applications



School of Design

Program of Industrial Design for International Students (2024)

I. Introduction

SUSTech School of Design aims to build a global creative community in which learning, research, and engagement are all part of the creative experience, to educate students in the enormous potentials and responsibilities of design, and to translate leading technologies into new design outcomes and industry advancement for social benefit.

SUSTech School of Design offers rigorous project-based teaching programs led by a team of leading designers, and scholars. Teaching programs will focus initially on object design, and experience design. These areas of focus are aligned and framed to bridge basic research to industrial needs, leading to careers in gaming, product design, animation, branding, graphics and so on. Cross-disciplinary activities are implemented, including internships, research projects, entrepreneurial projects, and graduation project. Close links with industry leaders and creative makers enhance learning and research. The curriculum structure of the School will allow future addition of areas such as interaction, environmental and wearables design.

Academic subject areas: Mechanical Engineering (0802)

Program code: 080205

II. Objectives and Learning Outcomes

1. Objectives

Design is the translation platform for bringing scientific and technological advances to broad benefit to society. The School of Design is committed to educating students into the skills and theoretical foundations of creative thinking of a wide range of fields of design, including object design, wearable design, interaction design, experience design and environmental design, with a contemporary focus on the opportunities for smart materials and devices, enhancing inclusiveness in society, and improving wellness through design. Particular attention will be paid to the ethical and professional responsibilities of design. Working closely with industry, the program will

develop innovation, entrepreneurship and creativity to drive the national and global outcomes from better design. Located in the global center for manufacturing and production, we are in an unparalleled context for developing creative ideas and delivering the outcomes to everyone in the world. Graduates will have capabilities to research, design, collaborate and communicate and will find future employment in designing consumer and IT products, furniture, toys, interaction, games, and exhibitions, or prepare for a career in research and academia.

2. Learning Outcomes

Upon graduation, students will:

- a) Attain the ability to recognize and grasp opportunities to use design skills to conceptualize and create the future
- b) Draw upon and integrate knowledge from diverse domains, including humanities, social sciences, natural sciences and technologies.
- c) Have developed skills and theoretical foundations for self-directed designing and learning
- d) Use contemporary tools, techniques and systems to deliver robust designed outcomes
- e) Develop capacities for critical thinking and evaluation that leads to design advances
- f) Hold aesthetic and ethical perspectives to guide responsible practice
- g) Be able to work effectively and respectfully in multicultural team contexts to pursue diverse opportunities
- h) Be aware of the social, cultural and environmental impacts of design

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: 157 credits. The specific requirements are as follows.

Module		Category	Minimum Credit Requirement
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	18
		Major Core Courses	15
		Practice-based Learning (Undergraduate Thesis, Internships, Research projects, etc.)	18
	Major Elective Courses	Major Elective Courses	27
Total			157
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	MA118/ MA117/ MA101a	Single-variable Calculus/Calculus I/Mathematical Analysis I	4/4/5	1 Fall	None	Department of Mathematics
	MA128/ MA127/ MA102a	Multivariable Calculus/Calculus II/Mathematical Analysis II	4/4/5	1 Spring	Single-variable Calculus/Calculus I/Mathematical Analysis I	Department of Mathematics
	MA113/ MA107	Linear Algebra/Advanced Linear Algebra I	4	1 Spring & Fall	None	Department of Mathematics
Physics	PHY105/ PHY101	College Physics I/General Physics I	4/5	1 Fall	None	Department of Physics
	PHY106/ PHY102	College Physics II/General Physics II	4/5	1 Spring	College Physics I/General Physics I	Department of Physics
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	Department of Physics
Chemistry	CH105/ CH103	Chemistry: The Central Science/General Chemistry	3	1-2 Spring & Fall	None	Department of Chemistry
Geoscience + Life Science	BIO102B/ BIO103 /EOE100	Introduction to Life Science/Principles of Biology/ Introduction to Earth Sciences	3	1-2 Spring & Fall	None	Department of Biology
Computer Programming	CS110/ CS109	Introduction to Java Programming/Introduction to Computer Programming	3	1-2 Spring & Fall	None	Dept. of Computer Science and Engineering

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA118/ MA117/ MA101a	Single-variable Calculus/Calculus I/Mathematical Analysis I	None
	MA128/ MA127/ MA102a	Multivariable Calculus/Calculus II/Mathematical Analysis II	Single-variable Calculus/Calculus I/Mathematical Analysis I
	MA113/ MA107	Linear Algebra/ Advanced Linear Algebra I	None
	PHY105/ PHY101	College Physics I/ General Physics I	None
	PHY106/ PHY102	College Physics II/ General Physics II	College Physics I/ General Physics I
	PHY104B	Experiments of Fundamental Physics	None
	CS110/ CS109	Introduction to Java Programming/ Introduction to Computer Programming	None
Declare major at the end of the second academic year	MA118/ MA117/ MA101a	Single-variable Calculus/Calculus I/Mathematical Analysis I	None
	MA128/ MA127/ MA102a	Multivariable Calculus/Calculus II/Mathematical Analysis II	Single-variable Calculus/Calculus I/Mathematical Analysis I
	MA113/ MA107	Linear Algebra/ Advanced Linear Algebra I	None
	PHY105/ PHY101	College Physics I/ General Physics I	None
	PHY106/ PHY102	College Physics II/ General Physics II	College Physics I/ General Physics I
	PHY104B	Experiments of Fundamental Physics	None
	CS110/ CS109	Introduction to Java Programming/ Introduction to Computer Programming	None
	CH105/ CH103	Chemistry: The Central Science/General Chemistry	None
	BIO102B/ BIO103/EO E100	Introduction to Life Science/Principles of Biology/ Introduction to Earth Sciences	None
Note: 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. 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. 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). 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).

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Industrial Design

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	DS209	Visual Perception and Cognition	3	1	2 Fall	NA	DES
	DS203	Additive Manufacturing	3	1	2 Fall	NA	DES
	DS211	Interactive Systems Design	3	1	2 Fall	NA	DES
	DS103	Designing for beginners	3		2 Fall	NA	DES
	DS207	Design History	3		2 Fall	NA	DES
	DS208	Design Ethics	3		2 Spr	NA	DES
	Total		18	3			
Students in Object focus take the following major core courses:							
Major Core Courses	DS304	Product Survey and Evaluation	3	1	3 Fall	NA	DES
	DS302	Product Realization	3	1	3 Spr	NA	DES
	DS303	Manufacturing Systems	3	1	3 Spr	NA	DES
	DS402	Research Project	3	1	4 Fall	NA	DES
	DS403	Research Methods for Design	3		3 Fall	NA	DES
	Total		15	4			
Students in Experience focus take the following major core courses:							
Major Core Courses	DS311	Game Survey and Evaluation	3	1	3 Fall	NA	DES
	DS312	Making a Game	3	1	3 Spr	NA	DES
	DS313	Sound & Senses	3	1	3 Spr	NA	DES
	DS402	Research Project	3	1	4 Fall	NA	DES
	DS403	Research Methods for Design	3		3 Fall	NA	DES
	Total		15	4			
Practice-based Courses	DS404	Internship	3	3	4 Fall	NA	DES
	DS411	Design Entrepreneurship Project	3	3	4 Fall	NA	DES
	DS420	Graduation Project	12	12	4 Spr	NA	DES
	Total		18	18			
Total			48	25			

Table 2: Major Elective Courses

Program of Industrial Design

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
major common electives	DS221	Personal System: Object	3	1	2 Spr	NA	DES
	DS222	Personal System: Experience	3	1	2 Spr	NA	DES
	DS223	Client Product: Object	3	1	2 Spr	NA	DES
	DS224	Client Product: Experience	3	1	2 Spr	NA	DES
	DS225	Circular Products: Object	3	1	2 Spr	NA	DES
	DS226	Circular Products: Experience	3	1	2 Spr	NA	DES
合计			18	6			
The program has two teaching focuses, i.e. object design and experience design. Each focus offers the series of three courses, which are personal system, client product and circular products. Students shall take the three courses for a total of 9 credits. Students can choose either teaching focus when take one of the three courses.							
Major common electives	DS321	Design Practice Management	3	1	3/4	NA	DES
	DS322	UX and Interaction	3	1	3/4	NA	DES
	DS323	AI in Design	3	1	3/4	NA	DES
	DS324	Contemporary Design History	3	1	3/4	NA	DES
	DS326	Realities VR & AR	3	1	3/4	NA	DES
	DS328	Materiality	3	1	3/4	NA	DES
	DS362	Designing with Environments	3	1	3/4	NA	DES
	DS367	Human Factors in Design	3		3/4	NA	DES
	DS331	Narrative and Cognition	3		3/4	NA	DES
	DS325	AI Environments	3	1	3/4	NA	DES
	DS327	Informational Landscapes	3	1	3/4	NA	DES
	DS329	Culture and Technology	3	1	3/4	NA	DES
	DS330	Machine Interactions	3	1	3/4	NA	DES
	DS332	Sustainable Digital Design	3		3/4	NA	DES
	DS110	Summer Studio	3	1	1/2/3 Summer	NA	DES
	DS111	Special Topics in Design	1	1	1/2/3 Summer	NA	DES
	SDM371	Big data	3	1	3 Fall	MA107A	SDIM
	SDM374	Machine Learning System Design	3	1	3 Spr	MA107A	SDIM
	SDM378	Computer Vision and Applications	3	1	3 Spr	CS102A, MA102B, MA107A	SDIM
	SDM391	Interactive Design	3	1	3 Spr	SDM114	SDIM

	SDM412	Wearable Technology and Design	3	1	3-4 Spr	SDM212	SDIM
	MIS202	Marketing	3		1 Fall	无	Business School
	FIN 213	Financial Markets and Institutions	3		2 Fall	无	Business School
	FIN 201	Microeconomics	3		1 Spr Fall	无	Business School
	FIN 204	Macroeconomics	3		1 Spr Fall	无	Business School
	ME357	Intelligent Manufacturing System Technology	3		Spr	无	MEE
Total			79	18			
Students complete 1 studio course and 1 lectures (6 credits)							
Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major focus electives	DS333	Narrative and Branding	3	1	3/4	NA	DES
	DS334	Advanced Manufacturing	3	1	3/4	NA	DES
	DS335	Product UX	3	1	3/4	NA	DES
	DS336	Electronics and Controls	3	1	3/4	NA	DES
	DS337	Responsive Devices	3	1	3/4	NA	DES
	DS338	Branding and Marketing	3	1	3/4	NA	DES
	DS339	Service Design	3	1	3/4	NA	DES
	DS340	Color, Materials, Finish	3	1	3/4	NA	DES
	DS341	Design for Industrial Additive Manufacturing	3	1	3/4	NA	DES
	DS342	Social Robotics	3	1	3/4	NA	DES
	DS357	Industry Practices and Strategies	3		3/4	NA	DES
	DS368	Materials and manufacturing	3		3/4	NA	DES
Total			36	10			
Students in Object focus complete 3 studio courses and 1 lectures (12 credits)							
major focus electives	DS345	Sound Design	3	1	3/4	NA	DES
	DS369	Generative Visualization	3	1	3/4	NA	DES
	DS344	Gamification	3	1	3/4	NA	DES
	DS346	Emotion-Driven Design	3	1	3/4	NA	DES
	DS347	Creative Machines	3	1	3/4	NA	DES
	DS349	Emerging Interface Technologies	3	1	3/4	NA	DES
	DS350	Haptic Interfaces	3	1	3/4	NA	DES
	DS351	Experiencing (in) Motion	3	1	3/4	NA	DES
	DS352	Embodied Media	3	1	3/4	NA	DES
	DS353	Media Scenography	3	1	3/4	NA	DES

	DS364	Sound Design for Immersive Experiences	3	1	3/4	NA	DES
	DS359	Data Management Tools and Strategies	3		3/4	NA	DES
	DS363	Design and Learning with Data	3		3/4	NA	DES
	DS366	Composing Experiences	3	1	3/4	NA	DES
	DS370	Information Visualization and Visual Analysis	3	1	3/4	NA	DES
Total			42	12			
Students in Experience focus complete 3 studio courses and 1 lectures (12 credits)							

Table 3: Overview of Practice-based Learning**Program of Industrial Design**

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
DS209	Visual Perception and Cognition	3	1	2 Fall	NA	DES
DS203	Additive Manufacturing	3	1	2 Fall	NA	DES
DS211	Interactive Systems Design	3	1	2 Fall	NA	DES
DS304	Product Survey and Evaluation	3	1	3 Fall	NA	DES
DS302	Product Realization	3	1	3 Spr	NA	DES
DS303	Manufacturing Systems	3	1	3 Spr	NA	DES
DS402	Research Project	3	1	4 Fall	NA	DES
DS311	Game Survey and Evaluation	3	1	3 Fall	NA	DES
DS312	Making a Game	3	1	3 Spr	NA	DES
DS313	Sound & Senses	3	1	3 Spr	NA	DES
DS404	Internship	3	3	4 Fall	NA	DES
DS411	Design Entrepreneurship Project	3	3	4 Fall	NA	DES
DS420	Graduation Project	12	12	4 Spr	NA	DES
DS221	Personal System: Object	3	1	2 Spr	NA	DES
DS222	Personal System: Experience	3	1	2 Spr	NA	DES
DS223	Client Product: Object	3	1	2 Spr	NA	DES
DS224	Client Product: Experience	3	1	2 Spr	NA	DES
DS225	Circular Products: Object	3	1	2 Spr	NA	DES
DS226	Circular Products: Experience	3	1	2 Spr	NA	DES
DS321	Design Practice Management	3	1	3/4	NA	DES
DS322	UX and Interaction	3	1	3/4	NA	DES
DS323	AI in Design	3	1	3/4	NA	DES
DS324	Contemporary Design History	3	1	3/4	NA	DES
DS326	Realities VR & AR	3	1	3/4	NA	DES
DS328	Materiality	3	1	3/4	NA	DES
DS362	Designing with Environments	3	1	3/4	NA	DES
DS325	AI Environments	3	1	3/4	NA	DES
DS327	Informational Landscapes	3	1	3/4	NA	DES
DS329	Culture and Technology	3	1	3/4	NA	DES
DS330	Machine Interactions	3	1	3/4	NA	DES
DS110	Summer Studio	3	1	1/2/3Summer	NA	DES
DS111	Special Topics in Design	1	1	1/2/3Summer	NA	DES
SDM371	Big data	3	1	3 Fall	MA107A	SDIM
SDM374	Machine Learning System Design	3	1	3 Spr	MA107A	SDIM
SDM378	Computer Vision and Applications	3	1	3 Spr	CS102A, MA102B, MA107A	SDIM
SDM391	Interactive Design	3	1	3 Spr	SDM114	SDIM

SDM412	Wearable Technology and Design	3	1	3-4 Spr	SDM212	SDIM
DS333	Narrative and Branding	3	1	3/4	NA	DES
DS334	Advanced Manufacturing	3	1	3/4	NA	DES
DS335	Product UX	3	1	3/4	NA	DES
DS336	Electronics and Controls	3	1	3/4	NA	DES
DS337	Responsive Devices	3	1	3/4	NA	DES
DS338	Branding and Marketing	3	1	3/4	NA	DES
DS339	Service Design	3	1	3/4	NA	DES
DS340	Color, Materials, Finish	3	1	3/4	NA	DES
DS341	Design for Industrial Additive Manufacturing	3	1	3/4	NA	DES
DS342	Social Robotics	3	1	3/4	NA	DES
DS345	Sound Design	3	1	3/4	NA	DES
DS369	Generative Visualization	3	1	3/4	NA	DES
DS344	Gamification	3	1	3/4	NA	DES
DS346	Emotion-Driven Design	3	1	3/4	NA	DES
DS347	Creative Machines	3	1	3/4	NA	DES
DS349	Emerging Interface Technologies	3	1	3/4	NA	DES
DS350	Haptic Interfaces	3	1	3/4	NA	DES
DS351	Experiencing (in) Motion	3	1	3/4	NA	DES
DS352	Embodied Media	3	1	3/4	NA	DES
DS353	Media Scenography	3	1	3/4	NA	DES
DS364	Sound Design for Immersive Experiences	3	1	3/4	NA	DES
DS366	Composing Experiences	3	1	3/4	NA	DES
DS370	Information Visualization and Visual Analysis	3	1	3/4	NA	DES
Total		187	75			

Curriculum Structure of Industrial Design (School of Design)

