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	数学プログラム

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Tab[redacted] Standards for Mathematics Program (Entrants of 2022)

Refer to [redacted]Program for requirements for attending the course.

Students [redacted]ided in other programs and schools, and in other universities, in addition to the class subjects listed in this table, and the credit for t[redacted]e of the Mathematics Program certifies is accepted as the required credit for graduation.
The cred[redacted]ematics Education I" and "Introduction to Mathematics Education II" that are provided by the School of Education is counted to[redacted](for the subject category of "Specialized Subjects").
When the[redacted]ogram allows it, students can take class subjects before the period defined in the class subject table.

* Studen[redacted]
1 license f[redacted]

Type	[redacted]															
Liberal Arts Education Subjects	Basic Courses in University	I[redacted]														
		I[redacted]														
	Common Subjects	[redacted]					1			①						
		[redacted]n Foreign Languages (select one language from German, French, Spanish, Russian, Chinese and Korean)		4	Foreign Languages: Basic Studies I	1	Elective/required	○							
					Foreign Languages: Basic Studies II	1		○							
					Foreign Languages: Basic Studies Ⅲ	1			○						
					Foreign Languages: Basic Studies Ⅳ	1			○						
					Ⅰ, Ⅱ, Ⅲ and Ⅳ must be the same language										
		Inf[redacted]rmation and Data Science Courses	4	2	Introduction to Information and Data Sciences	2	Required	②							
				2	Computer Programming	2	Elective/required	○	○						
					Intelligence and Computer	2			○						
					Ground zero programming	2			○						
					Fundamental Date Science	2			○						
		Health and Sports Courses	2		From "Health and Sports Courses"	1 or 2	Elective/required	○	○						
		[redacted]cial Cooperation Courses (Note 5)	(0)		From "Social Cooperation Courses"	1 or 2	Free elective	○	○						
		Foundation Courses	6		Linear Algebra I	2	Required	②							
					Seminar in Linear Algebra I	1		①							
					Linear Algebra Ⅱ	2			②						
					Seminar in Linear Algebra Ⅱ	1			①						
	Total([redacted]iberal Arts Education Subjects)		34												

(Note 1) [redacted]he indicated semester represents that in which students typically take the subject. It is permitted to take the subject in the same (first or second) semester in the following ye[redacted]r, however, it is required to confirm the details in syllabus for that academic year, because the subject might be provided in a different semester or term.

(Note 2) I[redacted] is required to earn 4 credits in "Human & Social Science Subjects" and 4 credits in "Natural Science Subjects". Students who want to acquire an educational personnel ce[redacted]tification must take the subject "Japanese Constitution" in the "Human & Social Science Subjects".
[redacted]redits earned through the subject "Advanced English for Communication", "Foreign Languages: Intensive Studies" and "Overseas Language Seminar (German, French, Sp[redacted]nish, Russian, Chinese, and Korean)" in "Foreign Languages" are accepted as the credits required for "Human & Social Science Subjects".

(Note 3) [redacted]chievement in a foreign language skill test might also be accepted as credit. For the details, refer to the description of English subjects in Liberal Arts Education and the ite[redacted]n "Credit based on Achievement in Foreign Language Skill Tests" in the Student Handbook.

(Note 4) [redacted]e credit for "Basic English Usage I" and "Basic English Usage II" is accepted as that for the category of "Any subject".

(Note 5) [redacted]e credit of the subject "Social Cooperation Courses" is accepted as credit for the category of "Any subject".

* Note for [redacted]he "Specialized Education Subjects" listed in the next page and after

(Note 6) [redacted] achieve the 54 credits required for the "Specialized Subjects", it is required to earn 26 or more credits for elective required subjects and free elective subjects, as well as 10[redacted]credits for required subjects and 18 credits for elective required subjects.
[redacted]e credit for the subjects "Introduction to Mathematics Education I" and "Introduction to Mathematics Education II" that are provided in School of Education is counted as cr[redacted]dit for the "Specialized Subjects."

(Note 7) [redacted]r the 11 class subjects of "Specialized Subjects", for which lectures and exercises are provided in pairs, it is required to earn 16 or more credits for 4 or more pairs of su[redacted]jects.

(Note 8) [redacted]e subject "Network and Algebra" is provided in the 7th or 8th semester.

(Note 9) [redacted]e subject "Topics in Mathematics" is provided in the form of such subjects as "Topics in Algebra", "Topics in Geometry", "Topics in Analysis" and "Topics in Probability an[redacted] Statistics".

(Note 10) [redacted]e classes in "Special Lectures in Mathematics" are provided as an integrated course within a certain period of time (after the 5th semester; mainly after the 7th semester).

(Note 11) [redacted]ecause 128 credits are required for graduation, it is required to earn not only the required credits for each subject category (121 credits in total that consist of 34 credits in Li[redacted]eral Arts Education Subjects and 87 credits in Specialized Education Subjects), but 128 or more credits in total regardless of the categorization of Liberal Arts Education Su[redacted]jects and Specialized Education Subjects.
[redacted]owever, the credits for the subjects described below are not accepted as required credit for graduation: For the details of subjects related to educational personnel ce[redacted]tification, refer to the list of required credits in "Acquisition of Educational Personnel Certification" in the Student Handbook.
・[redacted]ny credit for subjects only related to educational personnel certification, except for "Introduction to Mathematics Education I" and "Introduction to Mathematics Education II"
・"[redacted]asic Specialized Subjects" and "Specialized Subjects" provided in the other programs of the School of Science (except those that are admitted by the faculty committee of th[redacted] Mathematics Program)
・"[redacted]asic Specialized Subjects" and "Specialized Subjects" provided by the other programs in other schools (except those that are admitted by the faculty committee of the Ma[redacted]hematics Program)

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Academic achievements of Mathmatics Program

Relationships between the evaluation items and evaluation criteria

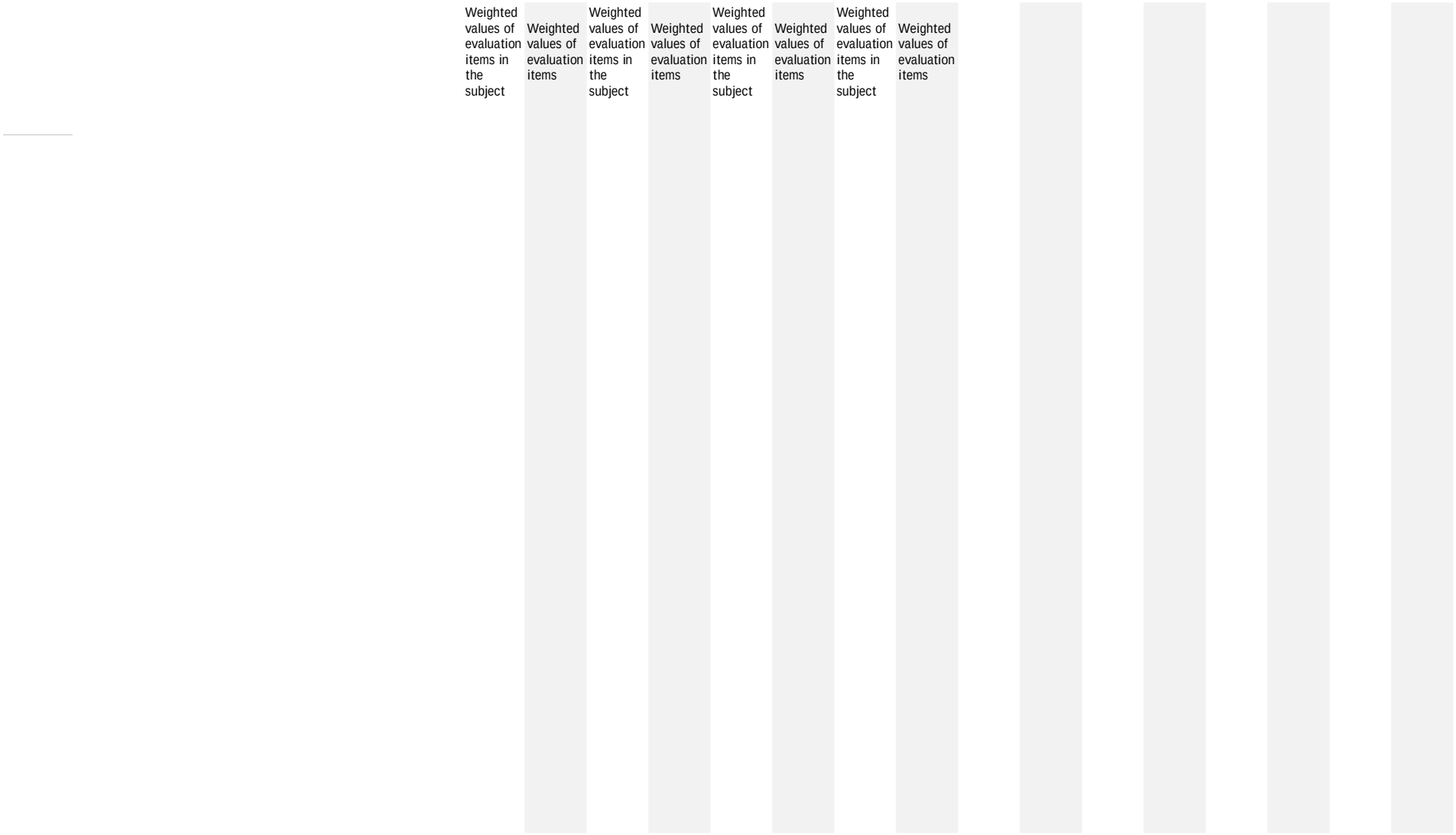
Academic achievements			Evaluation criteria		
Evaluation items			Excellent	Very Good	Good
Knowledge and Understanding	(1)	Understanding classical basic theory which is a base of modern mathematics. Being able to find and explain issues from specific events.	Having superb understanding on classical basic theory of modern mathematics. Being able to find and explain issues from specific events to the superb level.	Having well understanding on classical basic theory of modern mathematics. Being able to find and explain issues from specific events to the high level.	Understanding classical basic theory of modern mathematics. Being able to find and explain issues from specific events.
	(2)	Understanding on primary theory of modern mathematics established on classical theory.	Having a very superb level of understanding on primary theory of modern mathematics established on classical theory.	Having a superb level of understanding on primary theory of modern mathematics established on classical theory.	Having a certain level of understanding on primary theory of modern mathematics established on classical theory.
	(3)	Acquiring knowledge and vision on advanced theories as an extension of core theory of modern mathematics.	Having very advanced knowledge on advanced theory of modern mathematics and being able to have a vision with very wide eyesight.	Having advanced knowledge on advanced theory of modern mathematics and being able to have a vision with wide eyesight.	Having a certain knowledge on advanced theory of modern mathematics and being able to have a vision.
	(4)	To learn topic relevant to modern and historical concerns that human and society face through variety of classes.	To acquire advanced knowledge of topic relevant to modern and historical concerns that human and society face through variety of classes. Also, to be able to precisely explain about the topics.	To acquire advanced knowledge of topic relevant to modern and historical concerns that human and society face through variety of classes. Also, to be able to explain about the topics.	To acquire advanced knowledge of topic relevant to modern and historical concerns that human and society face through variety of classes. Also, to be able to explain about the topics.
	(5)	Being able to understand, learn and explain logical framework and system of basic studying according to each subject and necessary knowledge and skills for constructing learning.	Being able to very fully understand, learn and explain logical framework and system of basic studying according to each subject and necessary knowledge and skills for constructing learning.	Being able to fully understand, learn and explain logical framework and system of basic studying according to each subject and necessary knowledge and skills for constructing learning.	Being able to understand, learn and explain logical framework and system of basic studying according to each subject and necessary knowledge and skills for constructing learning.
	(6)	Able to understand, learn, and explain the necessity of college education, career education, and a code of ethics.	Able to understand, learn, and explain the necessity of college education, career education, and a code of ethics especially well.	Able to sufficiently understand, learn, and explain the necessity of college education, career education, and a code of ethics.	Able to understand, learn, and explain the necessity of college education, career education, and code of ethics.

Academic achievements			Evaluation criteria		
Evaluation items			Excellent	Very Good	Good
Abilities and Skills	(1)	To acquire basic mathematical abilities (Ability to understand concepts, calculation ability, argumentation ability).	1. Being able to understand the contents of definition of basic and mathematical concepts and to explain them giving some examples. 2. Being able to logically carry out transformation of numerical expressions and propositions. 3. Being able to understand and prove basic propositions	1. Being able to logically carry out basic calculation with formulae and transformation of propositions. 2. Being able to state basic concept definition and to give typical examples.	1. Being able to carry out basic calculation with formulae and transformation of propositions.
	(2)	To acquire skills to formulate and solve mathematical questions.	1. Being able to collect information even on issues difficult to find solutions by themselves with various ways such as literature references, discussion with friends or seniors, information equipment, questioning teachers and to make reports. 2. Being able to explain others the basic parts of the acquired results on issues or problems. 3. Being able to logically, correctly and straightforwardly explain others the basic parts of the acquired results on issues or problems.	1. Being able to collect information even on issues difficult to find solutions by themselves with various ways such as literature references, discussion with friends or seniors, information equipment, questioning teachers and to make reports. 2. Being able to explain others the basic parts of the acquired results on issues or problems.	1. Being able to collect information even on issues difficult to find solutions by themselves with various ways such as literature references, discussion with friends or seniors, information equipment, questioning teachers and to make reports.
	(3)	To learn basic knowledge, skills, and attitudes related to information. Based on them, to be able to process, output and input information, as well as to utilize information appropriately.	Being able to use various kinds of software including programming languages, analysis and graphics and to operate computers and networks.	To be able to use various software and to control computers and networks.	To be able to use software designed for document preparation or formula manipulation. Also to be able to basically operate computers and networks.
	(4)	Being able to conduct daily communication orally or in papers using foreign languages.	Being able to conduct daily communication orally or in papers using foreign languages at a very high level.	Being able to conduct daily communication orally or in papers using foreign languages at a high level.	Being able to conduct daily communication orally or in papers using foreign languages.
	(5)	Through practice of sports, being able to explain the necessity of physical strenth and health promotion.	Being able to practice sports and explain the necessity of health promotion and fitness at a very high level.	Being able to practice sports and explain the necessity of health promotion and fitness at a high level.	Being able to practice sports and explain the necessity of health promotion and fitness.
bilities	(1)	Acquiring a ability to think logically.	1. The ability to promote discussion by raising solid foundation. 2. The ability to find solutions by making logical thought from hypotheses. 3. The ability to logically find out the reason of unsuccessful trial	Having two abilities among following ones. 1. the ability of promoting discussion giving specific reasons. 2. the ability to pierce results through logical thinking from hypotheses. 3. the ability to find the logical reasons of unsuccessful trials.	Having one ability among following ones. 1. the ability of promoting discussion giving specific reasons. 2. the ability to pierce results through logical thinking from hypotheses. 3. the ability to find the logical reasons of unsuccessful trials.
	(2)	To acquire ability to utilize mathematical thinking.	1. Being able to find out the essence of difficult concepts and to understand in their own way. 2. Being able to consider various phenomena mathematically and make them into abstraction, generalization and modeling. 3. Being able to return results from those abstracted, generalized and modeled phenomena into the former issues. 4. Being able to emulate assumable possibilities and to consider the solution of each of them. 5. The ability to find out common points from various matters and to deal them with unified methods.	Having two abilities among following ones. 1. being able to select essence from difficult concepts and understand in their own way. 2. being able to consider various matters mathematically and make them abstracted, generalized and modeled. 3. being able to return abstracted, generalized and modeled matters to former issues. 4. enumerating expected possibilities and considering each solution. 5. the ability of selecting common points from different matters and generally dealing with them.	Having one ability among following ones. 1. being able to select essence from difficult concepts and understand in their own way. 2. being able to consider various matters mathematically and make them abstracted, generalized and modeled. 3. being able to return abstracted, generalized and modeled matters to former issues. 4. enumerating expected possibilities and considering each solution. 5. the ability of selecting common points from different matters and generally dealing with them.

Academic achievements	Evaluation criteria		
Evaluation items	Excellent	Very Good	Good
1. The ability to listen to others opinions carefully			

(3) To acquire the ability to understand sentences and communicate information.

Relationships between the evaluation items and class subjects



Subject Classification	Subject Name	Credits	Type of course registration	Grade	Evaluation items																Total weighted values of evaluation items in the
					Abilities and Skills						Comprehensive Abilities										
					(3)		(4)		(5)		(1)		(2)		(3)		(4)		(5)		
					Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	
Liberal Arts Education	Seminar in Linear Algebra	1	Required	1																	100
Liberal Arts Education	Linear Algebra	2	Required	2																	100
Liberal Arts Education	Seminar in Linear Algebra	1	Required	2																	100
Specialized Education	Introduction to Mathematics	2	Required	1																	100
Specialized Education	Introduction to Information Mathematics	2	Elective/ required	2																	100
Specialized Education	Introduction to Physics A	2	Elective/ required	1																	100
Specialized Education	Introduction to Physics B	2	Elective/ required	2																	100
Specialized Education	Introduction to Chemistry A	2	Elective/ required	1																	100
Specialized Education	Introduction to Chemistry B	2	Elective/ required	2																	100
Specialized Education	Introduction to Biological Sciences A	2	Elective/ required	1																	100
Specialized Education	Introduction to Biological Sciences B	2	Elective/ required	2																	100
Specialized Education	Introduction to Earth and Planetary Sciences A	2	Elective/ required	1																	100
Specialized Education	Introduction to Earth and Planetary Sciences B	2	Elective/ required	2																	100
Specialized Education	English Seminar on Mathematics	1	Elective/ required	4			100	1													100
Specialized Education	Analysis I	2	Required	1																	100
Specialized Education	Exercises in Algebra I	1	Required	1																	100
Specialized Education	Analysis II	2	Required	2																	100
Specialized Education	Exercises in Algebra II	1	Required	2																	100
Specialized Education	Analysis III	2	Required	3																	100
Specialized Education	Exercises in Algebra III	1	Required	3																	100
Specialized Education	Analysis IV	2	Required	4																	100
Specialized Education	Exercises in Algebra IV	1	Required	4																	100
Specialized Education	Algebra I	2	Required	3																	100

Subject Classification	Subject Name	Credits	Type of course registration	Grade	Evaluation items																Total weighted values of evaluation items in the
					Abilities and Skills						Comprehensive Abilities										
					(3)		(4)		(5)		(1)		(2)		(3)		(4)		(5)		
					Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	
Specialized Education	Exercises in Algebra I	1	Required	3																	100
Specialized Education	Algebra II	2	Required	4																	100
Specialized Education	Exercises in Algebra II	1	Required	4																	100
Specialized Education	Fundamental Concepts of Mathematics I	2	Required	3																	100
Specialized Education	Exercises in Fundamental Concepts	1	Required	3																	100
Specialized Education	Fundamental Concepts of Mathematics II	2	Required	4																	100
Specialized Education	Exercises in Fundamental Concepts	1	Required	4																	100
Specialized Education	Exercises in Mathematical Software	2	Required	3	50	1															100
Specialized Education	Special Study of Mathematics and Informatics for Graduation	5	Required	7 8	10	1					14	1	14	1	14	1	14	1	14	1	100
Specialized Education	Algebra	2	Elective/ required	5																	100
Specialized Education	Exercises in Algebra	2	Elective/ required	5																	100
Specialized Education	Algebra	2	Elective/ required	6																	100
Specialized Education	Exercises in Algebra	2	Elective/ required	6																	100
Specialized Education	Geometry	2	Elective/ required	5																	100
Specialized Education	Exercises in Geometry	2	Elective/ required	5																	100
Specialized Education	Geometry	2	Elective/ required	6																	100
Specialized Education	Exercises in Geometry	2	Elective/ required	6																	100
Specialized Education	Analysis	2	Elective/ required	5																	100
Specialized Education	Exercises in Algebra	2	Elective/ required	5																	100
Specialized Education	Analysis	2	Elective/ required	5																	100
Specialized Education	Exercises in Algebra	2	Elective/ required	5																	100
Specialized Education	Analysis	2	Elective/ required	6																	100
Specialized Education	Exercises in Algebra	2	Elective/ required	6																	100

Subject Classification	Subject Name	Credits	Type of course registration	Grade	Evaluation items																Total weighted values of evaluation items in the
					Abilities and Skills						Comprehensive Abilities										
					(3)		(4)		(5)		(1)		(2)		(3)		(4)		(5)		
					Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	
Specialized Education	Analysis	2	Elective/ required	6																	100
Specialized Education	Exercises in Algebra	2	Elective/ required	6																	100
Specialized Education	Mathematics for Computation	2	Elective/ required	4																	100
Specialized Education	Exercises in Mathematics for Computation	2	Elective/ required	4	50	1															100
Specialized Education	Mathematics for Computation	2	Elective/ required	5																	100
Specialized Education	Exercises in Mathematics for Computation	2	Elective/ required	5	50	1															100
Specialized Education	Probability and Mathematical Statistics	2	Elective/ required	5																	100
Specialized Education	Exercises in Probability and Mathematical	2	Elective/ required	5																	100
Specialized Education	Algebra	2	Free elective	7																	100
Specialized Education	Algebra	2	Free elective	8																	100
Specialized Education	Geometry	2	Free elective	7																	100
Specialized Education	Geometry	2	Free elective	8																	100
Specialized Education	Elementary nonlinear studies	2	Free elective	6																	100
Specialized Education	Mathematical Analysis	2	Free elective	7																	100
Specialized Education	Mathematical Analysis	2	Free elective	8																	100
Specialized Education	Probability and Mathematical Statistics	2	Free elective	6																	100
Specialized Education	Probability and Mathematical Statistics	2	Free elective	8																	100
Specialized Education	Data Science	2	Free elective	4	50	1															100
Specialized Education	Network and Algebra	2	Free elective	7 8	50	1															100
Specialized Education	Mathematics for Modeling and Simulation	2	Free elective	6	50	1															100
Specialized Education	Theory of Complex Systems	2	Free elective	7	50	1															100
Specialized Education	Mathematics for Computation	2	Free elective	8	50	1															100
Specialized Education	Mathematics Internship	1	Free elective	5	100	1															100

Subject Classification	Subject Name	Credits	Type of course registration	Grade	Evaluation items																Total weighted values of evaluation items in the
					Abilities and Skills						Comprehensive Abilities										
					(3)		(4)		(5)		(1)		(2)		(3)		(4)		(5)		
					Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	
Specialized Education	Topics in Mathematics	2	Free elective	7 8																	100

Curriculum Map of Mathematics