Doctoral program for World-leading Innovative & Smart Education

The Frontier Development Program for Genome Editing

AY2025

Separate volume of the student handbook

Graduate School of Integrated Sciences for Life
Graduate School of Biomedical and Health Sciences
Hiroshima University

Table of Contents

* This English version is not an official translation of the original Japanese document and may be used for reference purposes only. In cases where any differences occur between the English version and the original Japanese version, the Japanese version shall prevail.

1. Mission and Vision Statements

The Frontier Development Program for Genome Editing (hereinafter referred to as the "Genome Editing Program") is built on curricula led by world-class domestic and overseas genome editing researchers. We will develop the following human resources who can flexibly respond to changes in industry structure on new industries as well as changes in social trends for it.

① Developers of industrial genome editing technologies：We aim to nurture corporate researchers to acquire the know-how to effectively use genome editing technology.
Students will acquire the precision genetic modification methods, such as gene knock-in and single nucleotide modification, in addition to the method of applying genome editing technology to various species.

② Researchers of genome editing-based therapies and drug discovery：Genome editing is expected to be a new technology that can be directly linked to the treatment of diseases. We aim to nurture researchers who conduct translational research using cell production technology for disease treatment.

③ Developers of basic research in genome editing：We aim to nurture researchers who have the competitiveness and motivation to catch up with the development speed of overseas genome editing technology. Students will acquire not only the current genome editing technology, but also the skills to develop new technologies, such as gene modification and gene delivery.

④ Entrepreneurs of venture business related to genome editing：We aim to nurture researchers who have the mindset to plan value creation in new industrial fields, and link it to new startups based on the research results of genome-editing technology. To this end, we provide basic entrepreneurial skills training and practical training based on their own research topic in collaboration with some training programs in the university, such as the entrepreneurship education program and the seed discovery program for venture creation.

This program aims to train professionals who can take the lead in creating new industries in the field of biotechnology through these efforts.

2. Curriculum Policies

This program trains human resources who will contribute to the development of industrial technologies that will play a central role in the future industrial structure and lead to the creation of new industries contributing to economic development. Genome editing technology is expected to be used in a wide range of biotechnology industries from basics to applications, and there is an urgent need to train human resources who have mastered using this technology. Therefore, we will train researchers to freely edit the genomes of microorganisms and cultured cells, researchers to realize the creation of useful varieties, researchers to develop genome editing technologies in drug discovery, development and treatment, and researchers to develop basic technologies. In addition, we will train venture entrepreneurs who will develop genome editing technologies in Japan and overseas.

In this program, 12 specialized program subjects are offered to train the above-mentioned human resources while ratifying the curriculum policy of each degree program of the Graduate School. Students take courses and earn credits in accordance with the completion requirements of either Life Science Course of Medical Course.

The thesis research is carried out under the guidance of the primary advisor. The research topic, the guidance system, the research plan, the research progress, the interim presentation and the recording of the research results (Master's thesis) are voluntarily recorded and managed by the student in the learning portfolio, etc. with the confirmation of the primary and secondary advisors.

In Life Science Course, Qualifying Examination 1 (QE1) is taken in the second semester of the second year, Qualifying Examination 2 (QE2) as a Ph.D. candidate examination is taken in the second semester of the fourth year, and the final examination for the Ph.D. thesis is taken in the last year. In Medical Course, the Qualifying Examination (QE1) is taken in the second semester of the second year, the Qualifying Examination 2 (QE2) as a Ph.D. candidate examination is taken in the second semester of the third year, and the final examination for the doctoral dissertation is taken in the final year.

3. Diploma Policies

This program will award one of the following degrees to students who have acquired the knowledge, skills, and attitudes described below and who have passed the dissertation defense and final examination, while ratifying the degree policy of the program of the Graduate School to which they belong: Doctor of Philosophy in Engineering, Doctor of Philosophy in Agriculture, Doctor of Philosophy in Science, Doctor of Philosophy, Doctor of Philosophy in Medical Science, Doctor of Philosophy in Dental Science, or Doctor of Philosophy in Pharmaceutical Science.

Knowledge, skills, and attitudes to be acquired
(1) Basic knowledge of the principles of genome editing technology
(2) Knowledge and skills in genome editing through genome modification in microorganisms
(3) Knowledge and skills in genome editing for genetic modification in cultured cells
(4) Knowledge and skills in genome editing for genetic modification in animals and plants
(5) Ability to adapt to the rapid development of genome editing technology
(6) Knowledge and skills to assess the safety of genome editing
(7) Knowledge of the creation and management of intellectual property for genome editing
(8) Knowledge of social acceptance and ethics of genome editing
(9) High ethical standards for research in each area of expertise

・Doctor of Philosophy in Engineering
The Ph.D. degree in Engineering is awarded to the students who have acquired the above-mentioned knowledge, skills, and attitudes, and who have submitted a doctoral dissertation on the affiliated degree program of the Graduate School based on the research results mainly obtained from an engineering perspective, and who have passed the dissertation defense and final examination.

・Doctor of Philosophy in Agriculture
The Ph.D. degree in Agriculture is awarded to the students who have acquired the above-mentioned knowledge, skills, and attitudes, and who have submitted a doctoral dissertation on the affiliated degree program of the Graduate School based on the research results mainly obtained from an agricultural perspective, and who have passed the dissertation defense and final examination.

・Doctor of Philosophy in Science
The Ph.D. degree in Science is awarded to the students who have acquired the above-mentioned knowledge, skills, and attitudes, and who have submitted a doctoral dissertation on the affiliated degree program of the Graduate School based on the research results mainly obtained from a perspective of life sciences, and who have passed the dissertation defense and final examination.

・Doctor of Philosophy

The Ph.D. degree is awarded to the students who have acquired the above-mentioned knowledge, skills, and attitudes, and who have submitted a doctoral dissertation on the affiliated degree program of the Graduate School based on the research results mainly obtained from an interdisciplinary perspective, and who have passed the dissertation defense and final examination.

・Doctor of Philosophy in Medical Science

The Ph.D. degree in Medical Science is awarded to the students who have acquired the above-mentioned knowledge, skills, and attitudes, and who have submitted a doctoral dissertation on the affiliated degree program of the Graduate School based on the research results mainly obtained from a perspective of medical sciences, and who have passed the dissertation defense and final examination.

・Doctor of Philosophy in Dental Science

The Ph.D. degree in Dental Science is awarded to the students who have acquired the above-mentioned knowledge, skills, and attitudes, and who have submitted a doctoral dissertation on the affiliated degree program of the Graduate School based on the research results mainly obtained from a perspective of dental sciences, and who have passed the dissertation defense and final examination.

・Doctor of Philosophy in Pharmaceutical Science

The Ph.D. degree in Pharmaceutical Science is awarded to the students who have acquired the above-mentioned knowledge, skills, and attitudes, and who have submitted a doctoral dissertation on the affiliated degree program of the Graduate School based on the research results mainly obtained from a perspective of pharmaceutical sciences, and who have passed the dissertation defense and final examination.

4. Academic Regulations of the Program

○Academic Regulations of the Frontier Development Program for Genome Editing

April 1, 2019

Approved by the general meeting of the Frontier Development Program for Genome Editing

Purpose of Regulations:

Article 1. These regulations shall stipulate the matters necessary for course requirements of the Frontier Development Program for Genome Editing in addition to what is stipulated in the Hiroshima University Graduate School Regulations (January 15, 2008 Regulation No.2) and the Regulations for the Hiroshima University Graduate School Program for World-leading Innovative & Smart Education (March 29, 2019 Regulation No. 30).

Objectives of Education and Research:

Article 2. The Frontier Development Program for Genome Editing aims to to cultivate human resources that contribute to industrial technology development, which will lead to the creation of new industries that will be at the core of future industrial structures and contribute to economic development.

Standard Period of Study:

Article 3. Standard period of study of Life Science Course is five years, and that of Medial Course is four years.

Special Course for third-year transfer:

Article 4. [1] Life Science Course offers a special three-year curriculum for the third-year transfer students.

[2] Standard period of study of above special course is three years.

Curriculum:

Article 5. The curricula of the Frontier Development Program for Genome Editing shall be as shown in Appended Table 1 through Table 3.

Courses:

Article 6. [1] The courses and the number of credits to be taken in the Frontier Development Program for Genome Editing shall be as shown in Appended Table 1 through Table 3.

[2] The class schedule shall be announced at the beginning of the academic year.

Standards for Calculating Credits:

Article 7. The calculation of the number of credits for each course shall be in accordance with the standards of the Graduate School or department that offers the courses listed in the previous article.

Methods of Course-Taking:

Article 8. [1] Students must complete the prescribed procedures for the courses they intend to take under the guidance of their primary advisor, during the specified period each semester.

[2] A student who fails to follow the procedures prescribed in the preceding paragraph shall not

be allowed to take the course. However, in cases where special circumstances are acknowledged, the student may be allowed to take the course with the approval of both their primary advisor and the course instructor.

[3] Students who are not authorized by the Frontier Development Program for Genome Editing to attend its courses must complete the required procedures within the designated timeframe each semester.

Academic Advisors:

Article 9. [1] Students must submit the "Academic Advisor Request Form," along with the approval of their prospective academic advisors, to both the general meeting of the Frontier Development Program for Genome Editing (hereinafter referred to as the "program general meeting") and to their affiliated Graduate School.

[2] The program's general meeting shall appoint faculty advisors for each student as follows, based on the application outlined in the preceding paragraph, to provide guidance in the student's coursework and research:

(1) The primary advisor must be a member of both the student's affiliated graduate program and the Frontier Development Program for Genome Editing.

(2) A student may have two or more secondary advisors.

(3) At least one of the secondary advisors must be a member of the Frontier Development Program for Genome Editing.

(4) At least one of the secondary advisors must be appointed from a program other than the student's affiliated graduate program and may also be selected from another graduate school or university.

(5) In cases where one of the secondary advisors simultaneously meets the requirements of the previous two items, a faculty member other than those specified in the previous two items may be appointed as the secondary advisor.

(6) Other than the above items, students must follow the bylaws of the affiliated Graduate School.

[3] To change academic advisors, the student must submit the "Request for Change of Academic Advisor" to the program general meeting with the approval of the academic advisors and must be approved at the meeting.

Qualifying Examinations 1:

Article 10. [1] Students who meet the criteria specified in Article 11 below may take the Qualifying Examination 1 (QE1) specified in the following items. Students who pass the QE1 shall continue to the third year of the Frontier Development Program for Genome Editing.

[2] The examination consists of three components: a written exam on course work, an oral exam on research work, learning outcomes recorded in an e-learning portfolio.

Eligibility for Qualifying Examination 1:

Article 11. [1] The eligibility requirements for the QE1 for the five-year curriculum are as follows.

(1) Students must have earned (or will have earned) the required number of credits and be expected to complete the affiliated Graduate School master's course.

(2) By the end of the second year of a five-year curriculum, the student must have earned (or will have earned) 29 or more credits of the program completion requirements, as specified in Appended Table 1.

[2] The eligibility requirements for the QE1 for the four-year curriculum are as follows.

(1) Students must have earned (or will have earned) the certain number of credits at the end of the second year in the affiliated Graduate School master's course.

(2) By the end of the second year of a four-year curriculum, the student must have earned (or will have earned) 20 or more credits of the program completion requirements, as specified in Appended Table 3.

Qualifying Examinations 2:

Article 12. [1] Students recognized by the program director as being on track to earn (will have earned) the required number of credits for completion of both the affiliated Graduate School and the Frontier Development Program for Genome Editing are eligible to take the Qualifying Examination 2 (QE2), which serves as the PhD candidacy examination, as outlined in the respective sections below.

[2] The examination consists of two components: an oral exam on the PhD thesis proposal, learning outcomes recorded in the e-learning portfolio.

[3] As a rule, students are expected to pass the QE2 in the fourth year of the five-year curriculum or in the third year of the four-year curriculum.

Requirements for the completion of a five-year curriculum:

Article 13. The requirements for completing the five-year curriculum are as follows: a) Passing the QE2, b) Earning 51 credits or more from the courses listed in Appended Table 1, c) Accumulating the necessary credits for the completion of both the Master's and Doctoral courses at the affiliated Graduate School, d) Publishing an article in English in a peer-reviewed academic journal (excluding all bulletins), e) Presenting research findings at an international conference, and f) Submitting a doctoral thesis under the guidance of an academic supervisor, as well as passing the thesis defense and final examination. However, the degree may also be granted to individuals who demonstrate exceptional research results in fewer than the designated years of the curriculum, pending approval from the program's general meeting and the Faculty Council of the affiliated Graduate School. In such instances, the minimum enrollment period is four years.

Requirements for the completion of a special three-year curriculum:

Article 14. The requirements for completing the three-year curriculum are as follows: a) Passing the QE2, b) Earning 30 credits or more from the courses listed in Appended Table 2, c) Accumulating the necessary credits for the completion of Doctoral courses at the affiliated Graduate School, d)

Publishing an article in English in a peer-reviewed academic journal (excluding all bulletins), e) Presenting research findings at an international conference, and f) Submitting a doctoral thesis under the guidance of an academic supervisor, as well as passing the thesis defense and final examination. However, the degree may also be granted to individuals who demonstrate exceptional research results in fewer than the designated years of the curriculum, pending approval from the program's general meeting and the Faculty Council of the affiliated Graduate School. In such instances, the minimum enrollment period is two years.

Requirements for the completion of a four- year curriculum:

Article 15. The requirements for completing the four-year curriculum are as follows: a) Passing the QE2, b) Earning 43 credits or more from the courses listed in Appended Table 3, c) Accumulating the necessary credits for the completion of Doctoral courses at the affiliated Graduate School, d) Publishing an article in English in a peer-reviewed academic journal (excluding all bulletins), and e) Submitting a doctoral thesis under the guidance of an academic supervisor, as well as passing the thesis defense and final examination. However, the degree may also be granted to individuals who demonstrate exceptional research results in fewer than the designated years of the curriculum, pending approval from the program's general meeting and the Faculty Council of the affiliated Graduate School. In such instances, the minimum enrollment period is three years.

Miscellaneous Regulations;

Article 16. In addition to the matters set forth in these regulations, any necessary matters for course requirements of the Frontier Development Program for Genome Editing shall be stipulated separately.

Supplementary Provisions

These regulations shall come into effect as of April 1, 2019.

Supplementary Provisions (Partial revision made on March 5, 2020)

1. These regulations shall come into effect as of April 1, 2020.
2. With regard to persons who enrolled in the program in 2020AY, the provisions in force then shall remain applicable.

Supplementary Provisions (Partial revision made on February 14, 2022)

1. These regulations shall come into effect as of April 1, 2022
2. With regard to persons who enrolled in the program in or before 2021AY, the provisions in force then shall remain applicable. However, if deemed necessary for educational purposes, students may be permitted to take courses specified in the new regulation.
3. In the event that credits are earned in accordance with the provisions of the preceding paragraph, such credits shall be deemed to have been earned in accordance with the Course Regulations prior to the revision and credit shall be granted.

Supplementary Provisions (Partial revision made on February 13, 2023)

1. These regulations shall come into effect as of April 1, 2023
2. With regard to persons who enrolled in the program in or before 2022AY, the provisions in force then shall remain applicable. However, "Lecture on Translational Research B" will be added to the curricula for students who enrolled in the program in 2021AY and 2022AY.

Supplementary Provisions (Partial revision made on March 4, 2024)

1. These regulations shall come into effect as of April 1, 2024.
2. With regard to persons who enrolled in the program in or before 2023AY, the provisions in force then shall remain applicable.

Supplementary Provisions (Partial revision made on March 10, 2025)

1. These regulations shall come into effect as of April 1, 2025.
2. With regard to persons who enrolled in the program in or before 2024AY, the provisions in force then shall remain applicable.

Appended Table 1 (Related to Article 6,7, and 13)
【Life Science Course】

Course Category		Course	Credits	Required No. of credits		Recommended	Year taken	Department in charge
				Required	Required elective			
Common Graduate Courses		Data Literacy	1		1		1･2	Headquarters for Education
		Advanced Career Management	2					
		Select a course from Sustainable Development Courses in Common Graduate Courses (Doctoral Course)			1		3･4･5	
		Data Science	2		2		3･4･5	
		Pathway to Becoming a Data Scientist	1					
		Career Management Seminar	1					
Specialized Courses of the Frontier Development Program for Genome Editing	Lectures / Training	Ethics of Genome Editing Research	1	1			1	Graduate School of Integrated Sciences for Life
		Basics and Practical Applications of Genome Editing	2	2				
		Basic Training of Genome Editing	2	2			1･2	
		Bioinformatics	2	2				
		Introduction to Genetics and Genomics	2	2				
		Clinical Applications of Genome Editing Technology	1	1				
		Science and Technology in Society	1	1			2	
	Advanced Courses	Trends of Genome Editing in Life Science	2		2		3･4･5	
		Trends of Genome Editing in Medical Science	2					
	Internship	Internship at CiRA	2			2	1･2･3･4･5	
		Internship at Cutting-edge Genome Editing Laboratories	2					
		Internship at Collaborative Research Companies	2					
Graduate School of Integrated Sciences for Life	Common Courses in Graduate School	Special Lectures in Integrated Sciences for Life*	2	6			1	Graduate School of Integrated Sciences for Life
		Research Methods in Life Science*	2					
		Science Seminar A	2				1･2	
		Research Plans in Life Science	2		4		3	
		Career Development for Life Science	2					
		Science Seminar B	2				3･4･5	
	Specialized Courses in Program	Specialized Courses designated by the affiliated degree program			8		1･2	
		Research for Academic Degree Dissertation in the affiliated degree program*	4	4			1～2	
		Research for Academic Degree Dissertation in Integrated Life Sciences*	12	12			3～5	
Total required credits				33	18	0	Total 51 credits	

The asterisk (*) represents 'required course' in the Graduate School of Integrated Sciences for Life

Completion Requirements

Ⅰ Acquisition of at least 51 credits as specified below;

1 Required

- ･Specialized Courses of the Frontier Development Program for Genome Editing 11 credits
- ･Common Courses in the Graduate School of Integrated Sciences for Life 6 credits
- ･Specialized Courses in Program in the Graduate School of Integrated Sciences for Life 16 credits

2 Required Elective

- ･Common Graduate Courses 4 credits or more
- ･Specialized Course for the Frontier Development Program for Genome Editing 2 credits or more
- ･Common Courses in the Graduate School of Integrated Sciences for Life 4 credits or more
- ･Specialized Courses in Program in the Graduate School of Integrated Sciences for Life 8 credits

3 Recommended

･Students are highly encouraged to participate in internships as part of their professional development in this program, even though the credits do not count toward the completion requirements.

Ⅱ Fulfillment of requirements for the degrees in the affiliated graduate school (both master's course and doctoral course) .

NOTE : In case of overlapping courses, credits earned for the Degree PRG of the Graduate School will count towards the credits required for the Life Science Course completion.

Appended Table 2 (Related to Article 6,7, and 14)

【Life Science Course (3-year curriculum)】

Course Category		Course	Credits	Required No. of credits		Recommended	Year taken	Department in charge
				Required	Required elective			
Common Graduate Courses		Select a course from Sustainable Development Courses in Common Graduate Courses (Doctoral Course)			1		3・4・5	Headquarters for Education
		Data Science	2		2		3・4・5	
		Pathway to becoming a Data Scientist	1					
		Career Management Seminar	1					
Specialized Courses of the Frontier Development Program for Genome Editing	Lectures / Training	Ethics of Genome Editing Research	1	1			3	Graduate School of Integrated Sciences for Life
		Basic Training of Genome Editing	2	2				
		Science and Technology in Society	1	1			4	
		Basics and Practical Applications of Genome Editing	2		5		3・4・5	
		Bioinformatics	2					
		Introduction to Genetics and Genomics	2					
		Clinical Applications of Genome Editing Technology	1					
	Advanced Courses	Trends of Genome Editing in Life Science	2		2			
		Trends of Genome Editing in Medical Science	2					
	Internship	Internship at CiRA	2			2	3・4・5	
		Internship at Cutting-edge Genome Editing Laboratories	2					
		Internship at Collaborative Research Companies	2					
Graduate School of Integrated Sciences for Life	Common Courses in Graduate School	Research Plans in Life Science	2		4		3・4・5	Graduate School of Integrated Sciences for Life
		Career Development for Life Science	2					
		Science Seminar B	2					
	Specialized Courses in Program	Research for Academic Degree Dissertation in Integrated Life Sciences*	12	12			3～5	
Total required credits				16	14	0	Total 30 credits	

The asterisk(*) represents 'required course' in the Graduate School of Integrated Sciences for Life

Completion Requirements

Ⅰ Acquisition of at least 30 credits as specified below;

1 Required

・Specialized Courses of the Frontier Development Program for Genome Editing 4 credits

・Specialized Courses in Program in the Graduate School of Integrated Sciences for Life ('Research for Academic Degree Dissertation') 12 credits

2 Required Elective

・Common Graduate Courses 3 credits or more

・Specialized Course for the Frontier Development Program for Genome Editing 7 credits or more

・Common Courses in the Graduate School of Integrated Sciences for Life 4 credits or more

3 Recommended

・Students are highly encouraged to participate in internships as part of their professional development in this program, even though the credits do not count toward the completion requirements.

Ⅱ Fulfillment of requirements for the degrees in the affiliated graduate school (doctoral course) .

NOTE : In case of overlapping courses, credits earned for the Degree PRG of the Graduate School will count towards the credits required for Life Science Course (3-year curriculum) completion.

Bylaws for the Completion of the Frontier Development Program for Genome Editing, Appended Table 3 (Related to Article 6,7, and 15)
【Medical Course】

Course Category		Course	Credits	Required No. of credits		Recommended	Year taken	Department in charge
				Required	Required elective			
Common Graduate Courses		Select a course from Sustainable Development Courses in Common Graduate Courses (Doctoral Course)			1		1･2･3	Headquarters for Education
		Data Science	2		1		1･2･3	
		Pathway to becoming a Data Scientist	1					
		Career Management Seminar	1					
Specialized Courses of the Frontier Development Program for Genome Editing	Lectures / Training	Ethics of Genome Editing Research	1	1			1	Graduate School of Integrated Sciences for Life
		Basics and Practical Applications of Genome Editing	2	2				
		Basic Training of Genome Editing	2	2			1･2	
		Bioinformatics	2	2				
		Introduction to Genetics and Genomics	2	2				
		Clinical Applications of Genome Editing Technology	1	1				
		Science and Technology in Society	1	1			2	
	Advanced Courses	Trends of Genome Editing in Life Science	2		2		3･4	
		Trends of Genome Editing in Medical Science	2					
	Internship	Internship at CiRA	2			2	1･2･3･4	
		Internship at Cutting-edge Genome Editing Laboratories	2					
		Internship at Collaborative Research Companies	2					
Graduate School of Biomedical and Health Sciences	Common Courses	Medical Ethics B*	1	1	2		1	Graduate School of Biomedical and Health Sciences
		Methods in Biomedical Sciences B	1					
		Creation and Development of Biomedical Sciences	1					
		Lecture on Biodesign B1	1					
		Lecture on Biodesign B2	1					
		Lecture on Translational Research B	1					
		Multidisciplinary Cooperation B*	1	1				
	Common Courses in Division	Principles of Oncology	1		2		1	
		Integrated Radiation Medical Science	1					
		Pharmacotherapeutic Research	1					
		Practice of Oncology	1					
		Cause of Death Investigation	1					
	Specialized Courses in Program	Advanced Seminars in the Specialized Courses in the affiliated degree program			10		1	
		Advanced Reserch in the affiliated degree program		12			1～3	
Total required credits				25	18	0	Total 43 credits	

The asterisk(*) represents 'required course' in the Graduate School of Biomedical and Health Sciences

Completion Requirements

Ⅰ Acquisition of at least 43 credits as specified below;

1 Required

- Specialized Courses for the Frontier Development Program for Genome Editing 11 credits
- Common Courses in the Graduate School of Biomedical and Health Sciences 2 credits
- Specialized Courses in Program in the Graduate School of Integrated Sciences for Life (Research Courses) 12 credits

2 Required Elective

- Specialized Courses for the Frontier Development Program for Genome Editing 2 credits or more
- Common Graduate Courses 2 credits or more
- Common Courses in the Graduate School of Biomedical and Health Sciences 2 credits or more
- Common Courses in Division of the Graduate School of Biomedical and Health Sciences 2 credits or more
- Specialized Courses in Program of the Graduate School of Biomedical and Health Sciences 10 credits or more

3 Recommended

- Students are highly encouraged to participate in internships as part of their professional development in this program, even though the credits do not count toward the completion requirements.

Ⅱ Fulfillment of requirements for the degrees in the affiliated graduate school

NOTE : In case of overlapping courses, credits earned for the Degree PRG of the Graduate School will count towards the credits required for Medical Course completion.

5. Curriculum Overview

1) Life Science Course (D1-D5)

Students are required to earn the necessary credits to fulfill the requirements of their degree program in the Graduate School of Integrated Sciences for Life while simultaneously completing the specialized courses of the Genome Editing Program to meet the requirements of the Life Science Course. The Master's course (M1 and M2) in the Graduate School corresponds to D1 and D2, while the Doctoral course (D1 to D3) aligns with D3, D4, and D5 of the Life Science Course.

Students are not required to write a Master's thesis. Instead, they must pass Qualifying Examination 1 (QE1) by the end of D2. They must also pass Qualifying Examination 2 (QE2) as part of the doctoral candidate examination by the end of D4, and complete the Final Examination for the Doctoral Dissertation in their final year (D5).
Please keep the following points in mind to meet the completion requirements for the Life Science Course.

<Important Notes>

1. Up to 6 credits from the Specialized Course for the Genome Editing Program may be included in the Specialized Courses offered by other programs within the affiliated Graduate School or other Graduate Schools, which is one of the completion requirements for the Master's course in the Graduate School.
2. The credits for 'Research for Academic Degree Dissertation' in the Master's course and 'Research for Academic Degree Dissertation in Integrated Life Sciences' in the Doctoral course of the Graduate School will count toward the credits required for course completion as designated courses of the Genome Editing Program.
3. For course registration, please refer to the course list for each program provided in this handbook. Additionally, be sure to consult the Graduate School Student Handbook to confirm that you are earning the required credits. Please note that only the courses specifically designated by the Genome Editing Program are included in the course list.

2) Life Science Course (D3-D5) *3-year curriculum for 3rd-year transfer students

Third year transfer students are required to earn the necessary credits to fulfill the requirements of their degree program in the Graduate School of Integrated Sciences for Life while simultaneously completing the specialized courses of the Genome Editing Program to meet the requirements of the Life Science Course. The Master's course (M1 and M2) in the Graduate School corresponds to D1 and D2, while the Doctoral course (D1 to D3) aligns with D3, D4, and D5 of the Life Science Course.

Students must pass Qualifying Examination 2 (QE2) as part of the doctoral candidate examination by the end of D4, and complete the Final Examination for the Doctoral Dissertation in their final

year (D5).
Please keep the following points in mind to meet the completion requirements for the Life Science Course (3-year curriculum).

<Important Notes>

1. The credits for 'Research for Academic Degree Dissertation in Integrated Life Sciences' in the Doctoral course of the Graduate School will count toward the credits required for course completion as designated courses of the Genome Editing Program.
2. For course registration, please refer to the course list for each program included in this handbook. Additionally, be sure to consult the Graduate School Student Handbook to confirm that you are earning the required credits. Please note that only the "Specialized Courses" of the Genome Editing Program are included in the course list.

3) Medical Course (D1-D4)

Students are required to earn the necessary credits to fulfill the requirements of their degree program in the Graduate School of Biomedical and Health Sciences while simultaneously completing the specialized courses of the Genome Editing Program to meet the requirements of the Medical Course.

Students are required to pass Qualifying Examination 1 (QE1) by the end of D2. They must also pass Qualifying Examination 2 (QE2) as part of the doctoral candidate examination by the end of D3, and complete the Final Examination for the Doctoral Dissertation in their final year (D4).
Please keep the following points in mind to meet the completion requirements for the Medical Course.

<Important Notes>

1. The credits of the “research courses offered by the primary advisor” in the Graduate School of Biomedical and Health Sciences will count toward the credits required for course completion as designated courses of the Genome Editing Program.
2. For course registration, please refer to the course list for each program included in this handbook. Additionally, be sure to consult the Graduate School Student Handbook to confirm that you are earning the required credits. Please note that only the "Specialized Courses" of the Genome Editing Program are included in the course list.

4) Credit Approval of Internship

(Internship Objectives)

In order for students to be aware of the linkage between their specialized research and the real world as well as to become researchers or highly skilled professionals who are capable of building a more sustainable society, it is important for them to understand how specialized research in biology and life sciences is developed for social implementation in the real world. This program offers internships at academic institutions and companies in Japan and abroad for students to understand how research is conducted as a job, to improve their communication skills through discussions with people there, and to cultivate their social skills as professionals. In particular, this program recommends internship courses: advanced practical trainings at advanced laboratories overseas, companies, or partner institutions to enable students to experience practical application research and learn the situation of cutting-edge research and development in the research field.

<Notes for Course Registration>

1. Students are highly encouraged to participate in internships as part of their professional development in this program, even though the credits do not count toward the completion requirements.
2. For more information, please refer to the separately provided Internship Guidebook.

6. Course List of each Degree Program

（Course List of your degree program will be provided separately.）

7. Qualifying Examination 1 (QE1)

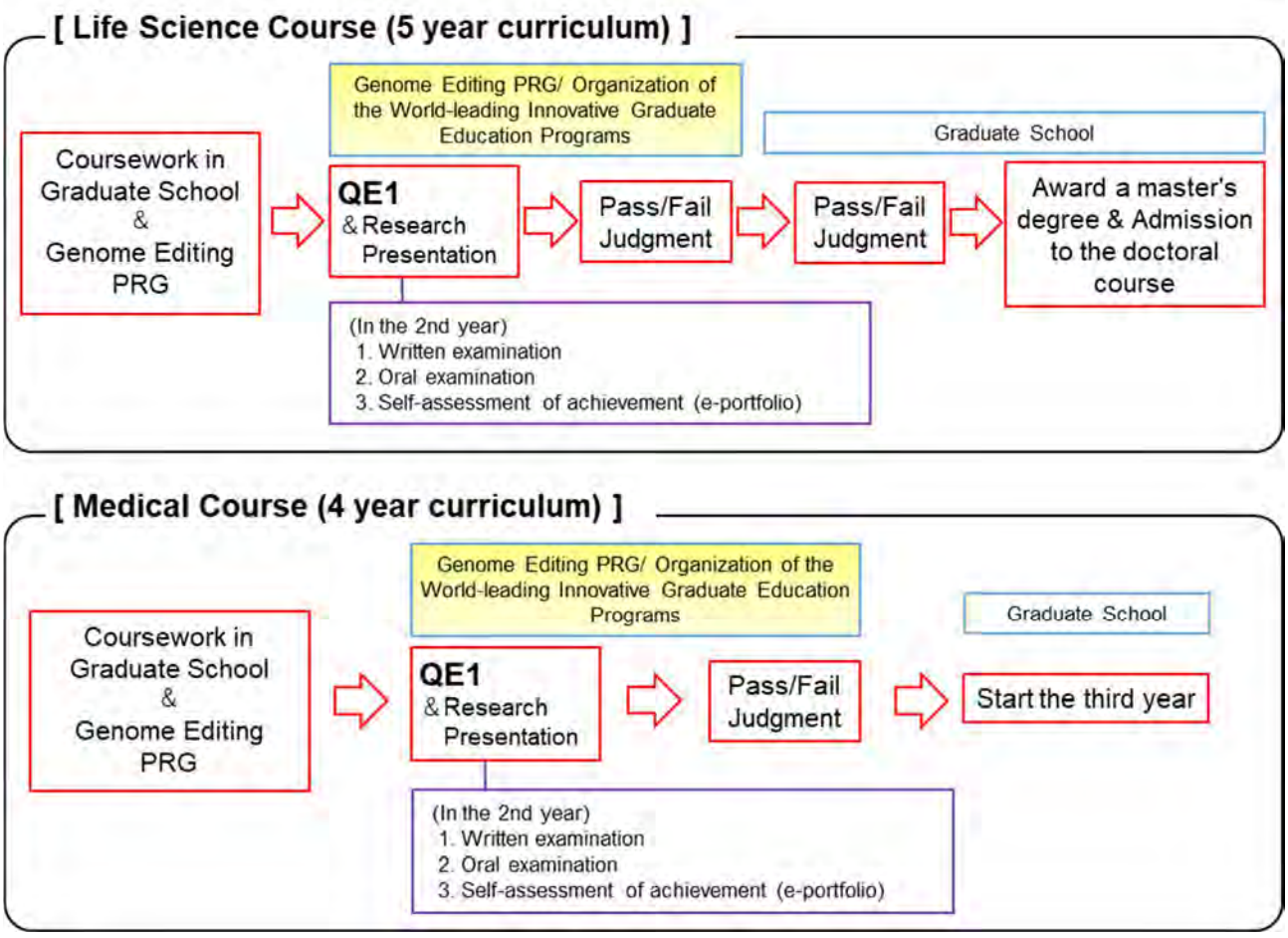
1) Overview

QE1 will take place in the second year of the Genome Editing Program. (*Students enrolled in the Life Science Course do not need to write a master's thesis.)

To be eligible for the examination, students in the Life Science Course must be on track to complete the requirements of both their Graduate School (master's course) and D1 and D2 of the Genome Editing Program. Students in the Medical Course must be on track to earn the required credits for D1 and D2 of the Genome Editing Program.

As part of the examination process, students must submit the following documents: (a) an application form, (b) a research achievement report, and (c) a dissertation proposal. QE1 consists of two parts: a written exam, which tests knowledge from the Graduate School and the specialized courses of the Genome Editing Program, and an oral exam, which focuses on the research results and dissertation proposal. The final pass/fail grade will be determined by an overall evaluation.

2) Flow Chart



年度　広島大学卓越大学院プログラム　ゲノム編集先端人材育成プログラム
博士論文研究基礎力審査（Qualifying Examination1）申請書
The Frontier Development Program for Genome Editing, Hiroshima University
Application for Qualifying Examination 1 in AY 20XX

年　　月　　日
YYYY/MM/DD

ゲノム編集先端人材育成プログラム責任者　殿
To the Director of the Frontier Development Program for Genome Editing

コース名/ Course　：

学生番号/ ID Number:

氏　　名/ Name　：

ゲノム編集先端人材育成プログラム博士論文研究基礎力審査（Qualifying Examination1）を申請します。
なお，博士論文研究基礎力審査（Qualifying Examination1）を受けるための基準を次のように
［　満たしています　・　満たす見込みです　］。
I hereby apply for Qualifying Examination 1 of the Frontier Development Program for Genome Editing.
The eligibility requirements for taking this examination ［have been fulfilled / will have been fulfilled］as follows:

記

所属研究科・プログラム Graduate School・Program					
所定の単位数 Required	単位 credits	修得単位数 Earned	単位 credits	修得見込み 単位数 Expected	単位 credits

プログラムコース名 Course		ゲノム編集先端人材育成プログラム ●●コース Frontier Development Program for Genome Editing XXX Course			
所定の単位数 Required	単位 credits	修得単位数 Earned	単位 credits	修得見込み 単位数 Expected	単位 credits

主指導教員/Primary Advisor:

【申請書の提出手続き/Submission procedure】
① それぞれの単位数を記入し，主指導教員の承認を受けること。
Fill in the number of acquired (prospective) credits, and receive the approval of your primary advisor.
② 事務室に申請書を提出すること。/Submit this form to the office.

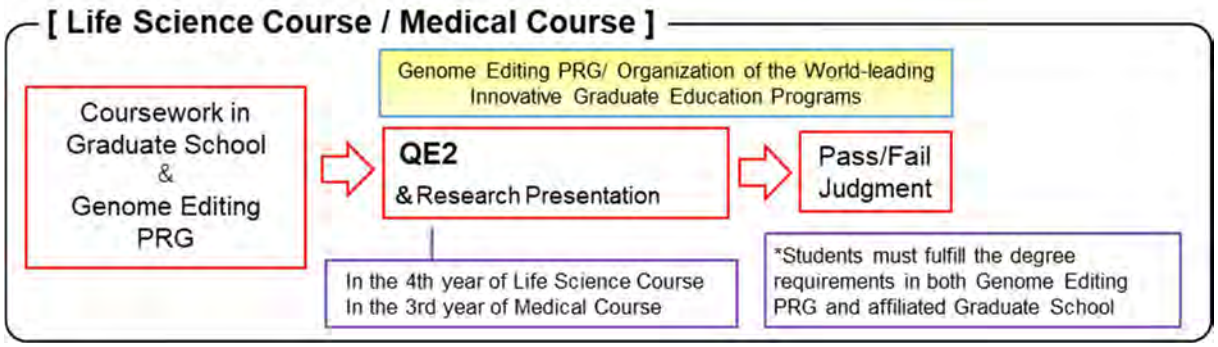
8. Qualifying Examination 2 (QE2)

1) Overview

QE2 will take place in the fourth year for students in the Life Science Course and the third year for students in the Medical Course within the Genome Editing Program. To be eligible for the examination, students must be on track to complete the course requirements for both their affiliated Graduate School (Doctoral course) and the Genome Editing Program.

As part of the examination process, students must submit an application form along with an abstract of their dissertation written in English. During QE2, there will be an oral examination on the dissertation outline, and the learning outcomes recorded in the e-portfolio will also be reviewed.

2) Flow chart



年度　広島大学卓越大学院プログラム　ゲノム編集先端人材育成プログラム
博士候補者試験（Qualifying Examination2）申請書
The Frontier Development Program for Genome Editing, Hiroshima University
Application for Qualifying Examination 2 in AY 20XX

年　　月　　日
YYYY/MM/DD

ゲノム編集先端人材育成プログラム責任者　殿
To the Director of the Frontier Development Program for Genome Editing

学生番号/ID Number　：
氏　　名/Name　：
主指導教員/Primary Advisor:

ゲノム編集先端人材育成プログラム博士候補者試験（Qualifying Examination2）を申請します。
I hereby apply for Qualifying Examination 2 of the Frontier Development Program for Genome Editing.

【申請書の提出手続き/Submission procedure】
主指導教員の承認を受け，事務室に申請書を提出すること。
Submit this form to the Office after receiving the approval of your primary advisor.

9. Doctoral Dissertation and Final Examination (FE)

Students who pass QE2 in the Genome Editing Program can apply for degree conferral. To do so, applicants must submit a doctoral dissertation and meet the following application requirements:

1) Applicants must fulfill the application criteria for the PhD degree in their affiliated Graduate School.
2) Applicants must have completed, or be on track to complete, the credit requirements for the affiliated course within the Genome Editing Program.
3) Applicants must have published, or have a paper scheduled for publication, in English in a peer-reviewed journal (excluding all bulletins).
4) Applicants must have presented their research at an international academic conference (this requirement applies only to the Life Science Course).
5) Applicants must have received appropriate research supervision.

The preliminary and final examinations for doctoral dissertations are conducted according to the By-Laws of the Graduate School and the Degree Regulations of Hiroshima University. For further details, please refer to the Graduate School's Student Handbook.

10. Academic and Financial Support Information

1) Notification

Notifications from the University will be sent to students via email or posted on 'Momiji', the portal site for Hiroshima University students. Please check both daily to ensure you do not miss any important announcements.

2) Changes in Student Status (Leave of Absence, Withdrawal, Name Change, etc.)

If you submit documents to the Graduate School to change your student status, or if you have any questions or concerns regarding the Genome Editing Program, please contact the Collaboration Office at leading-program@office.hiroshima-u.ac.jp.

3) Scholarships

Students in the Genome Editing Program are eligible to apply for the "Hiroshima University Doctoral Program for World-leading Innovative & Smart Education Scholarship." Up to three students will be selected each semester to receive 50,000 yen per month. To qualify for this scholarship, students must demonstrate outstanding academic performance and achievements while enrolled in the program. Further details will be announced separately.

4) Tuition Waiver

Doctoral students in the Genome Editing Program who exhibit exceptional academic performance may qualify for the “Tuition Waivers for the Hiroshima University Doctoral Program for World-leading Innovative & Smart Education.” Students will be evaluated each semester (Spring semester/ Fall semester) based on their grades and may receive a full tuition waiver. Results of the screening will be communicated around March and September.

5) International Research Travel Grant

This grant covers travel expenses (transportation fees, daily allowances, accommodation fees, etc.) in accordance with Hiroshima University's Travel Expense Regulations for the following international research activities: Successful applicants may receive a grant up to the amount specified by the program. Please contact the Collaboration Office for more details. Eligible activities include:

① Student-led research at overseas universities or institutions
② Student-led joint research at overseas universities or institutions
③ Additional international research activities deemed necessary by the Genome Editing Program

6) Mentoring Program

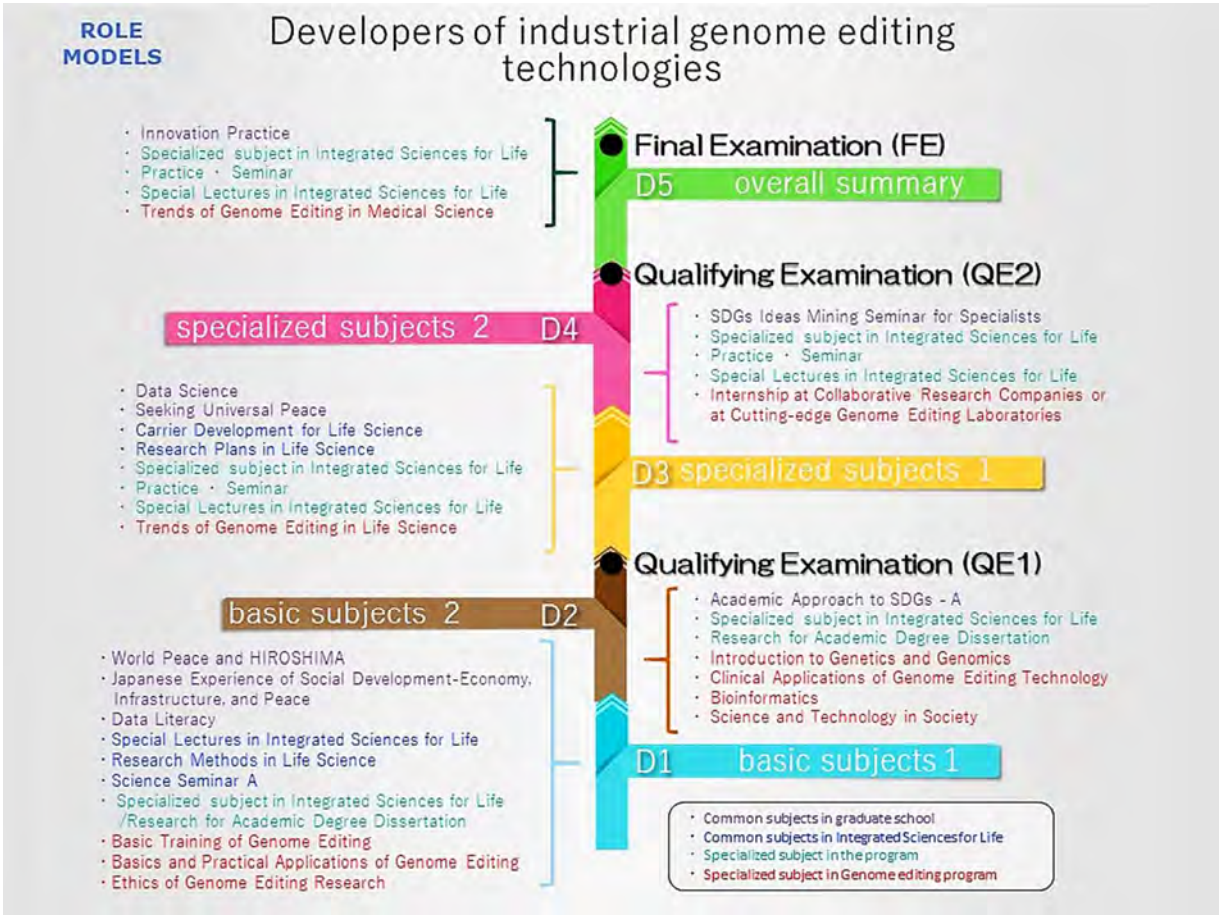
Associate professors, lecturers, and assistant professors in the Genome Editing Program provide valuable support to students as mentors. Program students can contact them directly for academic advice. Further details will be provided separately.

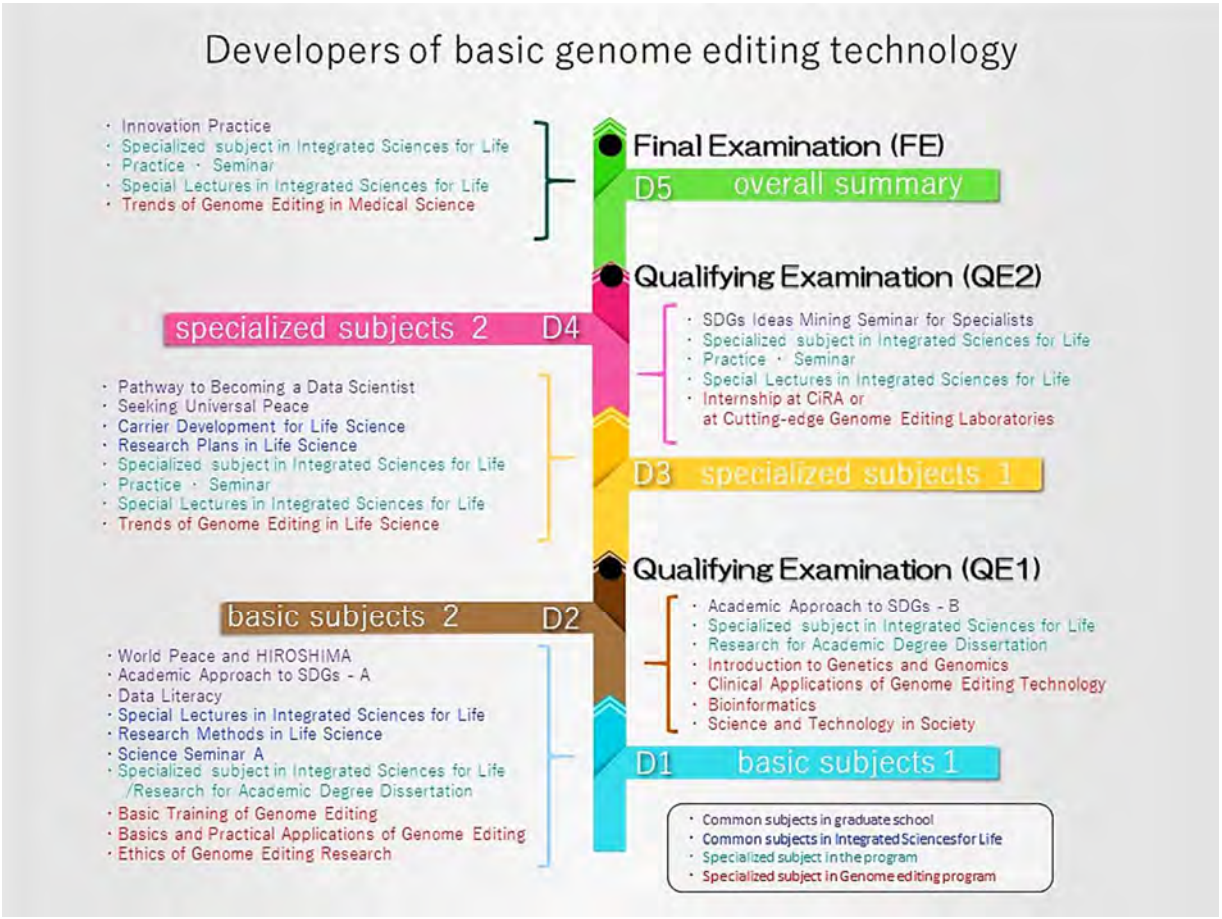
7) Career Survey

Alumni may be invited to participate in a career survey upon completing the program. Please provide the Collaboration Office (leading-program@office.hiroshima-u.ac.jp) with an email address where you can be reached.

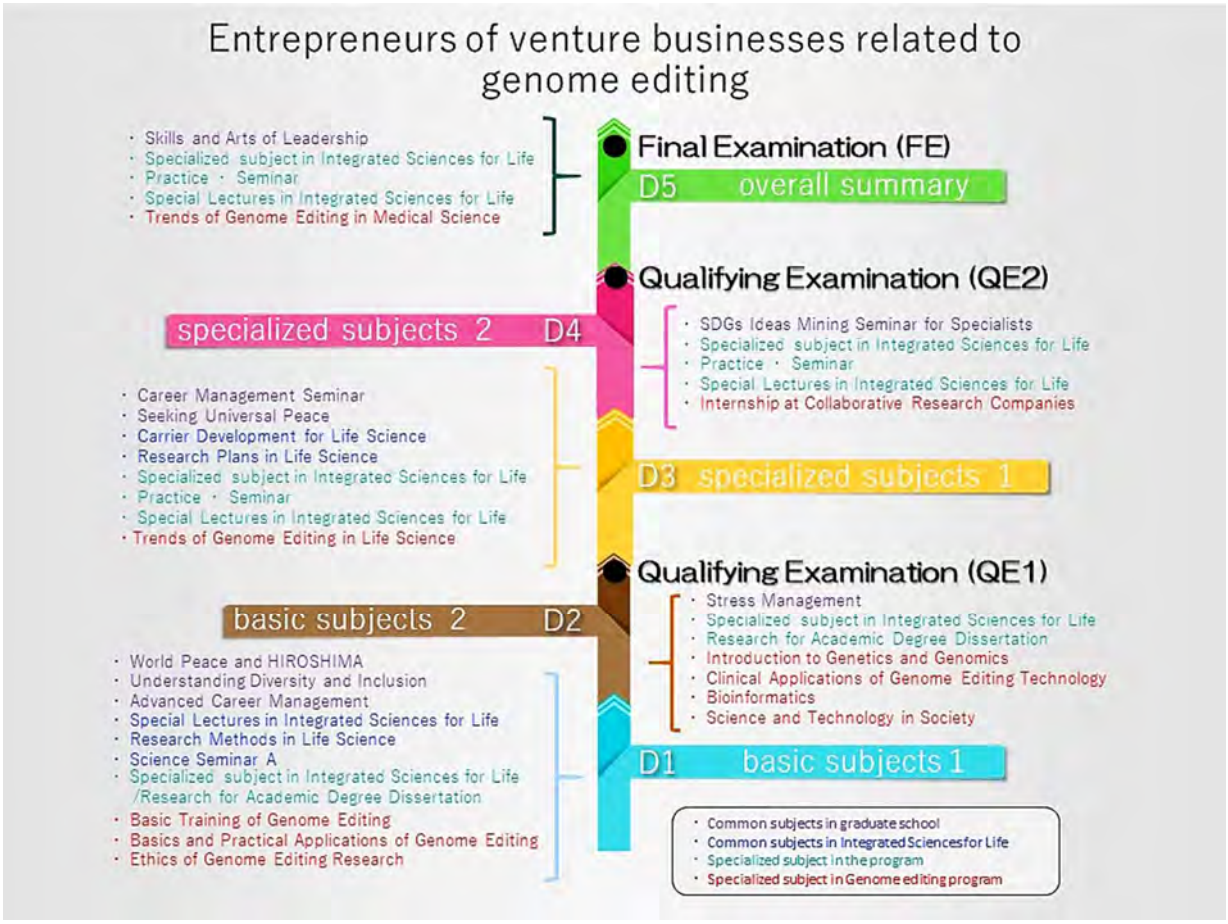
* Please note that items 3) to 6) above are subject to change or elimination based on University policy.

11. Course Models





Entrepreneurs of venture businesses related to genome editing



Researchers of genome editing-based therapies and drug discovery