

# For entrants in AY 2025

Appended Form 1

## Specifications for Major Program

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

|                         |                                     |
|-------------------------|-------------------------------------|
| Program name (Japanese) | 地球惑星システム学プログラム                      |
| (English)               | Earth and Planetary Systems Science |

- Degree to be obtained: Bachelor of Science
- 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 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.
- 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:

  - 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;
  - The basic skills in English and information processing required for studying a wide variety of areas of earth and

planetary systems science;

- 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
- 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.

- 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 learn foreign languages, mainly English, and the basics of information processing, in order to acquire the fundamental skills required for studying earth and planetary science. Students also acquire basic knowledge related to geology in liberal arts seminars and field excursions.
- In the second year, in specialized education, students study the basics of geology, physics of earth and planetary interiors, and geo- and cosmochemistry, in order to acquire basic capabilities required for the specialized study of a variety of areas in earth and planetary systems science. Students also acquire skills in basic English that can be immediately useful for specialized areas in the classes that are specifically designed for earth and planetary science. The field excursion is conducted in a different location to that of the first year, to enhance students' knowledge of geology.
- In the third year, students enhance their knowledge and skills in specialized areas through lectures and exercises mainly related to elective subjects for specialized education. Students also acquire skills in intermediate English that can be immediately useful for specialized areas in the classes that are specifically designed for earth and planetary science. They conduct geological surveys and indoor experiments as practice in order to acquire the practical capabilities required for research activities such as observation in the field, data processing, report preparation, and presentation.
- In the fourth year, students are allocated to a laboratory to conduct graduation research on their own topics. They acquire knowledge and skills related to specialized areas through their activities in the laboratory, and develop communication and presentation abilities in seminars and presentation practice.

Academic achievement is evaluated based on grade scores for the subjects, and the level of achievement against the target defined for this program.

#### 5. Start time and acceptance conditions

Students of the Department of Earth and Planetary Science choose this program when they enter our university. There is no problem even if the student did not take a course in geoscience at high school, since the program is designed to allow the student to study earth and planetary systems science from the basics to specialized knowledge in a step-by-step process, starting upon entering the university.

The curriculum is composed with the expectation that students have studied mathematics, physics and chemistry at high school, and they are required to take the specified fundamental subjects in mathematics, physics and chemistry in

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

| Academic achievement | 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.

# Table of Registration Standards for Earth and Planetary Systems Science Program (Entrants of 2025)

Refer to Study Guidance for the Earth and Planetary Systems Science Program for requirements for attending the course.

Students are allowed to take class subjects provided in other programs and schools, and in other universities, in addition to the class subjects listed in this table, and the credit for those subjects that the faculty committee of the Earth and Planetary Systems Science Program certifies is accepted as the required credit for graduation.

\* Students who have earned the required credits (refer to the Students Handbook for the details) can acquire the type 1 license for junior high school teacher (science), the type 1 license for senior high school teacher (science), the certification for assistant registered surveyor, and the curator license.

## (Liberal Arts Education)

| Type   | Subject type                             | Required<br>No. of<br>credits                    | Class subjects, etc.  | No. of<br>credits                            | Type of<br>course<br>registration             | Year in which the subject is taken<br>(*The lower figure means semester)(Note 1) |                   |           |      |           |      |           |      |  |  |  |  |  |
|--|--|--|---|--|---|--|-------------------|-----------|------|-----------|------|-----------|------|--|--|--|--|--|
|  |  |  |   |  |   | 1st grade  |                   | 2nd grade |      | 3rd grade |      | 4th grade |      |  |  |  |  |  |
|  |  |  |   |  |   | Spring   | Fall              | Spring    | Fall | Spring    | Fall | Spring    | Fall |  |  |  |  |  |
|  |  |  |   |  |   | 1  | 2                 | 3         | 4    | 5         | 6    | 7         | 8    |  |  |  |  |  |
| Liberal Arts Education Subjects                                    | Peace Science Courses                    |  | 2   | From "Peace Science Courses"                 | Each 2  | Elective/required  | ○                 |           |      |           |      |           |      |  |  |  |  |  |
|  | Basic Courses in<br>University Education | Introduction to University Education             | 2   | Introduction to University Education         | 2   | Required   | ②                 |           |      |           |      |           |      |  |  |  |  |  |
|  |  | Introductory Seminar for First-Year Students     | 2   | Introductory Seminar for First-Year Students | 2   | Required   | ②                 |           |      |           |      |           |      |  |  |  |  |  |
|  |  | Advanced Seminar (Note 2)                        |   | (0)  | Advanced Seminar                              | 1  | Free elective     | ○         | ○    |           |      |           |      |  |  |  |  |  |
|  |  | Area Courses                                     |   | 8  | From "Area Courses" (Note 3)                  | 1or2   | Elective/required | ○         | ○    | ○         | ○    |           |      |  |  |  |  |  |
|  | Common Subjects                          | Foreign Languages<br>English (Note 4)(Note<br>5) | Basic English Usage   | 2  | Basic English Usage I                         | 1  | Required          | ①         |      |           |      |           |      |  |  |  |  |  |
|  |  |  |   | Basic English Usage II                       | 1   |  |                   | ①         |      |           |      |           |      |  |  |  |  |  |
|  |  |  | Communication I   | 2  | Communication IA                              | 1  | Required          | ①         |      |           |      |           |      |  |  |  |  |  |
|  |  |  |   | Communication IB                             | 1   | ①  |                   |           |      |           |      |           |      |  |  |  |  |  |
|  |  |  | Communication II  | 2  | Communication IIA                             | 1  | Required          |           | ①    |           |      |           |      |  |  |  |  |  |
|  |  |  |   | Communication IIB                            | 1   |  |                   | ①         |      |           |      |           |      |  |  |  |  |  |
|  |  |  | Non-English Foreign Languages<br>(Select one language from<br>German, French, Spanish,<br>Russian, Chinese, Korean, and<br>Arabic) (Note 5) | 2  | Foreign Languages: Basic Studies I            | 1  | Elective/required | ○         |      |           |      |           |      |  |  |  |  |  |
|  |  |  |   | Foreign Languages: Basic Studies II          | 1   | Elective/required  | ○                 |           |      |           |      |           |      |  |  |  |  |  |
|  |  | I and II must be the same language               |   |  |   |  |                   |           |      |           |      |           |      |  |  |  |  |  |
|  |  | Information and Data Science Courses             |   | 4  | Introduction to Information and Data Sciences | 2  | Required          | ②         |      |           |      |           |      |  |  |  |  |  |
|  |  |  |   | Starting Programming from Scratch            | 2   |  |                   | ②         |      |           |      |           |      |  |  |  |  |  |
|  | Health and Sports Courses (Note 6)       |  | (0)   | From "Health and Sports Courses"             | 1or2  | Free elective  | ○                 | ○         |      |           |      |           |      |  |  |  |  |  |
|  | Social Cooperation Courses (Note 7)      |  | (0)   | From "Social Cooperation Courses"            | 1or2  | Free elective  | ○                 | ○         |      |           |      |           |      |  |  |  |  |  |
|  | Foundation Courses                       |  | 4   | Calculus I                                   | 2   | Elective/required  | ○                 |           |      |           |      |           |      |  |  |  |  |  |
|  |  |  |   | Calculus II                                  | 2   |  |                   | ○         |      |           |      |           |      |  |  |  |  |  |
|  |  |  |   | Linear Algebra I                             | 2   |  | ○                 |           |      |           |      |           |      |  |  |  |  |  |
|  |  |  |   | Linear Algebra II                            | 2   |  |                   | ○         |      |           |      |           |      |  |  |  |  |  |
|  |  |  | 2 subjects (4 credits) from the four subjects above   |  |   |  |                   |           |      |           |      |           |      |  |  |  |  |  |
| 4  |  |  | Experimental Methods and Laboratory Work in Physics I   | 1  | Elective/required                             |  | ○                 |           |      |           |      |           |      |  |  |  |  |  |
|  |  |  | Experimental Methods and Laboratory Work in Physics II  | 1  |   |  | ○                 |           |      |           |      |           |      |  |  |  |  |  |
|  |  |  | Experimental Methods and Laboratory Work in Chemistry I   | 1  |   |  |                   | ○         |      |           |      |           |      |  |  |  |  |  |
|  |  |  | Experimental Methods and Laboratory Work in Chemistry II  | 1  |   |  |                   | ○         |      |           |      |           |      |  |  |  |  |  |
|  |  |  | Experimental Methods and Laboratory Work in Biology I   | 1  |   |  | ○                 |           |      |           |      |           |      |  |  |  |  |  |
|  |  |  | Experimental Methods and Laboratory Work in Biology II  | 1  |   |  | ○                 |           |      |           |      |           |      |  |  |  |  |  |
|  |  |  | Experimental Methods and Laboratory Work in Earth Sciences I  | 1  |   | ○  |                   |           |      |           |      |           |      |  |  |  |  |  |
|  |  |  | Experimental Methods and Laboratory Work in Earth Sciences II   | 1  |   | ○  |                   |           |      |           |      |           |      |  |  |  |  |  |
| I and II of the same subject (4 credits) from the 8 subjects above |  |  |   |  |   |  |                   |           |      |           |      |           |      |  |  |  |  |  |
| Total (Liberal Arts Education Subjects)                            |  | 34   |   |  |   |  |                   |           |      |           |      |           |      |  |  |  |  |  |

(Note 1) The 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 year, 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) The credit for "Advanced Seminar" is accepted as credit for the category of "Any subject".

(Note 3) It 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 certification must take the subject "Japanese Constitution" in the "Human & Social Science Subjects".

Credits earned through the subject "Advanced English for Communication", "Foreign Languages: Intensive Studies" and "Overseas Language Seminar (German, French, Spanish, Russian, Chinese, and Korean)" in "Foreign Languages" are accepted as the credits required for "Human & Social Science Subjects".

(Note 4) You can transfer the credits acquired by completing courses of self-learning "Online English Seminar I, II, III" are accepted as the credit for the subject "Communication I and II". Excessive number of credits earned in the "Area Courses" and "Social Cooperation Courses" in which the language of instruction is in English is accepted as credits for the graduation requirement for English language courses.

(Note 5) Credit Approval for Foreign Language Proficiency Tests, etc.: For details, please refer to the sections relating to the English of Liberal Arts Education and "Handling of Credit Approval for Foreign Language Proficiency Tests, etc." in the Student Handbook.

(Note 6) The credit for "Health and Sports Courses" is accepted as credit for the category of "Any subject".

(Note 7) The credit for "Social Cooperation Courses" is accepted as credit for the category of "Any subject".

\* Note for the "Specialized Education Subjects" listed in the next page and after

(Note 8) To achieve the 84 credits required for the "Specialized Education Subjects", it is required to earn 8 or more credits for elective required subjects and free elective subjects, as well as 52 credits for required subjects and 24 credits for elective required subjects.

(Note 9) To attend the subject "Special Study for Graduation", it is required to earn 108 or more credits of the 128 credits required for graduation, including "Practice of Earth and Planetary Systems Science A (Field Work)" and "Practice of Earth and Planetary Systems Science B (Experimental Study)".

(Note 10) The class of the subject "Surveying" is provided biannually.

(Note 11) The classes of "Special Lectures in Earth and Planetary Systems Science" are provided as an integrated course within a certain period of time (after the 5th semester).

(Note 12) Because 128 credits are required for graduation, it is required to earn 10 or more credits regardless of the categorization of Liberal Arts Education Subjects and Specialized Education Subjects, in addition to the required credits for each subject category (118 credits in total that consist of 34 credits for Liberal Arts Education Subjects and 84 credits for Specialized Education Subjects).

However, the credit for the subjects described below is not accepted as the required credit for graduation: For the details of subjects related to educational personnel certification, refer to the list of required credits in "Acquisition of Educational Personnel Certification" in the Student Handbook.

- Any credit that exceeds 8 credits for "Area Courses"

- Any credit for subjects only related to educational personnel certification

- Credits for "Experiments in General Physics A", "Experiments in Chemistry A", "Laboratory Work in Biology A" and "Experiments in General Geology A"

- "Basic Specialized Subjects" and "Specialized Subjects" provided in another program in another school (except those that are admitted by the faculty committee of Earth and Planetary Systems Science Program)

(Specialized Education)

| Type                           | Subject type               | Required<br>No. of<br>credits                               |  | Class subjects, etc.                                       | No. of<br>credits  | Type of<br>course<br>registration          | Year in which the subject is taken<br>(*The lower figure means semester)(Note 1)     |                   |                   |      |           |      |           |      |   |   |   |   |  |  |
|--------------------------------|----------------------------|---|--|--|--|--|--|-------------------|-------------------|------|-----------|------|-----------|------|---|---|---|---|--|--|
|                                |                            |   |  |  |  |  | 1st grade  |                   | 2nd grade         |      | 3rd grade |      | 4th grade |      |   |   |   |   |  |  |
|                                |                            |   |  |  |  |  | Spring   | Fall              | Spring            | Fall | Spring    | Fall | Spring    | Fall |   |   |   |   |  |  |
|                                |                            |   |  |  |  |  | 1  | 2                 | 3                 | 4    | 5         | 6    | 7         | 8    |   |   |   |   |  |  |
| Specialized Education Subjects | Basic Specialized Subjects | 19  |  | Introduction to Physics A                                  | 2  | Required                                   | ②  |                   |                   |      |           |      |           |      |   |   |   |   |  |  |
|                                |                            |   |  | Introduction to Chemistry A                                | 2  |  | ②  |                   |                   |      |           |      |           |      |   |   |   |   |  |  |
|                                |                            |   |  | Introduction to Biological Sciences A                      | 2  |  | ②  |                   |                   |      |           |      |           |      |   |   |   |   |  |  |
|                                |                            |   |  | Introduction to Earth and Planetary Sciences A             | 2  |  | ②  |                   |                   |      |           |      |           |      |   |   |   |   |  |  |
|                                |                            |   |  | Field Excursion for Earth Science A                        | 1  |  | ①  |                   |                   |      |           |      |           |      |   |   |   |   |  |  |
|                                |                            |   |  | Tectonics of the Earth                                     | 2  |  |  | ②                 |                   |      |           |      |           |      |   |   |   |   |  |  |
|                                |                            |   |  | Introduction to Earth and Planetary Sciences B             | 2  |  |  | ②                 |                   |      |           |      |           |      |   |   |   |   |  |  |
|                                |                            |   |  | Basics of Earth and Planetary Materials Science            | 2  |  |  |                   | ②                 |      |           |      |           |      |   |   |   |   |  |  |
|                                |                            |   |  | Geologic Mapping   | 2  |  |  |                   |                   | ②    |           |      |           |      |   |   |   |   |  |  |
|                                |                            |   |  | English for Earth and Planetary Sciences I                 | 2  |  |  |                   |                   | ②    |           |      |           |      |   |   |   |   |  |  |
|                                |                            |   | 2 or<br>more   |  | Introduction to Mathematics  |  | 2  | Elective/required | ○                 |      |           |      |           |      |   |   |   |   |  |  |
|                                |                            |   |  | Introduction to Information Mathematics                    | 2  |  | ○  |                   |                   |      |           |      |           |      |   |   |   |   |  |  |
|                                |                            |   |  | Introduction to Physics B                                  | 2  |  | ○  |                   |                   |      |           |      |           |      |   |   |   |   |  |  |
|                                |                            |   |  | Introduction to Chemistry B                                | 2  |  | ○  |                   |                   |      |           |      |           |      |   |   |   |   |  |  |
|                                |                            |   |  | Introduction to Biological Sciences B                      | 2  |  | ○  |                   |                   |      |           |      |           |      |   |   |   |   |  |  |
|                                |                            | At least 1 subject (2 credits) from the five subjects above |  |  |  |  |  |                   |                   |      |           |      |           |      |   |   |   |   |  |  |
|                                |                            | Specialized Subjects  | 84<br>(Note<br>8)  | 33   |  | Sedimentology and Paleontology I           | 2  | Required          |                   |      |           | 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 Materials Science           | 1  |  |                   |                   |      | ①         |      |           |      |   |   |   |   |  |  |
|                                |                            |   |  |  | Physics of Earth and Planetary Interiors II                            | 2  |  |                   |                   |      |           | ②    |           |      |   |   |   |   |  |  |
|                                |                            |   |  |  | Earth and Planetary Materials Science I                                | 2  |  |                   |                   |      |           | ②    |           |      |   |   |   |   |  |  |
|                                |                            |   |  |  | Petrology  | 2  |  |                   |                   |      |           | ②    |           |      |   |   |   |   |  |  |
|                                |                            |   |  |  | Petrology laboratory   | 1  |  |                   |                   |      |           | ①    |           |      |   |   |   |   |  |  |
|                                |                            |   |  |  | Practice for Earth and Planetary Materials Science I                   | 1  |  |                   |                   |      |           | ①    |           |      |   |   |   |   |  |  |
|                                |                            |   |  |  | Field Excursion for Earth Science B                                    | 1  |  |                   |                   |      |           | ①    |           |      |   |   |   |   |  |  |
|                                |                            |   |  |  | English for Earth and Planetary Sciences II                            | 2  |  |                   |                   |      |           |      | ②         |      |   |   |   |   |  |  |
|                                |                            |   |  |  | Practice of Earth and Planetary Systems Science A (Field Work)         | 4  |  |                   |                   |      |           |      |           | ④    |   |   |   |   |  |  |
|                                |                            |   |  |  | Practice of Earth and Planetary Systems Science B (Experimental Study) | 2  |  |                   |                   |      |           |      | ②         |      |   |   |   |   |  |  |
|                                |                            |   |  |  | Special Study for Graduation (Note 9)                                  | Each 4                                     |  |                   |                   |      |           |      |           |      | ④ | ④ |   |   |  |  |
|                                | 2 or<br>more               |   |  |  |  | Advanced Mathematics                       | 2  |                   | Elective/required |      |           |      |           |      | ○ |   |   |   |  |  |
|                                |                            |   |  |  |  | Advanced Physics                           | 2  |                   |                   |      |           |      |           |      | ○ |   |   |   |  |  |
|                                |                            |   |  |  |  | Advanced Chemistry                         | 2  |                   |                   |      |           |      |           |      |   | ○ |   |   |  |  |
|                                |                            |   |  |  |  | Advanced Biology                           | 2  |                   |                   |      |           |      |           |      | ○ |   |   |   |  |  |
|                                |                            |   |  |  | Advanced Earth and Planetary Science                                   | 2  |  |                   |                   |      |           |      |           | ○    |   |   |   |   |  |  |
|                                |                            |   |  | At least 1 subject (2credits) from the five subjects above |  |  |  |                   |                   |      |           |      |           |      |   |   |   |   |  |  |
|                                | 20 or<br>more              |   |  |  |  |  | Astrobiology   | 2                 | Elective/required |      |           |      |           |      | ○ |   |   |   |  |  |
|                                |                            |   |  |  |  |  | Earth and Planetary Materials Science II   | 2                 |                   |      |           |      |           | ○    |   |   |   |   |  |  |
|                                |                            |   |  |  |  |  | Sedimentology and Paleontology II  | 2                 |                   |      |           |      |           | ○    |   |   |   |   |  |  |
|                                |                            |   |  |  |  |  | Exercise of Astronomy & Planetary Science  | 1                 |                   |      |           |      |           | ○    |   |   |   |   |  |  |
|                                |                            |   |  |  |  |  | Physics of Earth and Planetary Interiors A   | 2                 |                   |      |           |      |           |      | ○ |   |   |   |  |  |
|                                |                            |   |  |  |  |  | Solid Geochemistry II  | 2                 |                   |      |           |      |           |      | ○ |   |   |   |  |  |
|                                |                            |   |  |  |  |  | Practice for Earth and Planetary Materials Science II                                | 1                 |                   |      |           |      |           |      | ○ |   |   |   |  |  |
|                                |                            |   |  |  |  |  | Material evolution in the solar system   | 2                 |                   |      |           |      |           |      | ○ |   |   |   |  |  |
|                                |                            |   |  |  |  |  | Mathematical and numerical methods in the physics of Earth and Planetary Interiors A | 1                 |                   |      |           |      |           |      | ○ |   |   |   |  |  |
|                                |                            |   |  |  |  |  | Rock Deformation I   | 2                 |                   |      |           |      |           |      | ○ |   |   |   |  |  |
|                                |                            |   |  |  |  |  | Physics of Earth and Planetary Interiors B   | 2                 |                   |      |           |      |           |      |   | ○ |   |   |  |  |
|                                |                            |   |  |  |  |  | Cosmochemistry and Geochemistry  | 2                 |                   |      |           |      |           |      |   | ○ |   |   |  |  |
|                                |                            |   |  |  |  | Rock Deformation II                        | 2  |                   |                   |      |           |      |           |      | ○ |   |   |   |  |  |
|                                |                            |   | Mathematical and numerical methods in the physics of Earth and Planetary Interiors B                   |  |  | 1  |  |                   |                   |      |           |      |           | ○    |   |   |   |   |  |  |
|                                |                            |   | “Special Lectures in Earth and Planetary Systems Science” (Note 11)                                    |  |  |  |  |                   |                   |      |           |      |           | ○    | ○ | ○ | ○ |   |  |  |
|                                |                            |   | Surveying (Note 10)  |  |  | 2  |  |                   |                   |      |           |      |           |      | ← | ○ | → |   |  |  |
|                                |                            |   | Geochemistry and Geophysics Internship   |  |  | 1  |  |                   |                   |      |           |      |           | ○    |   |   |   |   |  |  |
|                                |                            |   | “Basic Specialized Subjects” and “Specialized Subjects” offered by other programs of School of Science |  |  |  | Free elective  | ○                 |                   | ○    | ○         | ○    | ○         | ○    | ○ | ○ | ○ | ○ |  |  |
| Any subject                    |                            |   |  | 10   | (Note 12)  |  |  |                   |                   |      |           | ○    | ○         | ○    | ○ | ○ | ○ | ○ |  |  |
| Total                          |                            |   |  | 128  |  |  |  |                   |                   |      |           |      |           |      |   |   |   |   |  |  |

## 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   |
| Knowledge and Understanding | (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.  |
|                             | (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.   |
|                             | (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.  |
|                             | (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. |
|                             | (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.   |

| Academic achievements   |     |   | Evaluation criteria   |  |   |
|-------------------------|-----|---|---|--|---|
| Evaluation items        |     |   | Excellent   | Very Good  | Good  |
| Abilities and Skills    | (1) | To acquire the ability to apply and develop the basic knowledge of earth and planetary science by organizing it.  | To be able to very thoroughly acquire the ability to apply and develop basic knowledge of earth and planetary science by organizing it.   | To be able to thoroughly acquire the ability to apply and develop the basic knowledge of earth and planetary science by organizing it.   | To be able to acquire the ability to apply and develop basic knowledge of earth and planetary science by organizing it.   |
|                         | (2) | Reading related papers and acquiring the ability of understanding the contents.<br>Verbal or written regular/daily communication can be carried out using foreign languages.<br>Understand different languages and cultures by using multiple foreign languages.                | Being able to read related papers and acquire the ability of understanding the contents very well.<br>Verbal or written regular/daily communication can be carried out using foreign languages.<br>Understand different languages and cultures by using multiple foreign languages. | Being able to read related papers and acquire the ability of understanding the contents well.<br>Verbal or written regular/daily communication can be carried out using foreign languages.<br>Understand different languages and cultures by using multiple foreign languages. | Being able to read related papers and acquire the ability of understanding the contents.<br>Verbal or written regular/daily communication can be carried out using foreign languages.<br>Understand different languages and cultures by using multiple foreign languages. |
|                         | (3) | 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 understand, learn and very superbly 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 fully 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.  |
|                         | (4) | Learn field research method and acquire results and acquire ability of making a presentation  | Learn field research method and being able to summarize results and extremely acquire ability of making a presentation  | Learning field research method and being able to summarize results and sufficiently acquire ability of making a presentation   | Learn field research method and being able to summarize results and acquire ability of making a presentation  |
|                         | (5) | To be able to learn to practice methods of presenting, collecting, examining, and analyzing geosciences data.   | To be able to very thoroughly learn and practice methods of proposal, collection, examining and analysis concerning geosciences data.   | To be able to thoroughly learn and practice methods of proposal, collection, examining and analysis concerning geosciences data.   | To be able to learn and practice methods of presenting, collecting, examining, and analyzing geosciences data.  |
|                         | (6) | To understand and explain the moral and social issues needed to utilize information. Also, to learn basic knowledge, skills, and attitudes pertaining to information.   | To understand the moral and social issues needed to utilize information. Also, to learn basic skills, knowledge, and attitudes related to information. In addition, based on these, to be able to process, input, and output information fairly appropriately.                      | To understand the moral and social issues needed to utilize information. Also, to learn basic skills, knowledge, and attitudes related to information. In addition, based on these, to be able to process, input, and output information fairly appropriately.                 | To understand the moral and social issues needed to utilize information. Also, to learn basic skills, knowledge, and attitudes related to information. In addition, based on these, to be able to process, input, and output information fairly appropriately.            |
|                         | (7) | To be able to scientifically explain the need for fitness and health promotion. Also, through practice of sports, to be able to understand and explain the significance of practicing sports for life and the importance of an appropriate attitude and sense of collaboration. | Through practice of sports, to be able to very thoroughly understand and scientifically explain the need for fitness and health promotion, the significance of practicing physical exercises for life, and the importance of an appropriate attitude and sense of collaboration.    | Through practice of sports, to be able to thoroughly understand and scientifically explain the need for fitness and health promotion, the significance of practicing physical exercises for life, and the importance of an appropriate attitude and sense of collaboration.    | Through practice of sports, to be able to understand and scientifically explain the need for fitness and health promotion, the significance of practicing physical exercises for life, and the importance of an appropriate attitude and sense of collaboration.          |
| Comprehensive Abilities | (1) | Acquire the ability and skills of setting team themes.  | Being able to acquire superbly the ability and skills of setting team themes.   | Being able to acquire well the ability and skills of setting team themes.  | Being able to acquire the ability and skills of setting team themes.  |
|                         | (2) | Learning the ability •skills to plan and carry out research plans.  | Being able to learn superbly the ability •skills to plan and carry out research plans.  | Being able to learn well the ability •skills to plan and carry out research plans.   | Being able to learn the ability •skills to plan and carry out research plans.   |
|                         | (3) | Having acquiring the ability •skills to compile research results and make the presentation.   | Being able to compile research results and make the presentation superbly.  | Being able to compile research results and make the presentation well.   | Being able to compile research results and make the presentation.   |

## Placement of Liberal Arts Education in the Major Program

The liberal arts education in this program aims to build the academic foundation required for the specialized education, and develops the capability for autonomous study, and scientific intelligence, based on the ability to collect, analyze, and criticize data. Also, it allows students to establish a point of view for insight into the essentials and background of phenomena, to acquire the linguistic ability and concern for peace which are required of a citizen of the world, to integrate a wide variety of knowledge into a system of intelligence that is truly useful for problem solving, and to acquire the ability to pioneer and promote interdisciplinary and integrated study beyond the existing framework of the academic areas.



### 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 subject |
|--|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|--|
|  |   |  |  |  | Knowledge and Understanding                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Abilities and Skills                               |  |  |  |  |  |  |  |  |  | Comprehensive Abilities                            |  |  |  |  |     |  |
|  |   |  |  |  | (1)  | (2)  | (3)  | (4)  | (5)  | (6)  | (7)  | (1)  | (2)  | (3)  | (4)  | (5)  | (6)  | (7)  | (1)  | (2)  | (3)  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |     |  |
| Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject            | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject |  |  |     |  |
| Liberal Arts Education                             | Peace Science Courses   | 2  | Elective/required                                  | 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                             | Advanced Seminar  | 1  | Free elective                                      | 1-2  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Area Courses  | 8  | Elective/required                                  | 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/required                                  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Foreign Languages: Basic Studies II                           | 1  | Elective/required                                  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Introduction to Information and Data Sciences                 | 2  | Required   | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Starting Programming from Scratch                             | 2  | Required   | 2  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Health and Sports Courses                                     | 0  | Free elective                                      | 1-2  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Social Cooperation Courses                                    | 0  | Free elective                                      | 1~2  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Calculus I  | 2  | Elective/required                                  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Calculus II   | 2  | Elective/required                                  | 2  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Linear Algebra I  | 2  | Elective/required                                  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Linear Algebra II   | 2  | Elective/required                                  | 2  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Experimental Methods and Laboratory Work in Physics I         | 1  | Elective/required                                  | 2  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Experimental Methods and Laboratory Work in Physics II        | 1  | Elective/required                                  | 2  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Experimental Methods and Laboratory Work in Chemistry I       | 1  | Elective/required                                  | 3  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Experimental Methods and Laboratory Work in Chemistry II      | 1  | Elective/required                                  | 3  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Experimental Methods and Laboratory Work in Biology I         | 1  | Elective/required                                  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Experimental Methods and Laboratory Work in Biology II        | 1  | Elective/required                                  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Experimental Methods and Laboratory Work in Earth Sciences I  | 1  | Elective/required                                  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |
| Liberal Arts Education                             | Experimental Methods and Laboratory Work in Earth Sciences II | 1  | Elective/required                                  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |  |

| Subject Classification                             | Subject Name   | Credits  | Type of course registration                        | Grade  | Evaluation items                                   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Total weighted values of evaluation items in the subject |     |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|
|  |  |  |  |  | Knowledge and Understanding                        |  |  |  |  |  |  |  |  |  |  |  |  |  | Abilities and Skills                               |  |  |  |  |  |  |  |  |  | Comprehensive Abilities                            |  |  |  |  |     |
|  |  |  |  |  | (1)  | (2)  | (3)  | (4)  | (5)  | (6)  | (7)  | (1)  | (2)  | (3)  | (4)  | (5)  | (6)  | (7)  | (1)  | (2)  | (3)  |  |  |  |  |  |  |  |  |  |  |  |  |     |
| Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject             | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject | Weighted values of evaluation items in the subject |  |  |     |
| Specialized Education                              | Introduction to Physics A                                      | 2  | Required   | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Introduction to Chemistry A                                    | 2  | Required   | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Introduction to Biological Sciences A                          | 2  | Required   | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Introduction to Earth and Planetary Sciences A                 | 2  | Required   | 1  | 25   | 1  | 25   | 1  | 25   | 1  |  |  |  |  |  |  |  |  |  |  |  | 25   | 1  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Field Excursion for Earth Science A                            | 1  | Required   | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Tectonics of the Earth   | 2  | Required   | 2  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Introduction to Earth and Planetary Sciences B                 | 2  | Required   | 2  | 25   | 1  | 25   | 1  | 25   | 1  |  |  |  |  |  |  |  |  |  |  |  | 25   | 1  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Basics of Earth and Planetary Materials Science                | 2  | Required   | 3  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Geologic Mapping   | 2  | Required   | 4  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | English for Earth and Planetary Sciences I                     | 2  | Required   | 4  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 50   | 1  | 50   | 1  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Introduction to Mathematics                                    | 2  | Elective/required                                  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Introduction to Information Mathematics                        | 2  | Elective/required                                  | 2  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Introduction to Physics B                                      | 2  | Elective/required                                  | 2  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Introduction to Chemistry B                                    | 2  | Elective/required                                  | 2  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Introduction to Biological Sciences B                          | 2  | Elective/required                                  | 2  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Sedimentology and Paleontology I                               | 2  | Required   | 3  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Physics of Earth and Planetary Interiors I                     | 2  | Required   | 3  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Solid Geochemistry I   | 2  | Required   | 3  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Optical crystallography laboratory                             | 1  | Required   | 3  | 25   | 1  | 25   | 1  | 50   | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Practice for Basics of Earth and Planetary Materials Science   | 1  | Required   | 3  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Physics of Earth and Planetary Interiors II                    | 2  | Required   | 4  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Earth and Planetary Materials Science I                        | 2  | Required   | 4  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Petrology  | 2  | Required   | 4  | 50   | 1  | 50   | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Petrology laboratory   | 1  | Required   | 4  | 25   | 1  | 25   | 1  | 50   | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Practice for Earth and Planetary Materials Science I           | 1  | Required   | 4  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Field Excursion for Earth Science B                            | 1  | Required   | 4  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100  | 1  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | English for Earth and Planetary Sciences II                    | 2  | Required   | 5  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Practice of Earth and Planetary Systems Science A (Field Work) | 4  | Required   | 5  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 50   | 1  | 50   | 1  |  |  |  |  |  |  | 100 |
| Specialized Education                              | Practice of Earth and Planetary Systems Science B (Field Work) | 2  | Required   | 5  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 50   | 1  | 50   | 1  |  |  |  |  |  |  | 100 |

[illegible]

## Curriculum Map of Earth and Planetary Systems Science Program

| Academic achievements<br>Evaluation items |  | 1st grade   |   | 2nd grade   |   | 3rd grade   |   | 4th grade       |               |
|---|--|---|---|---|---|---|---|-----------------|---------------|
|   |  | Spring semester                                   | Fall semester                                     | Spring semester   | Fall semester   | Spring semester   | Fall semester   | Spring semester | Fall semester |
| Knowledge and Understanding               | To acquire knowledge and understanding about the origin and development of the solar system and the earth.   | Introduction to Earth and Planetary Sciences A(◎) | Introduction to Earth and Planetary Sciences B(◎) | Optical crystallography laboratory(◎)                           | Geologic Mapping(◎)                                     | Material evolution in the solar system(○)   | Cosmochemistry and Geochemistry(○)  |                 |               |
|   |  |   |   | Solid Geochemistry I(◎)   | Petrology(◎)  | Solid Geochemistry II(○)  |   |                 |               |
|   |  |   |   |   | Petrology laboratory(◎)                                 | Astrobiology(○)   |   |                 |               |
|   |  |   |   |   | Exercise of Astronomy & Planetary Science(○)            |   |   |                 |               |
|   | To acquire understanding and technical knowledge about earthquake phenomena and the earth's internal structure.  | Introduction to Earth and Planetary Sciences A(◎) | Introduction to Earth and Planetary Sciences B(◎) | Optical crystallography laboratory(◎)                           | Physics of Earth and Planetary Interiors II(◎)          | Physics of Earth and Planetary Interiors A(○)   | Physics of Earth and Planetary Interiors B(○)   |                 |               |
|   |  |   | Tectonics of the Earth(◎)                         | Physics of Earth and Planetary Interiors I(◎)                   | Petrology(◎)  | Mathematical and numerical methods in the physics of Earth and Planetary Interiors A(○) | Mathematical and numerical methods in the physics of Earth and Planetary Interiors B(○) |                 |               |
|   |  |   |   |   | Petrology laboratory(◎)                                 | Rock Deformation I(○)   | Rock Deformation II(○)  |                 |               |
|   | To acquire understanding and technical knowledge about the progress of Earth surface environment and biosphere.  | Introduction to Earth and Planetary Sciences A(◎) | Introduction to Earth and Planetary Sciences B(◎) | Basics of Earth and Planetary Materials Science(◎)              | Sedimentology and Paleontology II(◎)                    | Practice for Earth and Planetary Materials Science II(○)                                |   |                 |               |
|   |  |   |   | Sedimentology and Paleontology I(◎)                             | Petrology laboratory(◎)                                 |   |   |                 |               |
|   |  |   |   | Optical crystallography laboratory(◎)                           | Earth and Planetary Materials Science II(○)             |   |   |                 |               |
|   |  |   |   | Practice for Basics of Earth and Planetary Materials Science(◎) | Earth and Planetary Materials Science I(◎)              |   |   |                 |               |
|   |  |   |   |   | Practice for Earth and Planetary Materials Science I(○) |   |   |                 |               |
|   | 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.  | Introductory Seminar for First-Year Students(◎)   |   |   |   |   |   |                 |               |
|   |  | Advanced Seminar(△)                               | Advanced Seminar(△)                               |   |   |   |   |                 |               |
|   | 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. | Peace Science Courses(○)                          |   |   |   |   |   |                 |               |
|   |  |   |   |   |   |   |   |                 |               |
|   |  |   |   |   |   |   |   |                 |               |
|   |  |   |   |   |   |   |   |                 |               |
|   | 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.    | Introduction to University Education(◎)           |   |   |   |   |   |                 |               |
|   |  | Social Cooperation Courses(△)                     |   |   |   |   |   |                 |               |
|   |  |   |   |   |   |   |   |                 |               |
|   | 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.  | Area Courses(○)                                   | Area Courses(○)                                   | Area Courses(○)   | Area Courses(○)   |   |   |                 |               |
|   |  |   |   |   |   |   |   |                 |               |

| Academic achievements   |   | 1st grade   |  | 2nd grade  |  | 3rd grade  |  | 4th grade                        |                                  |
|-------------------------|---|---|--|--|--|--|--|----------------------------------|----------------------------------|
| Evaluation items        |   | Spring semester   | Fall semester  | Spring semester  | Fall semester                                  | Spring semester  | Fall semester                            | Spring semester                  | Fall semester                    |
| Abilities and Skills    | To acquire the ability to apply and develop the basic knowledge of earth and planetary science by organizing it.  |   |  | Geochemistry and Geophysics Internship (○)                   |  | Material evolution in the solar system (○)                         | Cosmochemistry and Geochemistry (○)      |                                  |                                  |
|                         |   |   |  |  |  | Surveying (○)  | Advanced Earth and Planetary Science (○) |                                  |                                  |
|                         |   |   |  |  |  |  |  |                                  |                                  |
|                         |   |   |  |  |  |  |  |                                  |                                  |
|                         | Reading related papers and acquiring the ability of understanding the contents.<br>Reading related papers and acquiring the ability of understanding the contents.<br>Verbal or written regular/daily communication can be carried out using foreign languages.<br>Understand different languages and cultures by using multiple foreign languages. | Basic English Usage I (◎)   | Basic English Usage II (◎)                                 |  | English for Earth and Planetary Sciences I (◎) | English for Earth and Planetary Sciences II (◎)                    |  |                                  |                                  |
|                         |   | Communication I A (◎)   | Communication II A (◎)                                     |  |  |  |  |                                  |                                  |
|                         |   | Communication I B (◎)   | Communication II B (◎)                                     |  |  |  |  |                                  |                                  |
|                         |   | Foreign Languages: Basic Studies I (△)                            |  |  |  |  |  |                                  |                                  |
|                         |   | Foreign Languages: Basic Studies II (△)                           |  |  |  |  |  |                                  |                                  |
|                         | 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.  | Introduction to Physics A (◎)                                     | Introduction to Earth and Planetary Sciences B (◎)         | Experimental Methods and Laboratory Work in Chemistry I (○)  | English for Earth and Planetary Sciences I (◎) | Advanced Mathematics (○)   | Advanced Chemistry (○)                   |                                  |                                  |
|                         |   | Introduction to Chemistry A (◎)                                   | Introduction to Information Mathematics (○)                | Experimental Methods and Laboratory Work in Chemistry II (○) | Advanced Physics (○)                           | Advanced Biology (○)   | Advanced Earth and Planetary Science (○) |                                  |                                  |
|                         |   | Introduction to Biological Sciences A (◎)                         | Introduction to Physics B (○)                              |  |  |  |  |                                  |                                  |
|                         |   | Introduction to Earth and Planetary Sciences A (◎)                | Introduction to Chemistry B (○)                            |  |  |  |  |                                  |                                  |
|                         |   | Introduction to Mathematics (○)                                   | Introduction to Biological Sciences B (○)                  |  |  |  |  |                                  |                                  |
|                         |   | Calculus I (○)  | Calculus II (○)  |  |  |  |  |                                  |                                  |
|                         |   | Linear Algebra I (○)  | Linear Algebra II (○)                                      |  |  |  |  |                                  |                                  |
|                         |   | Experimental Methods and Laboratory Work in Earth Sciences I (○)  | Experimental Methods and Laboratory Work in Physics I (○)  |  |  |  |  |                                  |                                  |
|                         |   | Experimental Methods and Laboratory Work in Earth Sciences II (○) | Experimental Methods and Laboratory Work in Physics II (○) |  |  |  |  |                                  |                                  |
|                         |   |   | Experimental Methods and Laboratory Work in Biology I (○)  |  |  |  |  |                                  |                                  |
|                         |   |   | Experimental Methods and Laboratory Work in Biology II (○) |  |  |  |  |                                  |                                  |
|                         |   |   |  |  |  |  |  |                                  |                                  |
|                         | Learn field research method and acquire results and acquire ability of making a presentation  | Field Excursion for Earth Science A (◎)                           |  |  | Field Excursion for Earth Science B (◎)        | Practice of Earth and Planetary Systems Science A (Field Work) (◎) |  |                                  |                                  |
|                         |   |   |  |  |  | Practice of Earth and Planetary Systems Science B (Field Work) (◎) |  |                                  |                                  |
|                         |   |   |  |  |  |  |  |                                  |                                  |
|                         | To be able to learn to practice methods of presenting, collecting, examining, and analyzing geosciences data.   |   |  |  |  | Practice of Earth and Planetary Systems Science A (Field Work) (◎) |  |                                  |                                  |
|                         |   |   |  |  |  | Practice of Earth and Planetary Systems Science B (Field Work) (◎) |  |                                  |                                  |
|                         |   |   |  |  |  |  |  |                                  |                                  |
|                         | To understand and explain the moral and social issues needed to utilize information. Also, to learn basic knowledge, skills, and attitudes pertaining to information.   | Introduction to Information and Data Sciences (◎)                 | Starting Programming from Scratch (◎)                      |  |  |  |  |                                  |                                  |
|                         |   |   |  |  |  |  |  |                                  |                                  |
|                         | To be able to scientifically explain the need for fitness and health promotion. Also, through practice of sports, to be able to understand and explain the significance of practicing sports for life and the importance of an appropriate attitude and sense of collaboration.   | Health and Sports Courses (△)                                     | Health and Sports Courses (△)                              |  |  |  |  |                                  |                                  |
|                         |   |   |  |  |  |  |  |                                  |                                  |
|                         |   |   |  |  |  |  |  |                                  |                                  |
| Comprehensive Abilities | Acquire the ability and skills of setting team themes.  |   |  |  |  |  |  | Special Study for Graduation (◎) | Special Study for Graduation (◎) |
|                         |   |   |  |  |  |  |  |                                  |                                  |
|                         | Learning the ability・skills to plan and carry out research plans.   |   |  |  |  |  |  | Special Study for Graduation (◎) | Special Study for Graduation (◎) |
|                         |   |   |  |  |  |  |  |                                  |                                  |
|                         | Having acquiring the ability・skills to compile research results and make the presentation.  |   |  |  |  |  |  | Special Study for Graduation (◎) | Special Study for Graduation (◎) |
|                         |   |   |  |  |  |  |  |                                  |                                  |

Liberal Arts Education Subjects

Basic Specialized Subjects

Specialized Education Subjects

Graduation Thesis

(◎) Required

(○) Elective/required

(△) Free elective