

# Educational curriculum (for students enrolled in FY 2016)

## Inter-Graduate School of Science Subjects

Subjects	Credits	Semester FH: First Half LH: Latter Half	Hours per week			Eligible Students	Teacher- training course	Inter- Graduate School Classes	Remarks	Completion Requirements
			Lecture	Seminar	Experiment Practice					
<b>Master's and Doctoral Courses</b>										
(Elective Subjects)										
International Science Initiative	1	Semester 1	2			MC1~2	TTC	○		
Special Lecture I	1	(indetermination)	1			MC · DC				
Special Lecture II	2	(indetermination)	2			MC · DC				
Special Seminar I	1	(indetermination)		1		MC · DC				
Special Seminar II	2	(indetermination)		2		MC · DC				
Special Practice I	1	(indetermination)			1	MC · DC				
Special Practice II	2	(indetermination)			2	MC · DC				
Science Globe- Outbound I	1	Full Year			1	MC · DC				
Science Globe- Outbound II	2	Full Year			2	MC · DC				

Note:

1. "Math" and "Sci." in the Teacher-training course column in each list indicate subjects in Math and Science, respectively, and TTC indicates subjects pertaining to teacher training. Students who apply for a specialized teaching certificate (junior high school and/or high school) **must first fulfill the basic requirements for the First Class Teacher Certificate** (the requirements will vary according to teaching subject and school category), and shall additionally take 24 or more credits in total from the Teacher-training course column.

2. Students may take the same subject multiple times when if it is held in different contexts.

3. Check the schedule by syllabus and bulletin board as lecture periods are subject to be changed.

4. Regarding subjects whose semesters are listed as indetermination or intensive, they will be announced by Rigaku Joho System and bulletin board as soon as fixed.

5. Semester's name and period are as follows.

※Depending on fiscal year, the semester's ending month is subject to be changed; therefore, check the schedule by the annual event schedule etc.

•Semester 1 FH: Spring term April~May

•Semester 1 LH: Summer term June~July

•Semester 2 FH: Fall term October~November

•Semester 2 LH: Winter term After December

## Department of Mathematics

Subjects	Credits	Semester FH: First Half LH: Latter Half	Hours per week			Eligible Students	Teacher- training course	Inter- Graduate School Classes	Remarks	Completion Requirements	
			Lecture	Seminar	Experiment Practice						
<b>Master's Course</b>											
(Compulsory Subjects)											
Research in Mathematics	10	Full Year		5		MC1-2	Math			<b>Completion Requirements for the Master's Course</b> Take at least 30 credits, including , 10 from Compulsory Subjects and 20 or more from Primary Elective Subjects and Secondary Elective Subjects.  Credits from Secondary Elective Subjects may include credits from: -Inter-Graduate School of Science Subjects -Inter-Graduate School Classes -Subjects from other departments and graduate schools	
(Primary Elective Subjects)											
Overview of Modern Mathematics	1	Semester 1 & 2	2			MC1-2	Math	○			
Overview of Mathematical Sciences	1	Semester 1 & 2	2			MC1-2	Math	○			
Basic Studies on Mathematics I	2	Semester 1		2		MC1	Math				
Basic Studies on Mathematics II	2	Semester 2		2		MC1	Math				
Basic Studies on Mathematics III	2	Semester 1		2		MC2	Math				
Basic Studies on Mathematics IV	2	Semester 2		2		MC2	Math				
Investigation in Algebra 1	4	Semester 1 & 2		4		MC1-2	Math				
Investigation in Algebra 2	4	Semester 1 & 2		4		MC1-2	Math				
Investigation in Algebra 3	4	Semester 1 & 2		4		MC1-2	Math				
Investigation in Algebra 4	4	Semester 1 & 2		4		MC1-2	Math				
Investigation in Geometry 1	4	Semester 1 & 2		4		MC1-2	Math				
Investigation in Geometry 2	4	Semester 1 & 2		4		MC1-2	Math				
Investigation in Geometry 3	4	Semester 1 & 2		4		MC1-2	Math				
Investigation in Geometry 4	4	Semester 1 & 2		4		MC1-2	Math				
Investigation in Analysis 1	4	Semester 1 & 2		4		MC1-2	Math				
Investigation in Analysis 2	4	Semester 1 & 2		4		MC1-2	Math				
Investigation in Analysis 3	4	Semester 1 & 2		4		MC1-2	Math				
Investigation in Analysis 4	4	Semester 1 & 2		4		MC1-2	Math				
Investigation in Mathematical Sciences 1	4	Semester 1 & 2		4		MC1-2	Math				
Investigation in Mathematical Sciences 2	4	Semester 1 & 2		4		MC1-2	Math				
Investigation in Mathematical Sciences 3	4	Semester 1 & 2		4		MC1-2	Math				
(Secondary Elective Subjects)											
Algebra	2	Semester 1 & 2	2			MC1-2	Math				
Topics in Algebra A	1	Semester 1 & 2	2			MC1-2	Math	○			
Topics in Algebra B	1	Semester 1 & 2	2			MC1-2	Math	○			
Geometry	2	Semester 1 & 2	2			MC1-2	Math				
Topics in Geometry A	1	Semester 1 & 2	2			MC1-2	Math	○			
Topics in Geometry B	1	Semester 1 & 2	2			MC1-2	Math	○			
Analytic Studies	2	Semester 1 & 2	2			MC1-2	Math				
Topics in Mathematical Analysis A	1	Semester 1 & 2	2			MC1-2	Math	○			
Topics in Mathematical Analysis B	1	Semester 1 & 2	2			MC1-2	Math	○			
Special Lecture on Algebra	1	(Intensive)	1			MC1-2	Math				
Special Lecture on Geometry	1	(Intensive)	1			MC1-2	Math				
Special Lecture on Analytic Studies	1	(Intensive)	1			MC1-2	Math				
<b>Doctoral Course</b>											
(Tertiary Elective Subjects)											
Special Researches in Mathematics	12	Full Year		6		DC1-3	—			<b>Completion Requirements for the Doctoral Course:</b> Take at least 30 credits, including credits from a Master's Course. For exceptions, refer to the Hokkaido University Graduate School of Science Regulations.	

**Note:**

1. Students may take the same subject multiple times when if it is held in different contexts.
2. Check the schedule by syllabus and bulletin board as lecture periods are subject to be changed.
3. Regarding subjects whose semesters are listed as indetermination or intensive, they will be announced by Rigaku Joho System and bulletin board as soon as fixed.
4. Semester's name and period are as follows.

※Depending on fiscal year, the semester's ending month is subject to be changed; therefore, check the schedule by the annual event schedule etc.

- Semester 1 FH: Spring term April~May
- Semester 1 LH: Summer term June~July
- Semester 2 FH: Fall term October~November
- Semester 2 LH: Winter term After December

## Department of Condensed Matter Physics

Subjects	Credits	Semester FH: First Half LH: Latter Half	Hours per week			Eligible Students	Teacher- training course	Inter- Graduate School Classes	Remarks	Completion Requirements	
			Lecture	Seminar	Experiment Practice						
<b>Master's Course</b>											
(Compulsory Subjects)											
Senior Seminar in Physics	4	Full Year		2		MC1-2	Sci.			<b>Completion Requirements for the Master's Course</b> Take at least 30 credits, including 12 from Compulsory Subjects and 18 or more from Elective Subjects. Credits from Elective Subjects may include credits from: -Inter-Graduate School of Science Subjects -Inter-Graduate School Classes -Subjects from other departments and graduate schools	
Research in Condensed Matter Physics 1	8	Full Year			8	MC1-2	Sci.				
(Elective Subjects)											
Introduction to Modern Physics	1	Semester, FH	2			MC1-2	Sci.	○			
Statistical Physics	2	Semester 1or 2	2			MC1-2	Sci.				
Computational Physics	2	Semester 1or 2	2			MC1-2	Sci.				
Field Theory in Statistical Mechanics	2	Semester 1or 2	2			MC1-2	Sci.				
Physics of Dielectrics	2	Semester 1or 2	2			MC1-2	Sci.				
Quantum Optical Physics	2	Semester 1or 2	2			MC1-2	Sci.				
Semiconductor Physics	2	Semester 1or 2	2			MC1-2	Sci.				
Electronic Properties of Solids	2	Semester 1or 2	2			MC1-2	Sci.				
Superconductivity	2	Semester 1or 2	2			MC1-2	Sci.				
Low Temperature Physics	2	Semester 1or 2	2			MC1-2	Sci.				
Magnetism	2	Semester 1or 2	2			MC1-2	Sci.				
Surface and Thin-film Magnetism	2	Semester 1or 2	2			MC1-2	Sci.				
Physics of Phase Transition	2	Semester 1or 2	2			MC1-2	Sci.				
Physics of Quantum Device	2	Semester 1or 2	2			MC1-2	Sci.				
Complex Matter Physics	2	Semester 1or 2	2			MC1-2	Sci.				
Special Lecture on Condensed Matter Physics 1	1	(Non-regular)	1			MC1-2	Sci.				
Special Lecture on Condensed Matter Physics 2	1	(Non-regular)	1			MC1-2	Sci.				
<b>Doctoral Course</b>											
(Elective Subjects)											
Research in Condensed Matter Physics 2	12	Full Year			12	DC1-3	—		<b>Completion Requirements for the Doctoral Course</b> Take at least 30 credits, including credits from a Master's Course. For exceptions, refer to the Hokkaido University Graduate School of Science Regulations.		

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3. Regarding subjects whose semesters are listed as indetermination or intensive, they will be announced by Rigaku Joho System and bulletin board as soon as fixed.
4. Semester's name and period are as follows.
  - ※Depending on fiscal year, the semester's ending month is subject to be changed; therefore, check the schedule by the annual event schedule etc.
  - Semester 1 FH: Spring term April~May
  - Semester 1 LH: Summer term June~July
  - Semester 2 FH: Fall term October~November
  - Semester 2 LH: Winter term After December

## Department of CosmoSciences

Subjects	Credits	Semester FH: First Half LH: Latter Half	Hours per week			Eligible Students	Teacher- training course	Inter- Graduate School Classes	Remarks	Completion Requirements	
			Lecture	Seminar	Experiment Practice						
<b>Master's Course</b>											
(Compulsory Subjects)											
Seminar of CosmoSciences	2	Full Year		1		MC1-2	Sci.			<b>Completion Requirements for the Master's Course</b> Take at least 30 credits, including 12 from Compulsory Subjects and 18 or more from Elective Subjects. Credits from Elective Subjects may include credits from : -Inter-Graduate School of Science Subjects -Inter-Graduate School Classes -Subjects from other departments and graduate schools	
Seminar of CosmoSciences	2	Full Year		1		MC1-2	Sci.				
Special Research of CosmoSciences 1	8	Full Year			8	MC1-2	Sci.				
(Elective Subjects)											
Introduction to CosmoSciences	1	Semester 2, FH	2			MC1-2	Sci.	O			
Theory of Fields 1	2	Semester 1	2			MC1-2	Sci.				
Theory of Fields 2	2	Semester 2	2			MC1-2	Sci.				
Elementary Particle Physics	2	Semester 2	2			MC1-2	Sci.				
Nuclear Physics 1	2	Semester 1	2			MC1-2	Sci.				
Nuclear Physics 2	2	Semester 2	2			MC1-2	Sci.				
Astrophysics 1	2	Semester 1	2			MC1-2	Sci.				
Astrophysics 2	2	Semester 2	2			MC1-2	Sci.				
Advanced Course on Material Evolution 1	2	Semester 1	2			MC1-2	Sci.				
Advanced Course on Material Evolution 2	2	Semester 2	2			MC1-2	Sci.				
Advanced Course on Structure Formation 1	2	Semester 1	2			MC1-2	Sci.				
Advanced Course on Structure Formation 2	2	Semester 2	2			MC1-2	Sci.				
Advanced Course on Planetary Systems 1	2	Semester 1	2			MC1-2	Sci.				
Advanced Course on Planetary Systems 2	2	Semester 2	2			MC1-2	Sci.				
Planetary Atmospheric Sciences 1	2	Semester 1	2			MC1-2	Sci.				
Planetary Atmospheric Sciences 2	2	Semester 2	2			MC1-2	Sci.				
Advanced Course in Phase Transition of Planetary Materials	2	Semester 1	2			MC1-2	Sci.				
Advanced Course in Planetary Material Science	2	Semester 2	2			MC1-2	Sci.				
Special Lecture of CosmoSciences 1	1	(Intensive)	1			MC1-2	Sci.				
Special Lecture of CosmoSciences 2	1	(Intensive)	1			MC1-2	Sci.				
<b>Doctoral Course</b>											
(Elective Subjects)											
Special Research of CosmoSciences 2	12	Full Year			12	DC1-3	—		<b>Completion Requirements for the Doctoral Course</b> Take at least 30 credits, including credits from a Master's Course. For exceptions, refer to the Hokkaido University Graduate School of Science Regulations.		

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- Semester's name and period are as follows.
  - ※Depending on fiscal year, the semester's ending month is subject to be changed; therefore, check the schedule by the annual event schedule etc.
  - Semester 1 FH: Spring term April~May
  - Semester 1 LH: Summer term June~July
  - Semester 2 FH: Fall term October~November
  - Semester 2 LH: Winter term After December

## Department of Natural History Sciences

Subjects	Credits	Semester FH: First Half LH: Latter Half	Hours per week			Eligible Students	Teacher- training course	Inter- Graduate School Classes	Remarks	Completion Requirements
			Lecture	Seminar	Experiment Practice					
<b>Master's Course</b>										
<b>(Compulsory Subjects)</b>										
Seminar in Natural History Science 1	4	Full Year		2		MC1-2	Sci.			<b>Completion Requirements for Master's Course</b> Take at least 30 credits, including 12 from Compulsory Subjects and 18 or more from Primary Elective Subjects. Credits from Primary Elective Subjects may include credits from: -Inter-Graduate School of Science Subjects -Inter-Graduate School Classes -Subjects from other departments and other graduate schools  Take at least 4 or more credits from Inter-Graduate School Classes among Primary Elective Subjects
Research in Natural History Science 1	8	Full Year			8	MC1-2	Sci.			
<b>(Primary Elective Subjects)</b>										
Introduction to Earth and Planetary System Science	1	Semester 2, FH	2			MC1-2	Sci.	○		
Introduction to Magma Science	1	Semester 1, FH	2			MC1-2	Sci.	○		
Advanced Magma Science	1	Semester 1, LH	2			MC1-2	Sci.			
Advanced Geochemistry	2	Semester 1	2			MC1-2	Sci.			
Introduction to Earth & Planetary Materials	1	Semester 2, FH	2			MC1-2	Sci.			
Advanced Earth & Planetary Materials	1	Semester 2, LH	2			MC1-2	Sci.			
Introduction to Organic Geochemistry	1	Semester 1, FH	2			MC1-2	Sci.			
Advanced Organic Geochemistry	1	(Intensive)	2			MC1-2	Sci.			
Introduction to Geotectonics in Mobile Belts	1	Semester 2, FH	2			MC1-2	Sci.	○		
Advanced Geotectonics in Mobile Belts	1	Semester 2, LH	2			MC1-2	Sci.			
Advanced Seismology	2	Semester 2	2			MC1-2	Sci.			
Introduction to Earth Environmental History	1	(Intensive)	2			MC1-2	Sci.	○		
Advanced Earth Environmental History	1	Semester 2, LH	2			MC1-2	Sci.			
Internal Structure of the Earth	2	Semester 1	2			MC1-2	Sci.			
Advanced Crustal Dynamics	2	Semester 1	2			MC1-2	Sci.			
Introductory Satellite Geodesy	1	Semester 2, FH	2			MC1-2	Sci.	○		
Advanced Satellite Geodesy	1	Semester 2, LH	2			MC1-2	Sci.			
Applied Metrology to Seismology and Volcanology	2	Semester 2	2			MC1-2	Sci.			
Advanced Subsurface Exploration	2	Semester 2	2			MC1-2	Sci.			
Dynamics of Hydrological Cycles	2	Semester 1	2			MC1-2	Sci.			
Advanced Atmospheric Science	2	Semester 2	2			MC1-2	Sci.			
Advanced Physical Oceanography and Climatology	2	Semester 1	2			MC1-2	Sci.			
Prognosis of Earthquakes and Volcanic Eruptions	2	Semester 1	2			MC1-2	Sci.			
Introduction to Biodiversity Study	1	Semester 2, FH	2			MC1-2	Sci.	○		
Advanced Biodiversity Study I	2	Semester 1	2			MC1-2	Sci.			
Advanced Biodiversity Study II	2	Semester 2	2			MC1-2	Sci.			
Biodiversity	2	Semester 2, LH	4			MC1-2	Sci.			
Methods in Biodiversity Studies	2	Semester 1	2			MC1-2	Sci.			
Taxonomy	2	Semester 1	2			MC1-2	Sci.			
Evolutionary Biology	2	Semester 2	2			MC1-2	Sci.			
Advanced Course of Science Technology and Social System I	1	Semester 1, FH	2			MC1-2	TTC	○		
Advanced Course of Science Technology and Social System II	1	Semester 1, LH	2			MC1-2	TTC	○		
Communication in Science and Technology I	1	Semester 1, FH	2			MC1-2	TTC	○		
Communication in Science and Technology II	1	Semester 1, LH	2			MC1-2	TTC	○		
Communication in Science and Technology III	2	Semester 2	2			MC1-2	TTC			
Museum Communication	2	Semester 1 & 2	2	2		MC1-2	TTC	○		
History of Science and Technology	2	Semester 1	2			MC1-2	TTC			
Foundational Philosophy of Science and Technology	2	Semester 1	2			MC1-2	TTC			
Special Lecture on Design for Teaching and Learning of Science Education	2	Semester 1	2			MC1-2	TTC			
Social Construction for Science and Technology I	1	Semester 1, FH	2			MC1-2	TTC	○		
Social Construction for Science and Technology II	1	Semester 1, LH	2			MC1-2	TTC			
Special Lecture on Management for Science Education	2	Semester 2	2			MC1-2	TTC			
Special Lecture on Development in Higher Education	2	Semester 1	2			MC1-2	TTC			
Special Lecture on Natural History Science I	1	(Intensive)	1			MC1-2	Sci.			
Special Lecture on Natural History Science II	1	(Intensive)	1			MC1-2	Sci.			
Special Lecture on Natural History Science III	1	(Intensive)	1			MC1-2	Sci.			
Special Lecture on Natural History Science IV	1	(Intensive)	1			MC1-2	Sci.			
<b>Doctoral Courses</b>										
<b>(Secondary Elective Subjects)</b>										
Seminar in Natural History Sciences 2	6	Full Year		3		DC1-3	--			<b>Completion Requirements for the Doctoral Course</b> Take at least 30 credits, including credits from a Master's Course. For exceptions, refer to the Hokkaido University Graduate School of Science Regulations.
Research in Natural History Sciences 2	12	Full Year			12	DC1-3	--			

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4. Semester's name and period are as follows.

※Depending on fiscal year, the semester's ending month is subject to be changed; therefore, check the schedule by the annual event schedule etc.

- Semester 1 FH: Spring term April~May
- Semester 1 LH: Summer term June~July
- Semester 2 FH: Fall term October~November
- Semester 2 LH: Winter term After December

### Recommended Subjects of Department of Mathematics (Inter-Graduate School Classes)

Subjects	Credits	Semester FH: First Half LH: Latter Half	Hours per week			Eligible Students	Teacher- training course	Inter- Graduate School Classes	Remarks	Completion Requirements
			Lecture	Seminar	Experiment Practice					
<b>Master's Course</b>										
Introduction to Nanotechnology and Nanoscience 1	2	Semester 1, LH	2			MC1-2	--	○		
Introduction to Nanotechnology and Nanoscience 2	2	Semester 2, FH	2			MC1-2	--	○		

### Recommended Subjects of Department of Natural History Sciences (held at the Graduate School of Env. Sci.)

Subjects	Credits	Semester FH: First Half LH: Latter Half	Hours per week			Eligible Students	Teacher- training course	Inter- Graduate School Classes	Remarks	Completion Requirements
			Lecture	Seminar	Experiment Practice					
Fundamental Lecture in Biological Diversity	2	Semester 2, FH	4			MC1-2	--	○		

Note:

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