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Zhiyuan College Program Curriculum

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Contents

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Zhiyuan Mathematics Program

Mathematics Curriculum Characteristics

Mathematics curriculum set in Zhiyuan College emphasizes solid mathematical foundation, practical and effective interdisciplinary methods, and question-driven learning experience. Mainly are addressed as follows:

A. For freshmen and sophomores, fundamental courses like Mathematical Analysis and Linear Algebra (Advanced Linear Algebra) focus more on modern mathematical thinking cultivation and further topic elaboration. There are in total three terms for Mathematical Analysis, with five, five, and four credits for each term; And two terms for Linear Algebra and Advanced Linear Algebra, with credits five and three respectively. A thorough grounding would play an important role in students' later development.

B. For freshmen majoring in Mathematics, their curriculum also includes Introduction to Physics, Introduction to Computer Science, Introduction to Biology, and Chemical Principles. Among the four courses, except for the required Introduction to Physics, students have to pick at least two out of the rest three. Mathematics curriculum at the very beginning brings in interdisciplinary learning environment. To take a look at student later academic performance, this curriculum arouses their academic interest, and exerts positive influences on them to apply mathematical method to scientific researches.

C. For sophomores, there is Professional Seminar in the following five semesters. Corresponding to each topic, the course is taught by senior professors and academically active young scholars to lead students study and research in the fields they share interest in. In the final year, the course requires students to live up to active participation in relevant topic researches. With more guidance and supervision in thesis writing, and question-driven learning inspiration, students will be more into scientific studies.

D. From the year 2016, there will be a new while distinctive course called Freshman Seminar. It approaches

by telling a good story, leading to an inquiry, and opening up a field. Each class is in the form of stories to introduce scientific principles and mathematical theorems, echoing with the truth of “small fable whispers great wisdom”, to encourage deeper exploration from easy questions.

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Mathematics Curriculum

1. Education Objectives

Zhiyuan Mathematics Program is fully committed to bringing up scientific leaders of tomorrow who with creativity, critical thought and solid knowledge of Mathematics and Physics rejoice in discovery and serving society.

The graduates should be trained to obtain knowledge, abilities and qualities as follows:

A. Solid knowledge of Mathematics;

B. Strong research ability, application ability and innovative thinking;

C. International vision of Science, work with perseverance, and humanistic qualities;

D. The ability to be cooperative and communicative.

The graduates should fit in with multiple professional fields.

A. They will pursue further study in disciplines related to Mathematics, Natural Science, Engineering, Finance, Management and Life Science;

B. They will find new problems, seek and analyze new methods, accumulate knowledge to develop new areas, apply new methods and technology in the R&D and innovation of high-tech fields.

2. Education Principles

A. Adhere to the trinity talent education idea of "capacity development, knowledge exploration, and personality nurturing";

B. Meet the society's needs in top-notch talents of innovation;

C. Show elite education in basic disciplines;

D. Inherit SJTU's education tradition and culture, and make full use of its advantages in science education;

E. Emphasize solid knowledge of Mathematics and interdisciplinary ability;

F. Follow regular patterns of teaching and learning, and emphasize in individuation cultivation;

G. Question-driven and research-oriented teaching methods are achieved by having distinctive courses like Topic Seminars, by which students' abilities of critical thinking and innovation are greatly improved.

3. Standards and Requirements (work as reference to select courses and education activities)

A. Knowledge Exploration

A1. Basic knowledge of Literature, History, Philosophy, Arts, etc. —require students to enhance their knowledge levels in these fields.

A2. Introduction to the research methods of social sciences—through segments of a certain discipline and short academic exploration, the students will get to the research methods of this discipline, instead of just learning simplified concepts and general knowledge of it.

A3. Basic and frontier knowledge of Natural Science and Technology—the knowledge should be closely related to social and personal life. It helps students with their scientific literacy and engineering consciousness.

A4. Basic knowledge of Mathematics and logic.—based on basic education, we cultivate students' abilities in quantitative analysis and logical thinking.

A5. Systematic core knowledge of Mathematics and Applied Mathematics—these knowledge should be included in both basic courses and compulsory courses.

B. Capacity Development

B1. The ability to think clearly and express accurately.

B2. The ability to raise, analyze and solve problems.

B3. The ability to think critically and work innovatively.

B4. The ability to work with different types of people.

B5. The ability to appreciate Literature and Arts.

B6. Master at least one foreign language.

B7. Maintain life-long education.

B8. Organizing and managing capacity.

C. Personality Nurturing

C1. Stand high and aim far; have strong will—take inheriting culture, reaching after the truth, rejuvenating China and benefiting mankind as their duty to the end.

C2. Work hard with keen determination—be earnest and down-to-earth, work hard and pursue being outstanding.

C3. Be physically and mentally healthy and with broad vision—be physically and mentally healthy; good capacity of multiculturalism and broad vision of internationalization.

C4. Quick thinking and willing to be innovative—willing to think and work industriously, interested in developing the new from the old, with the exploration spirit and eager to solve problems.

4. Course Structure (More information at Zhiyuan Mathematics Curriculum Design)

Based on the relevance, the curriculum of Mathematics Program is divided into general education course, specialist education course, specialist practice and individualized course. According to teaching methods, courses are divided into theory teaching, practice teaching and research experiential teaching.

Each category is optional in different degrees. They are compulsory course, conditional electives and electives.

Students in Mathematics Program are required to obtain 141 credits to graduate.

Curriculum Category and Credits

Curriculum Category		Credit
General Education Course		27
Specialist Education Course	Basics	39
	Specialist Core Course	35
	Specialist Electives	18
Specialist Practice	Laboratory	3
	Military Training	3
	Specialist Comprehensive Practice	6
Individualized Course		10

General Education Course

The general education course of Mathematics Program in Zhiyuan College is set as required. This module has 27 credits and covers the courses like Basic Principles of Marxism, Mao Zedong Thought and Introduction to the Theoretical System of Socialism with Chinese Characteristics, Military Theory, Outline of Chinese Modern History, Education of Morality and Fundamentals of Law, PE and Basic College English.

Basic College English (1) and Basic College English (2) are compulsory to all students. Whether to choose Basic College English (3) and Basic College English (4) or not depends on the pass of SJTU English Proficiency Test. Since the second semester of enrollment, the Test will be held each semester one time afterwards. Passed students can choose by themselves if to continue the Basic College English in the coming semester. Failed students are required to continue the course of next semester until they pass the Test or complete the four-semester course.

Specialist Course

The specialist course of Mathematics Program in Zhiyuan College includes basics, specialist core courses, conditional specialist courses and specialist electives.

A. Basics have 39 credits and include: Mathematical Analysis, Linear Algebra, Introduction to Computer Science, Introduction to Biology, Chemical Principles, and so on. Mathematical Analysis, Linear Algebra and Introduction to Biology are compulsory. Students are required to choose two courses among Introduction to Computer Science, Introduction to Biology and Chemical Principles.
B. Specialist core courses have 35 credits and include Complex Analysis, Fourier Analysis and Real Analysis, Probability and Partial Differential Equations etc. It also includes a five-semester Professional Seminar.
C. Specialist electives: Students of Mathematics Program are required to obtain 18 credits before graduation.
D. Curriculum Design may be adjusted or complemented based on actual conditions.

Specialist Practice Course

The specialist practice course of Mathematics Program in Zhiyuan College is categorized into laboratory courses, internship, practices, military training and specialist comprehensive training.

A. Students are required to obtain 3 credits by taking Physics Laboratory.
B. Students are required to receive the military training to obtain 3 credits in the summer holiday at the end of the second semester.
C. Specialist comprehensive training: Students in the Mathematics Program are required to complete all courses as scheduled by the end of the seventh semester. Only then, they are qualified to start their graduation project. The graduation project covers the eighth semester and is worth 6 credits.
D. Based on their hobbies, interests and specialties, students are encouraged to take part in all kinds of extra-curriculum technological activities, including PRP academic research and all kinds of technological innovation contests. Students are encouraged to take part in social survey and practice of Basic Principles of Marxism and Education of Morality and Fundamentals of Law.

Individualized Course

Individualized course has 10 credits. Students can choose various theory teaching or practice teaching courses approved by SJTU, including general education or specialist electives, Basic College English (3) and Basic College English (4), PRP and other extra-curriculum technological or academic contests.

5. Qualification, Schooling Length, Credits and Diploma

A. Qualification assessment will be conducted in the mid-term of the first year's second semester. Failed students will be rolled out of Zhiyuan College.
B. Normal schooling length is four years. Extended time should not exceed six years.
C. The total credits of the major should not be less than 141 credits. Compulsory courses and conditional electives shall be at least 131 credits and the rest 10 credits are electives.

D. Credits requirement of the minor: the specialist compulsory course: "Ordinary Differential Equations and Dynamic System" and any three courses of the rest eight (exclude Professional Seminar) (≧15 credits). The credits of specialist electives module should be no less than 10. For more information, please refer to the Curriculum Design.

E. Eligible students will be awarded the Bachelor of Science.

6. Curriculum Design of Zhiyuan Mathematics Program

Curriculum Design of Zhiyuan Mathematics Program

Course Code	Course Name	Total Credits	Total Hour	Class hour	Hour Arrangement				Semester Recommended	Knowledge Contribution	Capacity Contribution	All-round Development Contribution
					Theory Teaching	Practice Teaching						
						Laboratory	Internship	Others				
General Education Course												
Common Course												
Compulsory Course												
Students are required to take all courses to graduate. (≧25 credits)												
TH021	Outline of Chinese Modern History	2	32		32				1			
TH000	Education of Morality and Fundamentals of Law	3	48		48				2			
TH012	Mao Zedong Thought and Introduction to the Theoretical System of Socialism with Chinese Characteristics	6	96		96				3			
TH007	Basic Principles of Marxism	3	48		48				4			
TH004	Military Theory	1	16		16				2			
EN025	Basic College English (1)	3	64		64				1			

EN026	Basic College English (2)	3	64		64				2			
PE001	PE(1)	1	32					32	1			
PE002	PE(2)	1	32					32	2			
PE003	PE(3)	1	32					32	3			
PE004	PE(4)	1	32					32	4			
	Total Credits	25										
General Education Practice												
Compulsory Course												
Students are required to take all courses to graduate (≧2 credits)												
XP000	General Education Practice Activities	2	32					32	2			
	Total Credits	2										
Specialist Course												
Basics												
Compulsory Course												
Students should choose at least two courses among "Introduction to Computer Science", "Introduction to Biology (1)" and "Chemical Principles". Students are required to take all the other courses. (≧39credits)												
MA146	Mathematical Analysis I(A)	5	112		80			32	1			
MA123	Mathematical Analysis II(A)	5	112		80			32	2			
	Mathematical Analysis III(A)	4	80		64			16	3			
MA236	Linear Algebra	5	80		80				1			
	Advanced Linear Algebra	3	48		48				2			
PH114	Introduction to Physics I(A)	5	96		64			32	1			
PH116	Introduction to Physics II(A)	5	96		64			32	2			
CS101	Introduction to Computer Science	3	48		48				1			
BI114	Introduction to Biology(1)	4	64		64				1			
CA127	Chemical Principles	4	64		64				1			
	Total Credits	43										
Specialist Core Course												
Compulsory Course												

Major：Students are required to take all courses(≧35credits). Minor：Students are required to take all specialist compulsory courses "Ordinary Differential Equations and Dynamic System" and any three courses among the rest eight courses. (Exclude Topic Course)(≧15credits).												
	Topic Course(1)	1	32		32				3			
	Topic Course(2)	1	32		32				4			
	Topic Course(3)	1	32		32				5			
	Topic Course(4)	1	32		32				6			
	Topic Course(5)	1	32		32				7			
	Numerical Analysis and Scientific Computing	3	48		48				2			
	Ordinary Differential Equations and Dynamic System	3	48		48				3			
	Complex Analysis	4	64		64				3			
	Fourier Analysis and Real Analysis	4	64		64				4			
	Probability	4	64		64				4			
	Abstract Algebra	4	64		64				4			
	Partial Differential Equations	4	64		64				5			
	Differential Geometry	4	64		64				5			
	Total Credits	35										
Specialist Electives												
Major students are required to obtain at least 18 credits. Among "Stochastic Process", "Functional Analysis", "Numerical Methods for Ordinary and Partial Differential Equations", and "Topology", students should choose at least three courses. Minor students are required to obtain at least 10 credits among Specialist Electives and Compulsory Course (Exclude Topic Course). Courses should be selected under the Zhiyuan College or Mathematics and Applied Mathematics module of School of Mathematical Sciences.												
	Stochastic Process	3	48		48				5			
	Mathematical Programming	3	48		48				5			
	Graph Theory and Network	3	48		48				5			
	Mathematical Statistics	3	48		48				6			
	Functional Analysis	3	48		48				6			

	Numerical Methods for Ordinary and Partial Differential Equations	3	48		48				6			
	Topology	3	48		48				6			
	Asymptotic Analysis	3	48		48				6			
	Representation of Groups and Algebras	3	48		48				6			
	Dynamics System	3	48		48				6			
	Computational Physics	3	48		48				7			
	Algebraic Number Theory	2	32		32				7			
	Differential Manifold	3	48		48				7			
	Coding and Decoding	2	32		32				7			
	Mathematical Finance	3	48		48				7			
	Time Series Analysis	3	48		48				7			
	Generalized Functions and Sobolev Spaces	2	32		32				7			
	Nonlinear Mathematical Methods in Physics	2	32		32				7			
	Selected Topics in Scientific Computing	2	32		32				7			
	Lie Groups and Lie Algebras	3	48		48				8			
	Combinatorial Mathematics	3	48		48				8			
	Computational Fluid Mechanics	2	32		32				8			
	Riemannian Geometry	3	48		48				8			
	Statistical Data Analysis	3	48		48				8			
	Ordinary Differential Equations(A)	2	32		32				8			

	Continued Course in Partial Differential Equations (A	2	32		32				8			
	Algebraic Topology	3	48		48				8			
	Algebraic Geometry	2	32		32				8			
	Total Credits	75										
Specialist Practice Course												
Laboratory Course												
Compulsory Course												
Require at least 3 credits to graduate(≧3credits)												
PH111	Physics Laboratory I	1.5	27		3	24			2			
PH117	Physics Laboratory II	1.5	27		3	24			3			
	Total Credits	3										
Military Training												
Compulsory Course												
Students are required to take all courses to graduate. (≧3credits)												
TH010	Military Training	3	48						2			
	Total Credits	3										
Specialist Comprehensive Training												
Compulsory Course												
Students are required to take all courses to graduate. (≧6credits)												
	Graduation project (Thesis)(Mathematics and Applied Mathematics)	6	96			96			8			
	Total Credits	6										
Individualized Course												
Students are required to obtain at least 10 credits. College Academic Research and Development Training and General Education Core Courses (Humanities) are recommended (PRP and College Student's Science and Innovation Project are recommended by the third year.).												

Zhiyuan Physics Program

Physics Curriculum Characteristics

Zhiyuan Physics' curriculum attempts to reflect Zhiyuan's education mode: through first-class teaching and good academic environment, we gather teachers with the best innovative thinking and students with the best innovative potential together; we encourage students to work in research labs of the Department of Physics and Astronomy and Institute of Natural Sciences. By research practice guided by front-line scientists, students' curiosity and creativity will be greatly aroused.

Zhiyuan Physics' curriculum is programed and implemented according to three principles as follows:

A. Starting from the first year, we encourage students' interest in interdisciplinary science. The curriculum on the one hand emphasizes Mathematics. We offer course like Mathematical Analysis (5+5 credits), Linear Algebra (5 credits), etc. On the other hand, we require students to select one out of three, among Introduction to Computer Science, Introduction to Biology and Chemical Principles.

B. For the core course Introduction to Physics, which covers the contents of Mechanics, Thermology, Optics, Electricity and Contemporary Physics, and four specialized core courses on Mechanics, we enhance the hardness of the theories. In addition, we especially emphasize the contents on physical schema and important experiments related, therefore, the students know better about the thinking mode and process of scientific discovery as well as the application. Thus, they obtain enough knowledge and methods on conducting research activities in the future.

C. Physics is basically based on experimental discovery and verification. We pay much attention on experiment courses. We conduct a series of experiment courses like Introduction to Physics laboratory, Physics experiment I, and Physics experiment II to encourage students to participate initially and innovatively in independent experiments.

To nurture students' interest in scientific research, Zhiyuan Physics Program emphasizes on students'

initiative in the discovery and development of scientific interest. Thus, we enhance and enrich the part of introduction and practice in the curriculum.

A. We offer the course of Introduction to Physics Research (2+2 credits) in the first and third semester. The students start to read frontier research papers under the guidance of professors. Through learning the latest research progress in frontier Physics, the students' curiosity will be aroused. Then we gradually introduce them to the mode of thinking and research process of Physics.

B. From the third to the sixth semester, we offer one course of Physics Research Practice for each semester (1+1+1+1 credit), which leads students to the labs in the Department of Physics and Astronomy and Institute of Natural Sciences. They attend group seminars and do some research experiments with senior students. In this process, we encourage students to enter research labs in several different areas and types, hopefully they will find research interests on their own. In the end of the semester, the students are required to submit a written report on their research practice and give a presentation in the lab.

C. Students are supposed to write thesis proposal starting from the seventh semester. We encourage them to mainly focus on thesis writing in the seventh and eighth semester. Thesis from our former graduates has indicated that our efforts had already lead to creative and productive results.

Physics Curriculum

1. Education Objectives

Zhiyuan Physics Program is dedicated to nurture future leaders having both strictness and abstract thinking from Mathematics as well as intuition, induction and deduction from Physics. We train them to work in the field of Physics and set Physics as their professional ideal.

The graduates should be trained to obtain knowledge, abilities and qualities as follows:

A. Solid knowledge of Mathematics and Physics, a global vision of science and technology, explorative and innovative thinking, perseverance, and humanistic quality;

B. The abilities to spot problems incisively, raise questions analytically, solve problems systematically, integrate knowledge initially, and communicate cooperatively.

The graduates should fit in with multiple professional fields.

A. They will pursue further study in disciplines related to Natural Science, Applied Science, Engineering and Technology, Management Science, etc.;

B. They will find new problems, seek and analyze new methods, accumulate knowledge to develop new areas, apply new methods, technology and materials in the field of manufacturing.

C. They will be urgently needed in emerging industries in which quantitative analysis and semiquantitative analysis, the ability to illustrate details, and the ability to deal with complicated systems are required, like consulting, trade management, project management, etc.

2. Education Principles

A. Adhere to the trinity talent education idea of “capacity development, knowledge exploration, and personality nurturing”;

B. Meet the society’s needs in top-notch talents of innovation;

C. Show elite education in basic disciplines;

D. Inherit SJTU's education tradition and culture, and make full use of its advantages in science education;

E. Give prominent to the characteristics of Physics, and point out the trend that the focus of scientific research has been shifted to interdisciplinary research;

F. In accordance to the regular patterns of teaching and learning;

G. Teach students in accordance with their aptitude by microteaching and respecting individualism.

3. Standards and Requirements (work as reference to select courses and education activities)

A. Capacity Development

A1. The ability to discover, raise, analyze and solves problems, and the ability to think critically and work innovatively.

A2. Maintain life-long education and the ability to learn and integrate new knowledge, methods and technologies.

A3. The ability to understand and discover the environment, especially the problems concerning science and technology. (The ability to analyze and solve problems professionally: modeling by using language, graphics, and mathematical methods; promote and select the most practical solution; the ability to analyze and decide the uncertain problems.)

A4. Solid knowledge of Mathematics and Physics, outstanding ability in logic and image thinking, the ability to grasp and conclude problems, the ability to conduct and design experiments, and the ability of professional expression. (Description of graphics and physical model, and expression of Physics-related problems and concepts, academic thesis writing, and research report presentation in both Chinese and English).

A5. Students will have to learn the basic problems, difficult problems and developing trend of frontier Physics as well as high-tech areas like new energy technology, optoelectronic technology, Materials Science, Computer Science, microelectronic technology, Life Science, etc.

A6. Programing ability and the ability to solve scientific and technical problems by using computer software.

And the ability to gather information and documents by using modern information technology.

A7. The ability to communicate and cooperate by clear and organized Chinese language.

A8. The ability to appreciate literature and arts.

A9. Organizing and managing capacity.

B. Knowledge Exploration

B1. Basic knowledge of Literature, History, Philosophy, Arts, etc. —require students to enhance their knowledge levels in these fields.

B2. Introduction to the research methods of social sciences—through segments of a certain discipline and short academic exploration, the students will get to the research methods of this discipline, instead of just learning simplified concepts and general knowledge of it.

B3. Basic and frontier knowledge of Natural Science and Technology—the knowledge should be closely related to social and personal life. It helps students with their scientific literacy and engineering consciousness.

B4. Basic knowledge of Mathematics and logic—based on basic education, we cultivate students' abilities in quantitative analysis and logical thinking.

B5. Systematic core knowledge of Mathematics in the field of Physics.

B5.1. Mathematics courses marked by three variable quantities (continued, random and discrete);

B5.2. Application and programing of mathematical software;

B5.3. Mathematics courses mainly focusing on analytical methods;

B5.4. Mathematics courses mainly focusing on the description of functional equations;

B5.5. Mathematics courses combine multiple methods;

B5.6. Other related Mathematics courses;

B5.7. Focus on the links between Mathematics and Physics, and encourage students to discover, raise and express problems by offering seminar courses;

B5.8. Comprehensive application experience in Physics;

B6. Systematic core knowledge in Physics;

B6.1. Mathematics courses related to physical theory and related methods;

B6.2. Basic Physics courses mainly focusing on phenomenological description;

B6.3. Core Physics courses mainly focusing on theoretical description;

B6.4. Application Physics courses combining phenomenological and theoretical description;

B6.5. Direction related Physics courses;

B6.6. Focus on the links between Mathematics and Physics, and encourage students to discover, raise and express problems by offering seminar courses;

B6.7. Experiment courses in Physics;

B6.8. Scientific practice courses in Physics.

C. Personality Nurturing

C1. Stand high and aim far, have strong will—take inheriting culture, reaching after the truth, rejuvenating China and benefiting mankind as their duty to the end.

C2. Work hard with keen determination—be earnest and down-to-earth, work hard and pursue being outstanding.

C3. Be physically and mentally healthy and with broad vision—be physically and mentally healthy; good capacity of multiculturalism and broad vision of internationalization.

C4. Quick thinking and willing to be innovative—willing to think and work industriously, interested in developing the new from the old, with the exploration spirit and eager to solve problems.

C5. Good professional ethics and academic morality.

C6. Great ability to adapt.

C7. Sense of righteousness and social responsibility, as well as independent spirit of pursuing the truth.

C8. The scientific spirit of making hypothesis boldly, verifying carefully and working with perseverance.

Curriculum Category and Credits

Curriculum Category		Credit
General Education Course		27
Specialist Education Course	Basics	30
	Specialist Core Course	28
	Specialist Electives	12+6
Specialist Practice	Laboratory	13
	Research Practice	8
	Military Training	3
	Specialist Comprehensive Training	6
Individualized Course		10

4. Course Structure (More information at Zhiyuan Physics Curriculum Design)

Based on the relevance, the curriculum of Physics Program is divided into general education course, specialist education course, specialist practice and individualized course.

According to teaching methods, courses are divided into theory teaching, practice teaching and research experiential teaching.

Each category is optional to different degrees. They are compulsory course, conditional electives and electives.

Credits of compulsory and conditional courses should be at least 133 to graduate from the Physics Program. The rest 10 credits can be any elective courses provided by Shanghai Jiao Tong University.

General Education Course Description

The general education course of Physics Program in Zhiyuan College is set as required. This module has 27 credits and covers the courses like Basic Principles of Marxism, Mao Zedong Thought and Introduction to the Theoretical System of Socialism with Chinese Characteristics, Military Theory, Outline of Chinese Modern History, Education of Morality and Fundamentals of Law, PE and Basic College English.

Basic College English (1) and (2) are compulsory courses. The results of English Proficiency Test will decide whether students can go on to take (3) and (4) or not. Since the second semester of enrollment, the Test will be held once in each semester afterwards. Passed students can choose to continue taking the Basic College English in the coming semester. Failed students are required to continue the course in the next semester until they pass the Test or complete the four-semester course.

Specialist Course Description

The specialist course of Physics Program in Zhiyuan College includes basics, specialist core courses, conditional specialist courses and specialist electives.

A. Basics include Mathematical Analysis, Linear Algebra, Introduction to Physics and other basic courses, contributing to 30 credits, including compulsory multi-disciplinary courses of 4 credits. Students can choose from Introduction to Biology, Introduction to Computer Science, and Chemical Principles.

B. Specialist core courses mainly consists of "Mathematical Methods in Physics" (includes "Probability") and four specialized core courses on mechanics contributing to 28 credits.

C. Specialist electives: Students of Physics Program are required to obtain 18 credits before graduation. Students must choose at least 12 credits specialist electives by Zhiyuan College. They can choose other specialist electives from physics specialist course of Department of Physics and Astronomy.

D. Curriculum Design may be adjusted or complemented based on actual conditions.

Specialist Practice Course

The specialist practice course of Physics Program in Zhiyuan College is categorized into laboratory courses, research practices, military training and specialist comprehensive training.

A. Students must obtain 13 laboratory credits to graduate from the Physics Program.

B. Introduction to Physics Research is a compulsory course. Students will take the course in the first and the second semester to obtain 2 credits respectively, and obtain 4 credits in the Physics Research Practice course from the third to the sixth semesters (one credit in each semester).

C. Students are required to receive the military training to obtain 3 credits in the summer holiday at the end of the second semester.

D. Specialist comprehensive trainings: The Graduation Project (Thesis) covers the seventh and the eighth semesters. Students from Physics Program can obtain 6 credits in total. Students must finish the thesis proposal of the Graduation Project by the midterm of the seventh semester, and finish all required curriculum in the course set. They also have to finish the mid-term report of the Graduation Project before the mid-term of the eighth semester to have the chance of apply for the thesis defenses by the end of the eighth semester.

E. Based on their hobbies, interests and specialties, students are encouraged to take part in all kinds of extra-curriculum technological activities, including PRP academic research and all kinds of technological innovation contests. Students are encouraged to take part in social survey and practice of Basic Principles of Marxism and Education of Morality and Fundamentals of Law.

Individualized Course

Individualized course has 10 credits. Students can choose various theory teaching or practice teaching courses approved by SJTU, including general education or specialist electives, Basic College English (3) and Basic College English (4), PRP and other extra-curriculum technological or academic contests.

5. Qualification, Schooling Length, Credits and Diploma

A. Qualification assessment will be conducted in the mid-term of the first year's second semester. Failed students will be rolled out of Zhiyuan College.

B. Normal schooling length is four years. Extended time should not exceed six years.

C. The total credits of the major should not be less than 143 credits. Credits of physics specialist courses should be at least 133 credits. Another 10 credits can be obtained from individualized education electives.

D. The total credits of the minor should be at least 22 credits, among which the specialist core courses should be more than or equal to 11 credits, specialist electives should be more than or equal to 8 credits, and laboratory courses should be more than or equal to 3 credits.

E. Eligible students will be awarded the Bachelor of Science.

6. Curriculum Design

Curriculum Design of Zhiyuan Physics Program

Course Code	Course Name	Total Credits	Total Hour	Class hour	Hour Arrangement				Semester Recommended	Knowledge Contribution	Capacity Contribution	All-round Development Contribution
					Theory Teaching	Practice Teaching						
						Laboratory	Internship	Others				
General Education Course												
Common Course												
Compulsory Course												
Require at least 25 credits to graduate.												
TH021	Outline of Chinese Modern History	2	32		32				1			
TH000	Education of Morality and Fundamentals of Law	3	48		48				2			
TH012	Mao Zedong Thought and Introduction to the Theoretical System of Socialism with Chinese Characteristics	6	96		96				3			
TH007	Basic Principles of Marxism	3	48		48				4			
TH004	Military Theory	1	16		16				2			
EN025	Basic College English (1)	3	64		64				1			

EN026	Basic College English (2)	3	64		64				2			
PE001	PE(1)	1	32					32	1			
PE002	PE(2)	1	32					32	2			
PE003	PE(3)	1	32					32	3			
PE004	PE(4)	1	32					32	4			
	Total Credits	25										
General Education Practice												
Compulsory Course												
Require at least 2 credits to graduate.												
XP000	General Education Practice Activities	2	32					32	2			
	Total Credits	2										
Specialist Course												
Basics												
Compulsory Course												
Students can choose from Introduction to Computer Science and Introduction to Biology (1), but have to take all other courses to graduate (≧29 credits).												
	Mathematical Analysis I(A)	5	112		80			32	1			
MA123	Mathematical Analysis II(A)	5	112		80			32	2			
	Linear Algebra	4	64		64				2			
	Introduction to Physics I	5	96		64			32	1			
	Introduction to Physics II	5	96		64			32	2			
	Supplementary Physics	2	32		32				2.5 Semester (Summer)			
CS101	Introduction to Computer Science	3	48		48				1			
BI114	Introduction to Biology(1)	4	64		64				1			
	Total Credits	33										
Specialist Core Course												
Major students are required to pass all courses to graduate (≧28 credits). Minor students are required to take Electrodynamics, Quantum Mechanics I, and Thermodynamics and Statistical Physics as compulsory courses (≧11 credits).												
	Mathematical Methods in Physics (1)	4	64		64				3			
	Mathematical Methods in Physics (2)	4	64		64				3			
	Analytical Mechanics	4	64		64				3			

	Quantum Mechanics I	4	64		48				4			
	Electrodynamics	4	64		64				4			
	Quantum Mechanics II	4	64		48				5			
PH303	Thermodynamics and Statistical Physics	4	64		64				5			
	Total Credits	28										
Specialist Electives												
Major students of Physics Program are required to obtain 18 credits before graduation. Students must choose courses worth at least 12 credits approved by Zhiyuan College. They can choose other specialist electives from physics specialist course of Department of Physics. Minor students are required to obtain 8 credits before graduation. They must choose at least 4 credits approved by Zhiyuan College, and choose other specialist electives from physics specialist course of Department of Physics.												
	Condensed Matter Physics	4	64		64				6			
	Laser Plasma Physics	4	64		64				6			
PH425	Quantum Optics	4	64		64				6			
	General Relativity	3	48		48				7			
	Particle Physics and Field Theory	4	64		64				7			
	Advanced Optics	4	64		64				7			
	Seminars on Solid State Physics	4	64		64				7			
	Biological Physics	4	64		64				6.5			
	Continuum Mechanics	3	48						6			
	Semiconductor Physics	3	48		48				7			
	Theory of Laser	3	48		48				7			
	Computational Physics	4	64		64				7			
	Plasma Physics	4	64		64				6.5			
	Ordinary Differential Equations and Dynamic System	3	48		48				3			
	Application of Simulation Software	2	32		32				2.5 Semester (Summer)			
	Total Credits	53										
Specialist Practice Course												
Laboratory Course												
Major students are required to take all courses to graduate (≧13 credits). Minor students are required to choose one course from Physics Experiment III and Professional Experiment.												

MS204	Introduction to Physics Laboratory	2	32			32			1			
PH123	Physics Laboratory I	2	32			32			2			
	Physics Laboratory II	3	48			48			3			
	Physics Laboratory III	3	48			48			4			
	Professional Experiment	3	48			48			5			
	Total Credits	13										
Internship and practices												
Research practice compulsory course (≧8 credits).												
	Introduction to Physics Research I	2	32						1			
	Introduction to Physics Research II	2	32						2			
	Physics Research Practice I	1	16						3			
	Physics Research Practice II	1	16						4			
	Physics Research Practice III	1	16						5			
	Physics Research Practice IV	1	16						6			
	Total Credits	8										
Military Training												
Compulsory Course												
Students are required to take all courses to graduate.(≧3 credits)												
TH010	Military Training	3	48						2			
	Total Credits	3										
Specialist Comprehensive Training												
Students are required to take all courses to graduate.(≧6 credits)												
	Graduation Project (Thesis) (Physics)	6	96			96			8			
	Total Credits	6										
Individualized Course												
Students are required to choose courses worth at least 10 credits in total. College Academic Research and Development Training and General Education Core Courses (Humanities) are recommended (PRP and College Student's Science and Innovation Project are recommended by the third year.).												

Zhiyuan Life Science Program

Life Science Curriculum Characteristics

The curriculum is designed to reflect 3 important aspects: 1) Building an essential foundation in Match, Physics and Chemistry for potential multidisciplinary interaction; 2) Establishing a solid base in Biology; 3) Cultivating the ability for critical thinking.

The first aspect is achieved by asking students to take fundamental courses in Math, Physics and Chemistry with students of these majors.

The second aspect is implemented with 4 required courses. In first year, students take a one-year introductory course covering all areas of biology (first semester small and second semester large). This is a cursory course but emphasize on cutting edge advances of all areas in biology. From 2nd year, students take Biochemistry, Genetics and Cell Biology, all critical foundation for contemporary biology. Each of these 4-credit courses, comes with a 2-credit discussion course, examining both how important discoveries were made and where the most exciting advances are taking places. In addition, there are electives as Neurobiology, Developmental Biology and Immunology in similar format, a 4-credit class with a 2-credit discussion. Students in the program are also encouraged to take courses in schools of Life Science, Biomedical Engineering, Pharmacy, Agricultural Sciences, and Medical School.

The third aspect is partly reflected in the discussion courses mentioned above, in the process of tracing the paths of important discoveries, it is also reflected in a strong emphasis for students to get involved in lab work. Most students interested in developing a career in research in the program get involved in research lab as interns from the mid 2nd year. They are supported to use the summer vacation to go overseas to work in labs as summer interns, and they are supported to carry out their graduation thesis work in the top labs overseas.

Life Science Curriculum

1. Education Objectives

Zhiyuan Life Science Program is dedicated to nurture future leaders in this discipline with solid knowledge of Mathematics, Physics, Chemistry and Information Science, mastery of the most important and frontier knowledge in Life Science, independent and critical thinking as well as strong desire to explore the nature of life.

2. Education Principles

A. Implement the teaching idea of "focusing on students' capacity development";

B. Achieve knowledge mastery, capacity development and sound personality, and provide the next generation of technical leaders and elites for the society;

C. Make full use of SJTU's advantages in science and technology education, and encourage interdisciplinary research between Life Science and other disciplines.

D. Conduct microteaching to encourage debates on scientific topics among students and teachers, as well as to nurture students' ability in independent and critical thinking.

3. Standards and Requirements (work as reference to select courses and education activities)

A. Knowledge Exploration

A1. Make full use of SJTU's platform of general education to enhance students' basic knowledge and research methods of humanity social sciences.

A2. Mastery of the basic knowledge of Mathematics, Physics, Chemistry and Information Science, as well as the latest developments.

A3. Mastery of the core knowledge of Life Science.

A3.1: core courses of Life Science;

A3.2: specialized courses of Life Science;

A3.3: experiment courses of Life Science.

B. Capacity Development

B1. Mathematical ability of scientific thinking.

B2. The ability to conduct quantitative analysis and modeling.

B3. The ability of independent and critical thinking.

B4. The ability to comprehend basic principles of Life Science on molecule and cell level, as well as the ability to analyze complex life phenomena.

B5. The preliminary ability to do research independently and good spirit of teamwork.

B6. Good oral and written language skills (both Chinese and English).

C. Personality Nurturing

C1. Good professional ethics and academic morality.

C2. The scientific spirit of making hypothesis boldly, verifying carefully and working with perseverance.

C3. Sense of righteousness and social responsibility, as well as independent spirit of pursuing the truth.

C4. Be physically and mentally healthy and with broad vision—be physically and mentally healthy; good capacity of multiculturalism and broad vision of internationalization.

C5. Quick thinking and willingness to be innovative—be willing to think and work industriously, interested in developing the new from the old, with the exploration spirit and eager to solve problems.

4. Course Structure (More information at Zhiyuan Life Science Curriculum Design)

Based on the relevance, the curriculum of Life Science Program is divided into general education courses, specialist education courses, specialist practice and individualized courses.

According to teaching methods, courses are divided into theory teaching, practice teaching and research experiential teaching.

Each category is optional to different degrees. They are compulsory courses, conditional electives and electives.

Credits of compulsory and conditional courses should be at least 136 to graduate from the Life Science Program.

The rest 10 credits can be any elective courses provided by Shanghai Jiao Tong University. There are no mandatory module requirements.

Curriculum Category and Credits

Curriculum Category		Credit
General Education Course		27
Specialist Education Course	Basics	36
	Specialist Core Course	30
	Specialist Electives	12
Specialist Practice	Laboratory	22
	Military Training	3
	Specialist Comprehensive Training	6
Individualized Course		10

General Education Course Description

The general education course of Life Science Program in Zhiyuan College is set as required. This module has 27 credits and covers the courses like Basic Principles of Marxism, Mao Zedong Thought and Introduction to the theoretical system of socialism with Chinese Characteristic, Military Theory, Outline of Chinese Modern History, Education of Morality and Fundamentals of Law, PE and Basic College English. Basic College English (1) and (2) are compulsory courses. The results of English Proficiency Test will decide whether students can go on to take (3) and (4) or not. Since the second semester of enrollment, the Test will be held each semester one time. Passed students can choose by themselves if to continue the Basic College English in the coming semester. Failed students are required to continue the course of next semester until they pass the Test or complete the four-semester course.

Specialist Course Description

The specialist course of Life Science Program in Zhiyuan College includes basics, specialist core courses, conditional specialist courses and specialist electives.

A. Specialist basics include: Mathematical Analysis, Linear Algebra, General Chemistry, Organic Chemistry, Introduction to Physics, and so on.

B. Specialist core courses include: Introduction to Biology, Biochemistry, Cell Biology, and Genetics.

C. Specialist electives include: Neurobiology (Overseas Curriculum Committee), Developmental & Regenerative Biology (Overseas Curriculum Committee), Immunology (Overseas Curriculum Committee), Computational Biology and Bioinformatics (Overseas Curriculum Committee), and other courses approved by School of Agriculture and Biology, School of Life Sciences and Biotechnology, School of Biomedical Engineering, and School of Medicine for sophomores.

D. Curriculum design may be adjusted or complemented based on actual conditions.

Specialist Practice Course

Practice course includes laboratory related with the course (for example, Introduction to Biology Introduction to Biology Laboratory and Cell Biology Laboratory), Graduation Project and other graduate research plans, National Innovative Experiment Plan, and Shanghai Innovative Activity Plan.

Individualized Course

Individualized course has 10 credits. Students can choose various theory teaching or practice teaching courses approved by SJTU, including general education or specialist electives, Basic College English (3) and Basic College English (4). There are no mandatory requirements. To cultivate multidisciplinary leaders, students are encouraged to choose advanced specialist course in the field of Mathematics, Physics, and Chemistry. To fully develop students' personality and humanistic quality, they are also encouraged to take art, literature and management courses.

5. Qualification, Schooling Length, Credits and Diploma

A. Qualification assessment will be conducted in the mid-term of the first year’s second semester. Failed students will be rolled out of Zhiyuan College.

B. Normal schooling length is four years. Extended time should not exceed six years.

C. The total credits of the major should not be less than 146 credits. Compulsory courses and conditional electives shall be at least 136 credits and the rest 10 credits are electives.

D. The total credits of the minor should be at least 22 credits, among which the specialist core courses should be more than or equal to 11 credits, specialist electives should be more than or equal to 20 credits, and laboratory courses should be more than or equal to 2 credits. For more information, please refer to Zhiyuan Life Science Curriculum Design (Note: Credits requirement for graduation may change with course credit modifications).

E. Eligible students will be awarded the Bachelor of Science.

6. Curriculum Design

Curriculum Design of Zhiyuan Life Science Program

Course Code	Course Name	Total Credits	Total Hour	Class hour	Hour Arrangement				Semester Recommende	Knowledge Contribution	Capacity Contribution	All-round Development Contribution
					Theory Teaching	Laboratory	Internship	Others				
General Education Course												
Common Course												
Compulsory Course												
Students are required to take all courses to graduate.												
TH021	Outline of Chinese Modern History	2	32		32				1			
TH000	Education of Morality and Fundamentals of Law	3	48		48				2			
TH012	Mao Zedong Thought and Introduction to the Theoretical System of Socialism with	6	96		96				3			

	Chinese Characteristics											
TH007	Basic Principles of Marxism	3	48		48				4			
TH004	Military Theory	1	16		16				2			
EN025	Basic college English (1)	3	64		64				1			
EN026	Basic college English (2)	3	64		64				2			
PE001	PE(1)	1	32					32	1			
PE002	PE(2)	1	32					32	2			
PE003	PE(3)	1	32					32	3			
PE004	PE(4)	1	32					32	4			
	Total Credits	25										
General Education Practice												
Compulsory Course												
Students are required to take all courses to graduate.												
XP000	General Education Practice Activities	2	32					32	2			
	Total Credits	2										
Specialist Course												
Basics												
Compulsory Course												
Students are required to take all courses to graduate. Students must take at least one of the following course in any semester before graduation: MA119 Probability and Mathematical Statistics, MA206 Probability, MA231 Probability and Measure Theory, MA306 Mathematical Statistics, MA332 Statistical Data Analysis, MA406 Multivariate Statistics, and MS107 Probability.												
	Mathematical Analysis I(A)	5	112		80			32	1			
MA123	Mathematical Analysis II(A)	5	112		80			32	2			
	Linear Algebra	5	80		80				3			

PH114	Introduction to Physics I	5	80		64			16	1			
PH116	Introduction to Physics II	5	80		64			16	2			
CA127	Chemical Principles	4	64		64				1			
CA113	Organic Chemistry	4	64		64				2			
	Probability-related Course	≧3										
	Total Credits	≧36										
Specialist Core Course												
Students are required to obtain 30 credits before graduation. Minor students shall take Introduction to Biology (1) and (2), Cell Biology, Genetics, and Biochemistry.												
BI114	Introduction to Biology(1)	4	64		64				1			
BI107	Introduction to Biology(2)	4	64		64				2			
BI106	Introduction to Biology Seminar(1)	2	64		64				1			
BI110	Introduction to Biology Seminar(2)	2	64		64				2			
BI385	Biochemistry	4	64		64				3			
BI249	Biochemistry Seminar	2	64		64				3			
BI261	Genetics	4	64		64				4			
BI262	Genetics Seminar	2	64		64				4			
BI259	Cell Biology	4	64		64				5			
BI260	Cell Biology Seminar	2	64		64				5			
	Total Credits	30										
Specialist Electives												
Students are required to obtain 12 credits before graduation. Besides specialist electives approved by Zhiyuan College, other specialist electives must be related specialist course for sophomores approved by School of Agriculture and Biology, School of Life Sciences and Biotechnology, School of Biomedical Engineering, and School of Medicine, and other schools.												

MS309	Neurobiology	4	64		64				6			
MS305	Neurobiology Seminar	2	32		32				6			
	Immunology	4	64		64				7			
	Immunology Seminar	2	32		32				7			
MS307	Developmental & Regenerative Biology	4	64		64				6			
MS308	Developmental & Regenerative Biology Seminar	2	32		32				6			
	Computational Biology and Bioinformatics	4	64		64				7			
	Computational Biology and Bioinformatics Seminar	2	32		32				7			
	Total Credits	24										
Specialist Practice Course												
Laboratory Course												
Students are required to take all courses to graduate. Minor students should take at least one Biology Laboratory to achieve 32 class hours.												
CA130	Chemical Principles	3	51		3	48			1			
CA036	Organic Chemistry Laboratory	4	68			68			2			
PH111	Physics Laboratory I	1.5	27		3	24			2			
PH117	Physics Laboratory II	1.5	27		3	24			3			
	Biology Laboratory I	4	64			64			3			
	Biology Laboratory II	4	64			64			4			

	Biology Laboratory III	4	64			64			5			
	Total Credits	22										
Military Training												
Compulsory Course												
Students are required to take all courses to graduate.												
TH010	Military Training	3	48						2			
	Total Credits	3										
Specialist Comprehensive Training												
Compulsory Course												
Students are required to take all courses to graduate.												
	Graduation Project (Thesis) (Life Science)	6	96			96			8			
	Total Credits	6										
Individualized Course												
Students should choose courses worth 10 credits in total based on their own conditions. There are no mandatory requirements.												

Note: Recommended semester and credits of part courses may be adjusted. Please refer to the required course on the recommended schedule when choose courses in each semester.

Zhiyuan Computer Science Program

Computer Science Curriculum Characteristics

Zhiyuan Computer Science Program is dedicated to nurture computer scientists. We advocate the education idea of "learn to be an upright person before and while pursuing your studies". We train our students to have great ambition, scientific spirit, global vision and academic sensibility; the ability to discover incisively, raise questions analytically, analyze carefully and solve problems systematically; solid knowledge of Mathematics and Physics, broad related knowledge and a wide range of research practice; the courage to face challenges, to be creative and strive for excellence; profound humanity, ability to communicate and cooperate, and good professional ethics. The main characteristics include:

A. Lay solid foundation: Focus on basic knowledge of Mathematics and Physics, strengthen computational thinking, and to obtain basic skills. Compulsory courses include Analytical Analysis, Introduction to Physics, Introduction to Computer Science, Linear Algebra, Probability, etc.; elective courses include Introduction to Scientific Computation, Algebraic Structures, Graph Theory and Combinatorics, etc.
B. Strengthen specialization: Combine specialization with individualism, and classics with frontiers. Compulsory courses include Programing, Data Structure, Algorithmic Design & Analysis, Computer System, Database System, etc.; elective courses include Approximation Algorithm, Probability and Computing, Computing Complexity, Machine Learning, Technology and Application of Deep Learning, Natural Language Processing, Programming Language and Logic, Mathematics for the Information age, Spatio-temporal Data Analysis, Distributed System, etc.
C. Emphasize practice: strengthen skill training, "build" the "inside" of the computer, and "step in" scientific research gradually. The courses include Programing Practice, Compiler Design and Implementation, Lab Practice, etc.
D. Enhance expansion: expand knowledge and abilities with new perspectives, multiple layers and in all

directions. We offer “four weeks” of course and internship in Cornell University, “half year” of research practice in top universities and institutes all over the world, “four times” of show time in the course of Scholar Forum, and “An experience” as a teaching assistant. Courses includes Professional Seminars, Scientific Research and Practice, Scholar Forum, Teaching Practice, etc.

Computer Science Curriculum

1. Education Objectives

Zhiyuan Computer Science Program is dedicated to nurture computer scientists. We advocate the education idea of "learn to be an upright person before and while pursuing your studies". We train our students in the aspects as follows:

A. Have great ambition, scientific spirit, global vision and academic sensibility;
B. The ability to discover incisively, raise questions analytically, analyze carefully and solve problems systematically;
C. Solid knowledge of Mathematics and Physics, broad related knowledge and a wide range of research practice;
D. The courage to face challenges, to be creative and strive for excellence;
E. Profound humanity, ability to communicate and cooperate, and good professional ethics.

2. Education Principles

A. Adhering to the trinity talent education idea of "capacity development, knowledge exploration, and personality nurturing";
B. Keep SJTU's good tradition of "high starting point, solid foundation, strict requirements, emphasize practice and innovation";
C. Aim at and fit for the national great strategic demands for innovative talents;
D. Make full use of the best global recourses to achieve the internationalization of our education;
E. Follow the regular pattern of teaching, and focus on Computer Science and practice training;
F. Follow the regular pattern of learning, be people oriented, conduct microteaching and teach according to the students' aptitudes.

3. Standards and Requirements (work as reference to select courses and education activities)

A. Capacity Development

A1. The ability to think clearly and express accurately.

A2. The ability to raise, analyze and solve problems.

A3. The ability to think critically and work innovatively.

A4. The ability to work with different types of people.

A5. The ability to appreciate literature and arts.

A6. Master at least one foreign language.

A7. Maintain life-long education.

A8. Organizing and managing capacity.

A9. Practice capacity.

B. Knowledge Exploration

B1. Basic knowledge of Literature, History, Philosophy, Arts, etc. —require students to enhance their knowledge levels in these fields.

B2. Introduction to the research methods of social sciences—through segments of a certain discipline and short academic exploration, the students will get to the research methods of this discipline, instead of just learning simplified concepts and general knowledge of it.

B3. Basic and frontier knowledge of Natural Science and Technology—the knowledge should be closely related to social and personal life. It helps students with their scientific literacy and engineering consciousness.

B4. Basic knowledge of Mathematics and logic—based on basic education, we cultivate students' abilities in quantitative analysis and logical thinking.

B5. Systematic core knowledge of Computer Science—this knowledge should be included in both basic courses and compulsory courses.

B5.1: Master basic theories, knowledge and skills of Computer Science;

B5.2: Master the knowledge hierarchy and understand the core knowledge of Computer Science.

C. Personality Nurturing

C1. Stand high and aim far, have strong will—take inheriting culture, reaching after the truth, rejuvenating China and benefiting mankind as their duty to the end.

C2. Work hard with keen determination—be earnest and down-to-earth, work hard and pursue being outstanding.

C3. Be physically and mentally healthy and with broad vision—be physically and mentally healthy; good capacity of multiculturalism and broad vision of internationalization.

C4. Quick thinking and be willing to be innovative—work hard in thinking and studying, interested in developing the new from the old, with the exploration spirit and eager to solve problems.

C5. Be honest, upright and confident.

C6. Be initiative and adaptive.

C7. With good professional ethics and academic morality.

Curriculum Category and Credits

Curriculum Category		Credits
General Education Course		25
Specialist Education Course	Specialist Basics	28
	Specialist Core Course	26
	Specialist Electives	15
Practice Education Course	Laboratory	3
	Internship and Practices	11
	Military Trainings	3
	Professional Design	14
	Specialist Comprehensive Training	10
Individualized Course		8

4. Course Structure (More information at Zhiyuan Computer Science Curriculum Design)

Based on the relevance, the curriculum of Computer Science Program is divided into general education course, specialist education course, specialist practice and individualized course.

According to teaching methods, courses are divided into theory teaching, practice teaching and research experiential teaching.

Each category is optional to different degrees. They are compulsory course, conditional electives and electives.

Credits of compulsory and conditional courses should be at least 120 to graduate from the Computer Science Program.

General Education Course Description

The general education course of Computer Science Program in Zhiyuan College is set as required. This module has 25 credits and covers the courses like Basic Principles of Marxism, Mao Zedong Thought and Introduction to the theoretical system of socialism with Chinese Characteristic, Military Theory, Outline of Chinese Modern History, Education of Morality and Fundamentals of Law, PE and Basic College English. Basic College English (1) and (2) are compulsory courses. The results of English Proficiency Test will decide whether students can go on to take (3) and (4) or not. Since the second semester of enrollment, the Test will be held each semester one time. Passed students can choose by themselves if to continue the Basic College English in the coming semester. Failed students are required to continue the course of next semester until they pass the Test or complete the four-semester course.

Specialist Course

The specialist course of Computer Science Program in Zhiyuan College includes basics, specialist core courses, conditional specialist courses and specialist electives.

A. Specialist basics include: Mathematical Analysis, Linear Algebra, Introduction to Physics, Introduction to Computer Science, Programming, Data Structure, Probability, and so on. Minor students are required to take electives including Introduction to Computer Science, Programming, Data Structure, and other courses.

B. Specialist core courses include: Algorithmic Design & Analysis, Computer System, Database System, and so on. Minor students are required to take all specialist core courses.

C. Specialist electives include: Scientific Computing, Algebraic Structures, Automata Theory, Mathematical Logic, Graph Theory and Combinatorics, Computer Science Theory in the Information Era, Distributed System, Approximation Algorithm, Probability and Computing, Space-time Data Analysis, Computing Complexity, Technology and Application of Deep Learning, Machine Learning (includes statistics), Computer Network, Natural Language Processing, Virtual Reality and Interactive 3D Graph Display, Programming Language and Logic, and so on.

D. Curriculum Design may be adjusted or complemented based on actual conditions.

Specialist Practice Course

The specialist practice course of Computer Science Program in Zhiyuan College is categorized into laboratory courses, internship, practices, military training and specialist comprehensive training.

A. Laboratory course includes Physics Laboratory I and II.

B. Internship and practices include Programming Practice and Teaching Practice. Programming Practice is set in the first summer vacation to train comprehensive programming design. Teaching Practice requires students to finish it at any time before the graduation.

C. Professional design includes Computer System Course Design and Lab Practice. Students must finish all practices and course design. Minor students shall take Computer System Course Design.

D. Military Training is set in the first summer vacation.

E. Specialist Comprehensive Training includes Professional Seminar, Scientific Research and Practice, and Graduation Project (Thesis).

Professional Seminar is the course that introduces cutting edge topics and knowledge in the field of mathematics, physics, life science, and computer science. It aims at enabling students to know more about research results in the related fields, and improving their practice capacity, innovative thoughts and team spirit. This is a series of comprehensive courses (the second semester of the second year and the third year), and is consist of one or more lectures in the related fields.

Scientific Research and Practice aims at facing students with the most cutting edge research results in the computer science field to let students understand deeper and apply further. Students have the opportunity to publish their researched in the field. This is a practical course (in the first semester of the fourth year). The college will provide students with opportunities for one semester to research and practice in top institutes and universities both home and abroad. Each student can follow their supervisors and go deep into the specific and frontier research programs to learn and practice. Students are required to take part in official research report defenses, including proposal, mid-term defense, and final defense.

Individualized Course

Individualized course has 8 credits. Students can choose various theory teaching or practice teaching courses approved by SJTU, including general education or specialist electives, Basic College English (3) and Basic College English (4), PRP and other extra-curriculum technological or academic contests.

The Scholar Forum is one the characteristic course of the Computer Science Program. It is an autonomous course for students to design, direct, and act by themselves. Students can experience "think-design-implement-communicate" process in the course: topic selection→content collection and organization→on-stage presentation→questions and discussions→reviews by teachers→pair review. The topic selection and contents should comply with four basic principles.

5. Qualification, Schooling Length, Credits and Diploma

A. Qualification assessment will be conducted in the mid-term of the first year's second semester. Failed students will be rolled out of Zhiyuan College.

B. Normal schooling length is four years. Extended time should not exceed six years.

C. The total credits of the major should not be less than 143 credits. Compulsory courses and conditional electives shall be at least 135 credits and the rest 8 credits are electives.

D. The specialist course credits of the minor should be at least 22 credits. Details can be found in the Curriculum Design.

E. Eligible students will be awarded the Bachelor of Science.

6. Curriculum Design

Curriculum Design of Zhiyuan Computer Science Program

Course Code	Course Name	Total Credits	Class hour	Hour Arrangement				Semester Recommended	Hour Arrangement												Remarks
				Theory Teaching	Practice Teaching				1	2	2.5	3	4	4.5	5	6	6.5	7	8		
					Laboratory	Internship	Others															
General Education Course																					
Common Course																					
Students are required to take all the following courses (25 credits) (20 credits inside the classroom)																					
TH021	Outline of Chinese Modern History	2	32	32				1	2												
TH000	Education of Morality and Fundamentals of Law	3	48	48				2		3											
TH012	Mao Zedong Thought and Introduction to the Theoretical System of Socialism with Chinese Characteristic	6	96	96				3				6									
TH007	Basic Principles of Marxism	3	48	48				4					3								
TH004	Military Theory	1	16	16				2		1											
EN025	Basic College English (1)	3	48	48				1	3												
EN026	Basic College English (2)	3	48	48				2		3											
PE001	PE(1)	1	16				16	1	1												

PE002	PE(2)	1	16				16	2		1										
PE003	PE(3)	1	16				16	3				1								
PE004	PE(4)	1	16				16	4					1							
		25																		
Specialist Course																				
Compulsory Basics																				
Compulsory Course																				
MA122	Mathematical Analysis I(A)	5	80	80			16	1	5											
MA123	Mathematical Analysis II(A)	5	80	80			16	2		5										
MA236	Linear Algebra	5	80	80				1	5											
PH108	Introduction to Physics I	5	80	80				2		5										
PH113	Introduction to Physics II	5	80	80				3				5								
MS107	Probability	3	48	48				4					3							
		28																		
Compulsory Course																				
Major students must take all courses. Minor students have to take Programming, Data Structure, Algorithmic Design & Analysis, Computer System I, and Computer System II contributing to 19 credits.																				
CS120	Introduction to Computer Science	4	64	64				1	4											
CS122	Programming	5	80	48	32			1	5											
MS105	Data Structure	3	48	32	16			2		3										
CS217	Algorithmic Design & Analysis	3	48	48				3				3								
MS108	Computer System I	4	64	48				4					4							
MS110	Computer System II	4	64	48				5							4					
CS392	Database System	3	48	48				6								3				
		26																		
Specialist Electives																				
Students are required to obtain at least 15 credits electives before graduation.																				

MA235	Selected Topics in Scientific Computing	3	48	48				3				3								Choose two
MA150	Algebraic Structures	3	48	48				3				3								
MS205	Automata Theory	2	32	32				3				2								
CS026	Mathematical Logic	3	48	64				4					3							Choose one
CS477	Graph Theory and Combinatorics	3	48	48				4					3							
CS389	Computer Science Theory in the Information Era	2	32	32				4.5						2						Choose two
CS220	Distributed System	2	32	32				4.5						2						
CS387	Approximatio n Algorithm	2	32	32				4.5						2						
CS225	Probability and Computing	2	32	32				4.5						2						
CS224	Space-time Data Analysis	2	32	32				4.5						2						
	Chair professor course A	2	32	32				4.5						2						
CS226	Computing Complexity	3	48	48				5							3					Choose two
	Technology and Application of Deep Learning	2	32	32				5							2					
	Application Matrix Analysis	2	32	32				5							2					

	Chair professor course B	2	32	32				5							2					
CS435	Machine Learning (includes statistics)	3	48	48				6								3				Choose two
CS391	Computer Network	3	48	48				6								3				
	Game Analysis in the Internet Protocol	2	32	32				6								2				
	Natural Language Processing	2	32	32				6								2				
	Virtual Reality and Interactive 3D Graph Display	2	32	32				6								2				
CS436	Programming Language and Logic	2	32	32				6.5									2			
	Chair professor course C	2	32	32				6.5									2			
General Education Course																				
Laboratory Course																				
Students are required to take all courses to graduate.																				
PH111	Physics Laboratory I	1.5	24		24			2		1.5										
PH117	Physics Laboratory II	1.5	24		24			3				1.5								
		3																		
Internship and practices																				
Compulsory course																				
Major students must take all courses. Minor students have to take Computer System Course Design and other courses contributing to 3 credits.																				

MS106	Programming Practice	3	48	16		32		2.5			3								
	Computer System Course Design	3	48				48	4					3						
EI335	Lab Practice	3	48			48		4.5							3				
CS207	Teaching Practice	2	32			32		8										2	
		11																	
Military Training																			
Compulsory Course																			
TH010	Military Training	3	48					2.5			3								
Specialist Comprehensive Training																			
Students are required to take all courses to graduate.																			
MS113	Professional Seminar I	2	32	32				5							2				
MS115	Professional Seminar II	2	32	32				6.5								2			
MS117	Scientific Research and Practice	10	160				160	7									10		
BS068	Graduation Project (Thesis)	10	160				160	8										10	
		24																	
Individualized Course																			
Students are required to obtain at least 8 credits electives before graduation.																			
CS037	Scholar Forum (1)	2	32	32				1	2										
CS038	Scholar Forum (2)	2	32	32				2		2									
CS039	Scholar Forum (3)	2	32	32				3				2							
CS040	Scholar Forum (4)	2	32	32				4					2						
		8																	

Zhiyuan Chemistry Program

Chemistry Curriculum Characteristics

A. Enforced training in Mathematics and Physics, the credit requirement is about 30% higher than the traditional Chemistry Program. Enforced fundamental chemistry courses, mainly on Organic Chemistry and Physical Chemistry. Redesigned Inorganic and Analytic chemistry. Emphasized the correlation between instructive and laboratory courses.

B. Redesigned the elective courses arrangement. Students have the freedom to elect almost any courses after accomplish their major required courses. This is very different from traditional program in which entire class is taking almost the same courses and the students can only take a few elective courses. We also reorganized the elective courses, most of them are new, taught by research-active faculties and only open for Zhiyuan Students.

C. Balanced course loads. We made it clear to faculties that each credit should cost a student on average three (3) working hours per week. Unfortunately, this was not clear to many faculties in the traditional program. Some courses are too easy, while some are too time-consuming. Using a standard course load scheme enables macroscopic quality control of teaching quality.

D. To encourage and inspire research interests, what we have done differently from traditional program is to help students get into research labs. The students are allowed to rotate up to three groups to find the best match of research groups for graduate research since their second year. For class 2013 and 2014, 100% students are working in research labs. We also promote opportunities for students to attend seminars, including Zhiyuan Salon.

E. Promote global education is another unique feature of Zhiyuan Chemistry. We organized international advisor group (IAG) to invite world-renowned scientists to lecture at Zhiyuan, organized a summer school that put together domestic (Zhiyuan) students and visiting students from UMich. We established

formal collaborations with UCB, UMich and CalTech (all in US), and informal collaborations with Stanford, UCSD, Washington (US), Nanyan (Singapore) Nagoya (Japan) and Cambridge (UK). Most students (80% of Class 2013) have participated in these collaborations by taking oversea graduate research projects.

上海交通大學
SHANGHAI JIAO TONG UNIVERSITY

Chemistry Curriculum

1. Education Objectives

Zhiyuan Chemistry Program is dedicated to nurture outstanding talents in chemical research, with solid knowledge of Mathematics and Physics and broad vision. They are able to do research thoroughly and solve key problems in Chemistry and its interdisciplinary research.

The graduates should be trained to obtain knowledge, abilities and qualities as follows:

A. Solid knowledge of Mathematics and Physics, Comprehensive knowledge and experimental skills of Chemistry;

B. The ability and innovative thinking to work in the field of scientific research, global vison of Science and Technology, and the spirit of perseverance;

C. Profound humanity, and good ability to communicate and cooperate.

2. Education Principles

A. Adhere to the trinity talent education idea of "capacity development, knowledge exploration, and personality nurturing";

B. Meet the society's needs in top-notch talents of innovation; provide the best educational resources to the best students;

C. Inherit SJTU's education tradition and culture, and emphasize solid knowledge of Mathematics and Physics and the ability of conducting interdisciplinary research;

D. In accordance to the regular patterns of teaching and learning, and emphasize the importance of individualization;

E. Develop research-oriented teaching and interactive teaching to train students' ability of critical thinking and innovation.

3. Standards and Requirements (work as reference to select courses and education activities)

A. Knowledge Exploration

A1. Basic knowledge of Literature, History, Philosophy, Arts, etc. —require students to enhance their knowledge levels in these fields.

A2. Introduction to the research methods of social sciences—through segments of a certain discipline and short academic exploration, the students will get to the research methods of this discipline, instead of just learning simplified concepts and general knowledge of it.

A3. Basic and frontier knowledge of Mathematics and Physics—these are the basics for the development of Chemistry and also the premise of studying chemical knowledge. Learning these, the students get basic skills to do scientific research in the future.

A4. Comprehensive basic knowledge of Chemistry, which includes basic knowledge and experimental methods of Inorganic Chemistry, Organic Chemistry, Physical Chemistry, and Analytic Chemistry. We focus both on the mastery of basic knowledge and students' ability of analyzing and logic thinking.

A5. The students choose to learn the core knowledge of several areas related to basic Chemistry, including Material Science, Polymer Science, Environmental Science, Energy Science, Bioscience, etc.

B. Capacity Development

B1. The ability to think clearly and express accurately.

B2. The ability to raise, analyze and solve problems.

B3. The ability to think critically and work innovatively.

B4. The ability to work with different types of people.

B5. The ability to appreciate literature and arts.

B6. Master at least one foreign language.

B7. Maintain life-long education.

B8. Organizing and managing capacity.

C． Personality Nurturing

C1. Stand high and aim far; have strong will—take inheriting culture, reaching after the truth, rejuvenating China and benefiting mankind as their duty to the end.

C2. Work hard with keen determination—be earnest and down-to-earth, work hard and pursue being outstanding.

C3. Be physically and mentally healthy and with broad vision—be physically and mentally healthy; good capacity of multiculturalism and broad vision of internationalization.

C4. Quick thinking and willing to be innovative—willing to think and work industriously, interested in developing the new from the old, with the exploration spirit and eager to solve problems.

Curriculum Category and Credits

Curriculum Category		Credits
General Education Course		27
Military Training		3
Specialist Education Course	Basics	28
	Specialist Core Course	28
	Specialist Laboratory	12
	Specialist Comprehensive Training	9
	Specialist Electives	25
Individualized Education		10

4. Course Structure (More Information at Zhiyuan Chemistry Curriculum Design)

Based on the relevance, the curriculum of Chemistry Program is divided into general education course, specialist education course, specialist practice and individualized course.

According to teaching methods, courses are divided into theory teaching, practice teaching and research experiential teaching.

Students in Chemistry Program are required to obtain 142 credits to graduate. Compulsory courses include general education course, military training (30 credits), and specialist basics, core courses, laboratory and comprehensive training (77 credits). Electives include specialist electives and individualized education (35 credits).

General Education Course Description

The general education course of Chemistry Program in Zhiyuan College is set as required. This module has 27 credits and covers the courses like Basic Principles of Marxism, Mao Zedong Thought and Introduction to the Theoretical System of Socialism with Chinese Characteristics, Military Theory, Outline of Chinese Modern History, Education of Morality and Fundamentals of Law, PE and Basic College English.

Basic College English (1) and (2) are compulsory courses. The results of English Proficiency Test will decide whether students can go on to take (3) and (4) or not. Since the second semester of enrollment, the Test will be held each semester one time. Passed students can choose by themselves if to continue the Basic College English in the coming semester. Failed students are required to continue the course of next semester until they pass the Test or complete the four-semester course.

Specialist Course Description

The specialist course of Chemistry Program in Zhiyuan College includes basics, specialist core courses, conditional specialist courses and specialist electives.

A. Basics include mathematics, physics and other courses that total 28 credits. This is one of Zhiyuan College's characteristics, the emphasis on mathematics and logic.

B. Specialist core courses mainly include Inorganic Chemistry, Organic Chemistry, Physical Chemistry, and Analytical Chemistry. They are the core courses for chemistry majors and are exclusive to Zhiyuan College. Teachers are excellent, and textbooks are advanced. The four chemistry courses total 28 credits.

C. Specialist laboratory mainly include laboratory that are closely connected with basics and specialist core courses. The actual class hour will be two to three times the length of the class hour. They total 12 credits.

D. Specialist Comprehensive Training: Students must decide their research fields and supervisors by two-way choice at the beginning of the second year, complete their courses and then work in the decided research team. The research includes at least one PRP or innovative experimental research, and graduation thesis. The trainings total 9 credits.

E. The specialist electives are compatible to advanced education system in the world, and shows the ideas of individualized education. Students can choose electives of 25 credits, among which they have to

choose at least 12 credits from the chemistry module. The selected courses shall be consecutive and systematic and shall be in one or two teaching modules.

Individualized Course

Individualized course has 10 credits. Students can choose various theory teaching or practice teaching courses approved by SJTU, including general education or specialist electives, Basic College English (3) and Basic College English (4), PRP and other extra-curriculum technological or academic contests.

5. Qualification, Schooling Length, Credits and Diploma

A. Qualification assessment will be conducted in the mid-term of the first year's second semester. Failed students will be rolled out of Zhiyuan College.

B. Normal schooling length is four years. Extended time should not exceed six years.

C. The total credits of the major should not be less than 142 credits. Compulsory courses and conditional electives shall be at least 132 credits and the rest 10 credits are electives.

D. Minor students are required to obtain 21 credits, among which 16 credits are from specialist compulsory course Physical Chemistry and Organic Chemistry, and 5 credits are from their related laboratory.

E. Eligible students will be awarded the Bachelor of Science.

6. Credits Distribution in Semesters

Semester	General Education Course	Compulsory Course	Electives	Total credits
1	6.0	15.5	0.0	21.5
2	7.0	18.5	0.0	25.5
2.5	3		1.0	1.0
3	10.0	16.0	3.0	29.0
4	4.0	11.5	6.0	21.5
4.5			1.0	1.0
5	0.0	8.0	6.0	14.0

6	0.0	2.5	12.0	14.5
6.5			1.0	1.0
7	0.0	2.0	5.0	7.0
8	0.0	3.0	0.0	3.0
Total credits	30.0	77.0	35.0	142.0

7. Curriculum Design

Curriculum Design of Zhiyuan Chemistry Program

Course Code	Course Name	Total Credits	Total Hour	Class hour	Hour Arrangement				Semester Recommended	Knowledge Contribution	Capacity Contribution	All-round Development
					Theory Teaching	Laboratory	Internship	Others				
I-General Education Course (Compulsory)												
Common Course												
TH021	Outline of Chinese Modern History	2	34	34				34	1			
TH000	Education of Morality and Fundamentals of Law	3	51	51	34			17	3			
TH012	Mao Zedong Thought and Introduction to the Theoretical System of Socialism with Chinese Characteristics	6	90	90	54			36	3			
TH007	Basic Principles of Marxism	3	34	34	34			17	4			
TH004	Military Theory	1	17	17	17				2			
EN025	Basic College English (1)	3	68	68				34	1			

EN026	Basic College English (2)	3	68	68	68				2			
PE001	PE(1)	1	34	34				34	1			
PE002	PE(2)	1	34	34	34				2			
PE003	PE(3)	1	34	34					3			
PE004	PE(4)	1	34	34	34				4			
	Total Credits	25	498									
General Education Practice												
XP000	General Education Practice Activities	2	34	34	34				2			
	Total Credits	2	34									
Military Training												
TH010	Military Training	3	51						2			
	Total Credits	3	51									
II-Compulsory Courses												
Specialist Basics (Honor Course)												
MA122	Mathematical Analysis I	5	112	112	80				1			
MA123	Mathematical Analysis II	5	112	112	80				2			
	Linear Algebra	5	80	80	80				3			
PH114	Introduction to Physics I	5	80	80	80				1			
PH116	Introduction to Physics II	5	80	80	80				2			
MS107	Probability	3	48	48	48				3			
	Total Credits	28	512									
Specialist Core Course (Honor Course)												
CA115	Chemical Principles	4	64	64	64				1			
	Frontier of Chemistry	2	32	32	32				2			
	Inorganic Chemistry	4	64	64	64				2			
	Physical Chemistry I	4	64	64	64				4			
	Physical Chemistry II	4	64	64	64				5			

	Organic Chemistry I	4	64	64	64				3			
	Organic Chemistry II	4	64	64	64				4			
	Analytical Chemistry	2	32	32	32				5			
	Total Credits	28	476									
Laboratory (Honor Course)												
PH111	Physics Laboratory I	1.5	48	26	2	24			2			
PH117	Physics Laboratory II	1.5	48	26	2	24			3			
CA118	Inorganic and Analytic Chemistry Lab. I	1.5	64	64		64			1			
	Inorganic and Analytic Chemistry Lab. II	1	51	51		51			2			
	Organic Chemistry Laboratory I	1.5	64	64		64			3			
	Organic Chemistry Laboratory II	1	51	51		51			4			
	Physical Chemistry Lab. I	1.5	64	64		64			4			
	Physical Chemistry Lab. II	1	48	48		48			5			
	Instruments Analysis Laboratory	1.5	64	64		64			6			
	Total Credits	12	406									
Specialist Comprehensive Training												
Students will join in the research team to train their research capabilities through internship since the third semester. Students must decide their research fields and supervisors by circular two-way choice before the fourth semester, and then work in the decided research team. The research includes at least one PRP or innovative experimental research, and graduation thesis.												
	Research Capacity Cultivation I	1	48			40			3			

	Research Capacity Cultivation II	1	48			40			4			
	Research Capacity Cultivation III	1	48			40			5			
	Research Capacity Cultivation IV	1	48			40			6			
	Graduation thesis	5	240			160			7-8			
	Total Credits	9	432									
III Electives (Courses with "*" are honor courses)												
Students are required to obtain at least 25 credits, among which 12 credits shall be in the chemistry module and the rest in other fields. The selected courses shall be consecutive and systematic and in the way of modules. Part of current recommended module courses are listed in the following chart (for specific time and order, refer to the official website). Choose at least one course from Introduction to Computer Science and Introduction to Computer Science.												
Chemistry Module												
CA305	Inorganic Synthesis	2	32	32	32				5			
CA316	Polymer Chemistry and Physics	3	48	48	48				5			
CA333	Organic Synthesis	3	48	48	48				5			
CA333	Spectrum Basics	2	32	32	32				6			
CA323	Bio-organic Chemistry	2	32	32	32				6			
CA304	Theory and Computational Chemistry	2	32	32	32				6			
CE403	Applied Electrochemistry	2	32	32	32				6			
CA402	Solid Chemistry	4	64	32	32				7			
CA310	Coordination Chemistry	2	32	32	32				7			

CA403	Colloid and Interface Chemistry	2	32	32	32				7			
Laboratory Module												
	Integrated Experimental Training I	1	48	48	48				2.5			
	Integrated Experimental Training II	1	48	48	48				4.5			
	Integrated Experimental Training III	1	48	48	48				6.5			
	Experimental Chemistry IV (Instrument Analysis)	2.5	120	120	120				6			
Polymer Module												
CA318	Polymer Chemistry	4	64	64					5			
CA319	Polymer Physics	4	64	64					5			
CA470	Polymer Material	2	32	32					7			
CA363	Functional Polymers	2	32	32					7			
Chemical Engineering Module												
CE204	Chemical Engineering Principles I	4	64	64					6			
CE329	Chemical Engineering Principles II	4	64	64					7			

CE303	Reaction Engineering Principles	3	48	48					7			
CE304	Chemical Engineering Process Control	2	32	32					7			
Biology Module												
BI113	Introduction to Biology(1)*	4	64	64					5			
BI114	Introduction to Biology(2)*	4	64	64					6			
MS202	Cell Biology *	4	64	64					7			
BI385	Biochemistry	4										
Computer Module												
	Introduction to Computer Science*	3	48	48					5			
MA136	Numerical Analysis and Programming Design*	4	64	64					6			
	Data Structure	4	192	64					7			
Physics Module												
MA070	Mathematical Methods in Physics *	4	64	64					7			
	Quantum Mechanics I*	4	64						6			
PH303	Thermodynamics and Statistical Physics*	4	64						7			
	Must choose	25										

Individualized Course												
Students can choose courses worth 10 credits in total, based on their own conditions. The courses available include English, PRP and graduate innovative practice. There are no mandatory requirements.												
	Basic College English (3)	3	64	64	64				3			
	Basic College English (4)	3	64	64	64				4			

Note: Recommended semester and credits of part courses may be adjusted. Please refer to the required course on the recommended schedule when choose courses in each semester.