

For entrants in AY 2021

Appended Form 1

Specifications for Major Program

Name of School (Program) [School of Education, Cluster 2 (Science, Technology and Society Education)

Program in Mathematics Education]

Program name (Japanese) (English)	中等教育科学（数学）プログラム <hr/> Program in Mathematics Education
1. Academic Degree to Be Acquired: Bachelor's Degree (Education)	
2. Overview <p>The Mathematics Education Program delivers the following education aimed at training junior and senior high school mathematics teachers with a high level of knowledge and mathematical ability, and fostering professionals who aim to go on to a graduate school related to mathematics education, to become researchers or to work at the highest levels of their profession.</p> <p>The curriculum of this program organizes basic and advanced special education organically, so that students can learn the principles, contents, and methodology of mathematics education in a varied and systematic manner. Eventually, the students will become experts in the basic theory of mathematics education, acquiring the capacity to provide excellent lessons, and to analyze and develop teaching materials. This will contribute to the overall development of mathematics education, which will contribute to laying the foundations of a nation built on creativity in science and technology.</p>	
3. Diploma Policy (Policy of Awarding Degrees & Goal of the Program) <p>The Mathematics Education Program fosters junior and senior high school mathematics teachers with a high level of knowledge and mathematical ability, and professionals who go on to graduate school in mathematics education to be researchers or highly specialized workers. Therefore, this program awards bachelor's degree (education) to students who, in addition to obtaining the standard number of credits set forth in the curriculum, have acquired the following abilities.</p> <p>(1) A broad range of knowledge, a command of foreign languages, and information processing abilities, a multidisciplinary grasp of the challenges facing humanity, and especially of issues related to peace, and the ability to take action from a broad, international perspective.</p> <p>(2) A broad range of knowledge and skills based on the contents of mathematics curricula, a high level of mathematical ability, and the ability to give excellent guidance in high school mathematics, while at the same time positively undertaking practical research in mathematics education.</p> <p>(3) A broad range of knowledge and skills related to mathematics curricula, and a high level of mathematical ability, to be deployed in the analysis and development of teaching materials for mathematics education in secondary schools.</p> <p>(4) The ability to conduct research into academic literature and materials on mathematics education; to organize, analyze, and study problems in order to make theoretical presentations; and, at the same time, to positively undertake theoretical research in mathematics education.</p>	

4. Curriculum Policy (Policy on Curriculum Organization and Implementation)

The Mathematics Education Program organizes and implements a curriculum based on the following policies, in order to achieve the goal set forth above.

In the first year, students study liberal arts and foreign languages subjects in order to acquire a broad range of knowledge with which they can undertake research into mathematics education in the future. They also study “Calculus I, and II” and “Linear Algebra I, and II” to master the basic knowledge of modern mathematics, as well as “Methodology of Mathematics Education” as a basic special subject. These will serve as an introduction to the special education, as well as the foundation of the whole program.

In the second year, students continue studying liberal arts subjects, forming the basis of special education, and also study special subjects such as “Introduction to Mathematics Education”, “Introduction to Algebra”, “Introduction to Geometry”, “Introduction to Analysis”, and “Mathematical Statistics” in order to master the basic and fundamental knowledge and skills related to the principles and methodology of mathematics education, and to acquire a broad range of knowledge and skills based on the curriculum, as well as the high-level mathematical abilities required for the analysis and development of teaching materials. These form the framework that will support the rest of the program.

In the third year, students study “Curriculum of Mathematics Education,” etc. to further develop their knowledge and skills. They also focus on special subjects such as “Research Methods in Algebra I”, “Research Methods in Geometry I and II”, and “Research Methods in Analysis I and II”, acquiring a deeper understanding and curriculum related skills, built on the abilities accumulated so far, in order to form practical abilities and attitudes.

In the fourth year, students focus on their graduation thesis, based on their own original topic, making use of the special knowledge, skills, and abilities mastered through the program in order to cultivate the ability to identify problems and find solutions. At the same time, they study special subjects to enrich their knowledge and skills in relation to theoretical and practical research into mathematics education.

The result of learning will be evaluated through both the academic assessment of the respective subjects, and the degree of achievement of the targets established by this educational program.

5. Commencement Timing and Conditions

In the first year, students of the Mathematics Education Program start studying the necessary subjects to acquire the basic and fundamental knowledge, abilities, skills, and attitudes required for mathematics education. As such, except for in special cases, the students of the Mathematics Education Program will select and start this program when they enter the school in the first year, which is, therefore, the timing of the start of the program.

6. Obtainable Qualifications

Students can acquire the license of Class 1 Junior High School Mathematics Teacher and High School Teacher on the condition that the credits in professional teaching subjects are acquired, in accordance with the Education Personnel Certification Act.

Furthermore, licenses such as those of curator, and school librarian can be obtained by taking the relevant program and acquiring the specified credits.

7. Subjects and Lesson Contents

* For subjects, please refer to the subject list given in Attachment 1. (Attach the list.)

* For the lesson contents, please refer to the syllabus for each school year.

8. Academic Results

At the end of each semester, the standard of evaluation will be explicitly given for each evaluation item to show the level of achievement.

The academic result evaluation for each item will be converted as follows: S=4, A=3, B=2, and C=1. These results are accumulated and classified as one of three levels: Excellent, Very Good, and Good, from the first semester of the first year to the current semester.

Result Evaluation	Conversion
S (90 points or over)	4
A (80 to 89 points)	3
B (70 to 79 points)	2
C (60 to 69 points)	1

Academic Results	Standard
Excellent	3.00 ~ 4.00
Very Good	2.00 ~ 2.99
Good	1.00 ~ 1.99

* Attachment 2: Relationship between evaluation item and evaluation standard.

* Attachment 3: Relationship between evaluation item and subject.

* Attachment 4: Curriculum Map

9. Study in Graduation Thesis (Purpose, Assignment, Timing, etc.)

○ Purpose

The graduation thesis is a final piece of research (for graduation) which constitutes the ultimate goal of learning in the program. The students select a topic, which will be an issue related to mathematics education discovered during course activities, such as subject exploration activities, seminar classes, and teaching practice at schools. Have chosen a topic, they put together a paper that includes analysis of the literature and research, together with their own original considerations, and a plan for making their graduation presentation. Such activities will develop their abilities, skills, and attitudes in order to be able to practice mathematics education at secondary school. They will also cultivate the fundamental abilities needed to progress to graduate school for further study of mathematics education.

○ Assignment Timing and Method

After studying a number of seminar lessons during the second semester of the third year, students decide on their tutor at the end of the third year. In the fourth year, they do research in relation to mathematics education and prepare their graduation thesis. Assignment will be based primarily on their wishes; however, in order to ensure that teachers' guidance is, tailored to each student, the number of students allocated to one tutor may be restricted.

At the end of the third year, the students who have not acquired 90 credits or more in total; 30 credits or more in liberal arts education and 60 credits or more in special education; may not proceed to the study of graduation thesis in the fourth year.

Table of Registration Standards for the Subjects of Liberal Education

Cluster 2: Program in Mathematics Education

Type	Subject type		Required Credits	Class subjects, etc.	Credits	Type of course registration	Semester for the subject to be taken (Note 1)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Note 1: ○marks the standard semester for the subjects the students will study. Students can study in the following semester if they cannot obtain the credits in this semester. The timetable for a subject may change year by year. Please check the timetable for Liberal Arts subjects issued every year.

Note 2: Field Research in an English-speaking country through the short-term overseas education, etc. or the study of Online English Seminar I / II / III through self-initiated learning can be included in the English credits required for graduation. In addition, there is a credit recognition system for foreign language proficiency tests and language training. Please refer to the sections on English and Liberal Arts Education in the Student Handbook and the "Handling of Credit Recognition for Foreign Language Proficiency Tests, etc."

Note 3: Due to the requirements of organizing the timetable, Communication I A and Communication I B are designated for the 1st semester, while Communication II A and Communication II B are designated for the 2nd semester.

Note 4: • It is recommended to take subjects outside the student's area of specialization. In order to acquire the license for educational personnel, students need to take two credits in "Japanese Constitutional Law."
• Credits obtained by taking "Data science for education" can be included in the Area Courses (Courses in Natural Sciences) credits required for graduation.
• Foundation Courses not listed in this table can be included in the Area Courses credits required for graduation.

Note 5: Select one language from German, French, Spanish, Russian, Chinese, South Korean and Arabic

Note 6: Select from "Computer Programming", "Intelligence and Computer", "Fundamental Data Science" or "Ground zero programming".

Note 7: This includes Area courses, Foreign Languages, and Foundation Courses.

Registration standards for Schools

Cluster 2: Science, Technology and Society Education Program in Mathematics Education

Subject type, etc.				No. of credits required for graduation	
Liberal Arts Education	Peace Science Courses			2	42
	Basic Courses in University Education	Introduction to University Education		2	
		Introductory Seminar for First-Year Students		2	
	Common Subjects	Area Courses	Courses in Arts and Humanities / Social Sciences	4	
			Courses in Natural Sciences	4	
		Foreign Languages	English	4	
			Non-English Foreign Languages	2	
		Information and Data Science Courses		4	
		Health and Sports Courses		2	
	Foundation Courses			8	
	Free Elective Subjects			8	
Specialized Education	Special Basic Subjects			24	86
	Special Subjects			18	
	Special Elective Subjects			38	
	Free Elective Subjects				
	Graduation Research			6	
Total				128	

Registration standards for Specialized Education Subjects

Cluster 2 Program in Mathematics Education

Class Subject			No. of credits required for graduation		School(s)
Special Basic Subjects	I	Mathematics Education	6	24	Program in Mathematics Education
	II	Algebra	4		
	III	Geometry	4		
	IV	Analysis	4		

	V	Statistics	2		
	VI	Probability & Computer	4		
Special Subjects			18	School of Education etc.	
Special Elective Subjects			38		
Free Elective Subjects					
Graduation Research			6	Program in Mathematics Education	

<Matters to note when taking subjects>

1. The number of credits exceeding 38 credits in Special Education can be included in the number of credits for Free Elective Subjects.
2. In order to study the Practical Seminar for the Teaching Profession (High School) (8th Semester), in principle, students must obtain the credits in Practical Study at the High School I and II at the end of the 7th semester. If, however, they cannot obtain the credits in Practical Study by the semester in which they take the Practical Seminar for the Teaching Profession, their registration will be accepted on the condition of their obtaining them during the same semester.

Cluster 2 Program in Mathematics Education

Subjects with a circle in the “No. of credits to obtain” column are required subjects. The semester marked with ○ is the standard semester for taking the related subject

Type		Class Subject	Credits	Semester in which the subject is taken								Remarks
				1	2	3	4	5	6	7	8	
Special Basic Subjects	I	Introduction to Mathematics Education I	②			○						
		Introduction to Mathematics Education II	②				○					
		Methodology of Mathematics Education	②		○							
	II	Introduction to Algebra	②			○						
		Practice in Introduction to Geometry	②				○					
	III	Introduction to Geometry	②			○						
		Practice in Introduction to Geometry	②				○					
	IV	Introduction to Analysis	②			○						
		Practice in Introduction to Algebra	②				○					
	V	Descriptive Statistics	②			○						
	VI	Computer Practice I	②			○						
		Computer Practice II	②			○						
Special Subjects	I	Curriculum in Mathematics Education	2					○				
		History of Mathematics Education	2							○		
		Research on Mathematics Education	2						○			
	II	Research Methods in Algebra I	2					○				
		Algebra A	2							○		School of Science
		Algebra B	2								○	School of Science
		Study of Instructional Materials in Algebra	2						○			

Special Elective Subjects	III	Research Methods in Geometry I	2					○				
		Research Methods in Geometry II	2						○			
		Geometry A	2							○		School of Science
		Geometry B	2								○	School of Science
		Study of Instructional Materials in Geometry	2						○			
	IV	Research Methods in Analysis I	2					○				
		Research Methods in Analysis II	2						○			
		Analysis A	2							○		School of Science
		Analysis C	2								○	School of Science
		Study of Instructional Materials in Analysis	2						○			
	V	Probability and Mathematical Statistics A	2					○				
		Probability and Mathematical Statistics B	2						○			
		Statistical Test	2					○				
		Inferential Statistics	2					○				
			2									
Special Elective Subjects		Guidance on the Teaching Profession	2			○						
		Principles of Education	2			○						
		Developmental Psychology of Children and Adolescents	2					○				
		Education and Society and Systems	2				○					
		General Curriculum Theory	2					○				
		Methodology on Moral Education	2					○				
		Teaching Special Activities	2				○					
		Educational Method and Teaching Skill	2				○					
		Psychology of Educational and Vocational Guidance	2				○					
		Educational Counseling	2						○			
		Methodology on Period for Integrated Studies	1						○			
		Special Needs Education	1					○				
		Introduction of Teaching Practice for Lower and Upper Secondary Schools	2	○								
		Teaching Practice Focusing on Classroom Observation at Lower and Upper Secondary Schools	1				○					
		Practice in Teaching B	1					○				
		Teaching Practice at Junior and Senior High School I	4						○			
		Teaching Practice at Junior and Senior High School II	2							○		
		Practical Seminar for the Teaching Profession	2								○	
		Introduction to Care Practice	1			○						

Free Elective Subjects	Includes special subjects of this course and other courses, and special education subjects held in other schools (including minor and special programs).											
Graduation Research	Practical Research in Mathematics Education	2	②							○		
	Study of Instructional Materials in Algebra Education	2								○		
	Study of Instructional Geometry Materials in Education	2								○		
	Study of Instructional Materials in Analysis Education	2								○		
	Graduation Thesis		④									