For entrants in AY 2021

Appended Form 1

Specifications for Major Program

Name of School (Program) [School of Science (Department of Earth and Planetary Systems Science)

F	Program name (Japanese)	#+ h ″ ' « , ÒÛÉߢ ÛÒ
	(English)	Earth and Planetary Systems Science
1.	Degree to be obtained: E	Bachelor of Science

2. Overview

The School of Science at Hiroshima University aims to educate students to steadily learn the basics of natural science, and to foster acute sensitivity for exploring truth, in order to provide professionals with an integrated ability to make judgments based on broad and deep intelligence.

The Earth and Planetary Systems Science Program aims to provide people of talent who have their intellectual base in earth and planetary science and are capable of working as (1) researchers, (2) engineers, and (3) educators in various fields in society. For example, students are expected to become (1) faculty members at a college or researchers in another research institute, (2) civil engineering consultants and engineers in a company related to natural resources, energy, disaster prevention, and information technology, and (3) science teachers in junior and/or senior high schools. In order to educate students to acquire knowledge, specialized skills, and analytic capabilities that cover the wide field of earth and planetary science, and to provide subjects that meet the various interests and characteristics of each student, the program consists of field exercises and graduation research in addition to lectures, practices, and exercises provided as indoor classes.

In this program, students study, from the basics to the application, three categories of subjects required for advanced research in earth and planetary systems science, i.e. (1) minerals, rocks, and ores geology; (2) the solar system, the earth, and the emergence and evolution of life; and (3) the motion mechanisms and internal structure of the solid part of the earth and planets. This program is composed as a bottom-up process that works on a year by year basis to enable students to study earth and planetary science from its basics and finally become capable of the application and practice required for state-of-the-art research.

3. Diploma policy (policy for awarding degrees and goal of the program)

This program aims to educate students to become people of talent who can work actively, with an international point of view, as researchers, engineers, and educators in fields related to earth and planetary systems science, in which various areas of earth and planetary science are amalgamated. This program will award the degree bachelor of science to students who have acquired the capabilities described below and earned the required credits defined for the educational course:

- i The basic knowledge of mathematics, physics, chemistry, biology, and earth and planetary science required for studying a wide variety of areas of earth and planetary systems science;
- í The basic skills in English and information processing required for studying a wide variety of areas of earth and

planetary systems science;

- í The capability for reading academic documents related to earth and planetary science in Japanese and English, and understanding and examining structures and phenomena from the microscopic to the macroscopic level; and
- í The capability for performing specialized research related to earth and planetary systems science, organizing the results into a thesis, and presenting it in English.
- 4. Curriculum policy (policy for organizing and implementing the curriculum)

This program has been designed to educate students through the study, first of all, of the wide range of basics in earth and planetary systems science that form a fusion of the various areas of the field, before advancing to further specialized areas.

í In the first year, students study subjects to learn a wide range of the basics of mathematics, physics, chemistry, biology, and earth and planetary science in liberal arts education and specialized education. In addition to this, they

their first and second years to understand basics of those subjects.

Requirements for when a student in a department other than the Department of Earth and Planetary Systems Science chooses this program are separately stipulated based on the provisions regarding transfer between schools/departments.

6. Obtainable qualifications

- 1: Educational personnel certification
 - (1) Type 1 License for Junior High School Teacher (Science)
 - (2) Type 1 License for High School Teacher (Science)
- 2: Curator license
- 3: Assistant registered surveyor

7. Class subjects and their contents

* For the class subjects, refer to the subject table in Attachment 1.

* For the details of the class subjects, refer to the syllabus that is published for each academic year.

8. Academic achievement

The evaluation criteria are specified for each evaluation item for academic achievement, and the level of achievement against the criteria is designated at the end of the semester.

The evaluation score for each evaluation item is converted to a numerical value (S = 4, A = 3, B = 2, and C = 1) and the evaluation standard for academic achievement, from when the student entered the university to the end of the last semester, is determined using these values while applying weightings. The evaluation standards consist of three levels, i.e. Excellent, Very Good, and Good.

Evaluation of academic	Converted
achievement	value
S (90 or more points)	4
A (80 – 89 points)	3
B (70 – 79 points)	2
C (60 – 69 points)	1

Acadomic achiovomont	Evaluation
	criteria
Excellent	3.00 - 4.00
Very Good	2.00 – 2.99
Good	1.00 – 1.99

* Refer to the relationship between evaluation items and evaluation criteria described in Attachment 2.

* Refer to the relationship between evaluation items and class subjects described in Attachment 3.

* Refer to the curriculum map in Attachment 4.

9>, Graduation thesis (graduation research) (meaning, student allocation, timing, etc.)

1. Meaning

To demonstrate achievement in the bachelor's course as a whole.

2. Timing of student allocation

At the beginning of the fourth academic year. To be allocated to a laboratory, students must satisfy the "Conditions for Starting Graduation Research." For the details, refer to Study Guidance for the Earth and Planetary Science Program in the "Students Handbook" (received when the student enters the university).

3. Method of student allocation

If the number of students who wish to be allocated to each member of faculty varies significantly, the faculty member to which students are allocated for graduation research is determined based on their academic score at the end of the third academic year.

10>, Responsibility

(1) Responsibility for PDCA (plan, do, check, and act) cycle

If the number of students who wish to be allocated to each member of faculty varies significantly, the faculty member to which students are allocated for graduation research is determined based on their academic score at the end of the third academic year.



(Specialized Education)

								Year (*The	r in wh e lower fic	ich th jure me	e subje ans seme	ct is t ster)(N	aken ote 1)	
Type	Subject type	Requir	ed f	Class subjects etc	No. of	Type of	1st g	rade	2nd g	jrade	3rd g	rade	4th g	rade
.)	Subject type	credit	ts		credits	registration	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
						-	1	2	3	4	5	6	7	8
				Introduction to Physics A	2		2							
				Introduction to Chemistry A	2		2							
				Introduction to Biological Sciences A	2		2							
				Introduction to Earth and Planetary Sciences A	2		2							
			10	Field Excursion for Earth Science A	1		1							
			19	Tectonics of the Earth	2	Required		2						
				Introduction to Earth and Planetary Sciences B	2			2						
	Pagia Crasializad Cubicata			Basics of Earth and Planetary Materials Science	2				2					
	Basic Specialized Subjects			Geologic Mapping	2					2				
				English for Earth and Planetary Sciences I	2					2				
				Introduction to Mathematics	2		0							
				Introduction to Information Mathematics	2			0						
		2	2 or	Introduction to Physics B	2	Elective/required		0						
		m	iore	Introduction to Chemistry B	2			0						
				Introduction to Biological Sciences B	2			0						
				At least 1 subject (2 credits) from the five subject	cts above	9								
				Sedimentology and Paleontology I	2				2					
				Physics of Earth and Planetary Interiors I	2				2					
				Solid Geochemistry I	2				2					
				Optical crystallography laboratory	1				1					
				Practice for Basics of Earth and Planetary	1				(1)					
				Materials Science Physics of Farth and Planetary Interiors II	9				-	0				
				Farth and Planetary Materials Science I	2					0				
			0.0	Potrology	2	D 1				0				
			33	Petrology laboratory	1	Requirea				0				
				Practice for Earth and Planetary Materials	1					0				
				Science I Field Excursion for Earth Science B	1					0				
				English for Earth and Planetary Sciences II	2					٠.	2			
		84		Practice of Earth and Planetary Systems Science	-						•			
		(Note		A (Field Work) (Note 7)	4						4			
		0)		B (Field Work)	2						2			
				Special Study for Graduation (Note 8)	Each 4								4	4
				Advanced Mathematics	2						0			
				Advanced Physics	2					0				
		2	2 or	Advanced Chemistry	2	Elective/required						\bigcirc		
		m	iore	Advanced Biology	2						0			
				Advanced Earth and Planetary Science	2							0		
	Specialized Subjects			At least 1 subject (2credits) from the five subject	ts above									
				Astrobiology	2							0		
				Earth and Planetary Materials Science II	2					0				
				Sedimentology and Paleontology II	2					0				
				Exercise of Astronomy & Planetary Science	1					0				
				Physics of Earth and Planetary Interiors A	2						0			
				Solid Geochemistry II	2						0			
				Practice for Earth and Planetary Materials Science II	1						0			
				Material evolution in the solar system	2						0			
		20	0 or	Mathematical and numerical methods in the physics of Earth and Planetary Interiors A	1						0			
		m	iore	Rock Deformation I	2	Elective/required					0			
				Diserte of Forth and Disertons Interious D	0						0	\sim		
				Cosmochemistry and Geochemistry	2							0		
					4							0		
				Kock Deformation II	2							Ο		
				Mathematical and numerical methods in the physics of Earth and Planetary Interiors B	1							0		
				"Special Lectures in Earth and Planetary							\cap	\bigcirc	\cap	\cap
				Systems Science" (Note 10)	0						0		<u> </u>	0
				Surveying (Note 9)	2				\sim			← (, →	
				"Basic Specialized Subjects" and "Specialized	1				U					
				Subjects" offered by other programs of School		Free elective	0	0	0	0	0	0	0	0
	Any subject	Q		(Note 11)			\bigcirc	\circ	\bigcirc	\bigcirc	0	\circ	\circ	\cap
	Total	0		(Note 11)			U	U	U	U	U	U	U	U
	IULAI	128												

Sheet 2

Academic achievements of Earth and Planetary Systems Science Program

Relationships between the evaluation items and evaluation criteria

		Academic achievements		Evaluation criteria	
		Evaluation items	Excellent	Very Good	Good
	(1)	To acquire knowledge and understanding about the origin and development of the solar system and the earth.	To be able to very thoroughly understand technical knowledge about the birth and development of the solar system and the earth.	To be able to thoroughly understand technical knowledge about the birth and development of the solar system and the earth.	To be able to understand technical knowledge about the birth and development of the solar system and the earth.
	(2)	To acquire understanding and technical knowledge about earthquake phenomena and the earth's internal structure.	To be able to very thoroughly understand technical knowledge about earthquake phenomena and the earth's internal structure.	To be able to thoroughly understand technical knowledge about earthquake phenomena and the earth's internal structure.	To be able to understand technical knowledge about earthquake phenomena and the earth's internal structure.
ing	(3)	To acquire understanding and technical knowledge about the progress of Earth surface environment and biosphere.	To be able to thoroughly understand technical knowledge about the progress of supracrustal environment and biosphere.	To be able to understand technical knowledge about the progress of the supracrustal environment and biosphere.	To be able to understand technical knowledge about the progress of the supracrustal environment and biosphere.
nderstandi	(4)	Being able to collect materials by basic ways. Being able to find issues from specific phenomena and explain them. Being able to make clearly arguable discussion and effective presentation.	Being able to collect materials by basic ways, find issues from specific phenomena and explain them and to make clearly arguable discussion and effective presentation very superbly.	Being able to collect materials by basic ways, find issues from specific phenomena and explain them and to make clearly arguable discussion and effective presentation superbly.	Being able to collect materials by basic ways, find issues from specific phenomena and explain them and to make clearly arguable discussion and effective presentation.
ledge and Ui	(5)	To be able to express opinions by thinking of peace from multiple perspectives, including understanding various causes and complex aspects which hinder the realization of peace, as well as conflicts between ideal and reality. Also, to be able to explain one's knowledge.	To be able to express opinions by thinking of peace from multiple perspectives, including understanding various causes and complex aspects which hinder the realization of peace, as well as conflicts between ideal and reality. Also, to be able to explain one's knowledge very well.	To be able to express opinions by thinking of peace from multiple perspectives, including understanding various causes and complex aspects which hinder the realization of peace, as well as conflicts between ideal and reality. Also, to be able to explain one's knowledge well.	To be able to express opinions by thinking of peace from multiple perspectives, including understanding various causes and complex aspects which hinder the realization of peace, as well as conflicts between ideal and reality. Also, to be able to explain one's knowledge.
Know	(6)	To be able to explain historical or modern issues that human and society face (social structure and the way science should be, significance of intellectual activities, and significance of multicultural relations and coexistence with nature) from multiple perspective.	To be able to excellently explain historical or modern issues that human and society face (social structure and the way science should be, significance of intellectual activities, and significance of multicultural relations and coexistence with nature) from multiple perspective.	To be able to explain historical or modern issues that human and society face (social structure and the way science should be, significance of intellectual activities, and significance of multicultural relations and coexistence with nature) from multiple perspective in a good way.	To be able to explain historical or modern issues that human and society face (social structure and the way science should be, significance of intellectual activities, and significance of multicultural relations and coexistence with nature) from multiple perspective.
	(7)	Being able to explain the process of construction and development in each academic discipline. Being able to explain how each academic discipline relates to culture and society.	Being able to explain the process of construction and development of each academic discipline and very superbly explain the relationship between each academic discipline and culture and society.	Being able to explain the process of construction and development of each academic discipline and superbly explain the relationship between each academic discipline and culture and society.	Being able to explain the process of construction and development of each academic discipline and explain the relationship between each academic discipline and culture and society.



Sheet 3

Relationships between the evaluation items and class subjects

			Evaluation items Evaluation items Type of (1) (2) (4) (5) (1) Comprehensive Abilitie Type of (1) (2) (4) (5) (1) <th c<="" th=""><th></th><th></th><th></th></th>														<th></th> <th></th> <th></th>																						
Subject Classification									K	nowled	lge and	d Unde	erstand	ing										Ał	oilities	and S	kills							Comp	prehen	sive Ab	ilities		Total
Subject	Coltra Nu	G 11	Type of course	C 1	(1)		(2)		(3)	((4)	(5)	(6)	(7)	(1)	((2)	(3)	((4)	(5)	(6)	((7)	(1)	(2)	(:	3)	values of
Classification	Subject Name	Credits	registratio	Grade	Weighted values of	Weighted	Weighte values of	d f Weighte	Weighted d values of	l Weighted	Weighted values of	l Weighter	Weighted values of	Weighted	Weighted values of	Weighted	Weighted values of	Weighted	Weighted values of	Weighted	Weighted values of	Weighted	Weighted values of	Weighted	Weighted values of	Weighted	Weighted values of	Weighted	Weighted values of	Weighted	Weighted values of	Weighted	Weighted values of	Weighted	Weighted values of	Weighted	Weighted values of	Weighted	evaluation items in
					evaluatio n items in	values of evaluatio	evaluation items i	o values o in evaluatio	f evaluatio n items i	values of evaluatio	evaluatio n items ir	values of n evaluation	evaluatio n items in	values of evaluatio	evaluatio n items in	values of evaluatio	evaluatio n items in	values of evaluatio	evaluatio n items ir	values of evaluatio	evaluatio n items ir	values of evaluatio	evaluatio n items in	values of evaluatio	evaluatio n items ir	values of evaluatio	evaluatio n items in	values of evaluatio	≥valuatio n items in	values of evaluatio	the subject								
					the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	:he subject	n items	
Liberal Arts Education	Peace Science Courses	2	Elective/red uired	1 1									100	1																									100
Liberal Arts Education	Introduction to University Education	2	Required	1											100	1																							100
Liberal Arts Education	Introductory Seminar for First-Year Students	2	Required	1							100	1																											100
Liberal Arts Education	Area Courses	8	Elective/red uired	1-4													100	1																					100
Liberal Arts Education	Basic English Usage I	1	Required	1																	100	1																	100
Liberal Arts Education	Basic English Usage II	1	Required	2																	100	1																	100
Liberal Arts Education	Communication I	2	Required	1																	100	1																	100
Liberal Arts Education	Communication II	2	Required	2																	100	1																	100
Liberal Arts Education	Foreign Languages: Basic Studies I	1	Elective/red uired	1																	100	1																	100
Liberal Arts Education	Foreign Languages: Basic Studies II	1	Elective/red uired	1 1																	100	1																	100
Liberal Arts Education	Introduction to Information and Data Sciences	2	Required	1																									100	1									100
Liberal Arts Education	Ground zero programming	2	Elective/r equired	2																									100	1									100
Liberal Arts Education	Fundamental Date Science	2	Elective/r equired	2																									100	1									100
Liberal Arts Education	Health and Sports Courses	2	Elective/red uired	1-2																											100	1							100
Liberal Arts Education	Social Cooperation Courses	0	Free elective	$1 \sim 2$											100	1																							100
Liberal Arts Education	Calculus I	2	Elective/red uired	1																			100	1															100
Liberal Arts Education	Calculus II	2	Elective/red uired	2																			100	1													ĺ		100
Liberal Arts Education	Linear Algebra I	2	Elective/red uired	1																			100	1													ĺ		100
Liberal Arts Education	Linear Algebra II	2	Elective/red uired	2																			100	1															100
Liberal Arts Education	Experimental Methods and Laboratory Work in Physics I	1	Elective/red uired	2																			100	1															100
Liberal Arts Education	Experimental Methods and Laboratory Work in Physics II	1	Elective/red uired	2																			100	1															100
Liberal Arts Education	Experimental Methods and Laboratory Work in Chemistry I	1	Elective/red uired	3																			100	1													ľ		100
Liberal Arts Education	Experimental Methods and Laboratory Work in Chemistry II	1	Elective/red uired	3																			100	1															100
Liberal Arts Education	Experimental Methods and Laboratory Work in Biology I	1	Elective/red uired	1																			100	1															100
Liberal Arts Education	Experimental Methods and Laboratory Work in Biology II	1	Elective/red uired	1																			100	1															100
Liberal Arts Education	Experimental Methods and Laboratory Work in Earth Sciences I	1	Elective/red uired	1																			100	1															100
Liberal Arts Education	Experimental Methods and Laboratory Work in Earth Sciences II	1	Elective/red uired	1																			100	1															100

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												K	nowled	lge and	l Unde	rstand	ing										Ab	lities a	and Sk	ills							Comp	rehensi	ive Abi	lities		Total voighted
Subject						Type of course		((1)	(2)	(3)	(4	4)	()	5)	(6)	(7)	()	1)	(2	2)	(3	3)	(4	1)	(5)	(6)	•	(7))	(1	L)	(2)	(3)	,	alues of
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Specialize Education	d I	ntroductio	n to Phy A	sics	2	Required	1	subject		subject		subject		subject		subject		subject		subject		subject		subject		100	1	subject		subject		subject	30	inject		subject		subject		ubject		100
Specialite Education		inino di Oberi	iction le istry A		2	Required	1																			100	1															100
Specialize Educatio	d	Introd Biological	uction to Science	s A	2	Required	1																			100	1															100
Specialize Education	d i ar	Introduct id Planeta	ion to Ea ry Scien	rth es A	2	Required	1	25	1	25	1	25	1													25	1															100
Specialize Education	d Fi	eld Excur Scie	sion for nce A	Earth	1	Required	1																					100	1													100
Specializ Education	d,	Tectonics	of the E	arth r	2	Required	2			100	1																															100
Specialize Education	t ٤	introduct ind Planet	on to Ea ary Scie B	rth ices	2	Required	2	25	1	25	1	25	1													25	1															100
Specialize Education	d I	Planetar; Sci	, Harth a 7 Materi: ence	nc. ds	2	Required	3					100	1																													100
Specialize Educatio		Geologi	s Mappir	g.	2	Required	4	100	1																																	100
	ţ	English fo Planetary	F Barth Science		2	Required	4																	50	1	50	1															100
Specialize Education	d 1	Introdu Math 1	uction to emati	ci di																																						

Required 3

			Evaluation items Knowledge and Understanding Abilities and Skills Comprehensive Abilities															1																					
									K	nowled	lge and	l Unde	erstand	ing										Al	bilities	and S	kills							Com	orehens	sive A	oilities		Total weighted
Subject	Subject News	Caralita	Type of course	Carda	(1)	((2)	((3)	(4)	(5)	(6)		(7)	((1)		(2)	((3)	((4)	(5)	((6)	((7)	(1)	()	2)	(3)	values of
Classification	Subject Mane	Creats	registratio	Graue	Weighted values of	Weighted	Weighter values of	Weightee	Weighted values of	d Weighte	d values of	Weightee	d values of	i Weighted	Weighted values of	Weighted	items in																						
					evaluatio n items in	values of evaluatio	evaluatio n items in	values of evaluatio	evaluatio n items in	values of evaluatio	evaluatio n items ir	values of evaluatio	evaluatio n items in	values of evaluatio	evaluatio n items ir	values of evaluatio	evaluation n items i	values of evaluation	evaluatio n items in	n evaluation	f evaluatio n items i	values of n evaluatio	f evaluatio n items ir	values of evaluatio	evaluatio n items ii	values of evaluatio	evaluatio n items ir	values of evaluatio	evaluatio n items in	values of evaluatio	evaluatio n items ir	values of evaluatio	evaluatio n items in	values of evaluatio	evaluatio n items in	values of evaluatio	evaluatio n items in	values of evaluatio	the subject
					the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	the subject	n items	1												
Specialized Education	Special Study for Graduation	各4	Required	7-8																													33.33	1	33.33	1	33.33	1	100
Specialized Education	Advanced Mathematics	2	Elective/rec uired	5																			100	1															100
Specialized Education	Advanced Physics	2	Elective/rec uired	4																			100	1															100
Specialized Education	Advanced Chemistry	2	Elective/rec uired	6																			100	1															100
Specialized Education	Advanced Biology	2	Elective/rec uired	5																			100	1															100
Specialized Education	Advanced Earth and Planetary Science	2	Elective/req uired	6															100	1																			100
Specialized Education	Astrobiology	2	Elective/req uired	5	100	1																																	100
Specialized Education	Practice for Earth and Planetary Materials Science II	1	Elective/req uired	5					100	1																													100
Specialized Education	Sedimentology and Paleontology II	2	Elective/req uired	4					100	1																													100
Specialized Education	Exercise of Astronomy & Planetary Science	1	Elective/rec uired	4	100	1																																	100
Specialized Education	Physics of Earth and Planetary Interiors A	2	Elective/req uired	5			100	1																															100
Specialized Education	Solid Geochemistry II	2	Elective/rec uired	5	100	1																																	100
Specialized Education	Earth and Planetary Materials Science II	2	Elective/rec uired	4					100	1																													100
Specialized Education	Material evolution in the solar system	2	Elective/rec uired	5	50	1													50	1																			100
Specialized Education	Mathematical and numerical methods in the physics of Earth and Planetary Interiors A	1	Elective/rec uired	5			100	1																															100
Specialized Education	Rock Deformation I	2	Elective/rec uired	5			100	1																															100
Specialized Education	Physics of Earth and Planetary Interiors B	2	Elective/rec uired	6			100	1																															100
Specialized Education	Cosmochemistry and Geochemistry	2	Elective/rec uired	6	50	1													50	1																			100
Specialized Education	Rock Deformation II	2	Elective/req uired	6			100	1																															100
Specialized Education	Mathematical and numerical methods in the physics of Earth and Planetary Interiors B	1	Elective/rec uired	6			100	1																															100
Specialized Education	Surveying	2	Elective/rec uired	5-8															100	1																			100
Specialized Education	Geochemistry and Geophysics Internship	1	Elective/rec uired	3															100	1																			100

Sheet 4

Curriculum Map of Earth and Planetary Systems Science Program



