

平成30年度入学生対象	
別記様式 1	
主 専 攻 プ ロ グ ラ ム 詳 述 書	
開設学部（学科）名〔生物生産学部（生物生産学科）〕	
プログラムの名称（和文）	分子細胞機能学主専攻プログラム
（英文）	Applied Molecular & Cellular Biology Program
1. 取得できる学位 学士（農学）	
2. 概要 生物生産学部の5つの主専攻プログラム（生物圏環境学、水産生物学、動物生産科学、食品科学および分子細胞機能学）では、生物生産に係わる自然科学から社会科学に及ぶ幅広い知識と知恵を身につけさせることを目標とする。具体的には、①生物資源と食料生産、バイオテクノロジー、生物環境の保全に関する基礎的知識の修得、②フィールド科学分野の体験学修、③生命倫理や技術者倫理の理解、④英語等の語学能力や情報処理能力の修得を目指した教育を行う。 分子細胞機能学主専攻プログラムは、5つの教育科目（生態機能物質化学、生体分子機能学、微生物機能学、酵素化学、免疫生物学）に所属する教員によって実施され、履修する学生は、生物の機能を低分子化合物や遺伝子、蛋白質等の生体高分子の視点から解き明かす能力を養う。加えて、細胞や細胞内の小器官を生体分子の集合体として特徴づけ、分子が織り成す細胞や生物個体の生命現象を学修する。本プログラムの特徴は、対象とする生物が微生物から動物、植物といったすべての生物界に及ぶこと、およびこれら生物の営みを生態系との関わりから捉えることである。本プログラムのコアとなる履修科目の学問分野は、分子生物学、生化学、有機化学、免疫生物学等である。さらに学生は、これらの基礎的な学修から出発して、生物界の各論を学び、卒業時には食料および環境分野への応用へと展開できる能力を身につけることができる。 本プログラムの実施にあたり、本コースの教員は水平的なネットワークを構成し、生物学の応用を目指した体系的な教育を行う。また、本コースの教員各個人は世界的なトップレベルの研究成果を挙げており、本プログラムでは最先端の知見に触れながら基礎力を養い、さらにその応用へと視野を広げることができる。 本プログラムでは、卒業後に大学院に進学しさらに高度な専門的知識と技能を有した人材や、農林水産関係の官公庁、食品・化学・医薬等に関係する業界で国際的視野を持った研究者・専門技術者となる人材を養成する。	
3. ディプロマ・ポリシー（学位授与の方針・プログラムの到達目標） 分子細胞機能学主専攻プログラムでは、生物生産学の基盤となる生体分子・細胞・生物個体の生命現象に関する基礎的および専門的な知識と技能を修得し、さらに思考力と創造力を発揮できる科学者として企業、大学、その他公的機関等で活躍できる人材を養成する。そのため本プログラムでは、以下の能力を身につけ、基準となる単位を修得すると共に規定の到達目標に達し、かつ生物生産学部が定める審査に合格した学生に「学士（農学）」の称号を授与する。 教養教育を通して 1. 自主的・自立的に学修する態度を習慣づけており、情報収集力・分析力・批判力を身につけ、これらを活用できる。 2. ものごとの本質と背景を広い視野から洞察する力や、国際人として生きるにふさわしい語学力と平和に関する関心を持っている。 3. 幅広い知識から、問題を発見し、真に問題解決に役立つ「知識体系」へと統合し、総合的な見地からものごとを俯瞰できる。 4. 一般的な科学的基礎知識を持ち、生物生産学の専門領域への応用展開に必要な知識と技能を理解できる。 専門教育（専門基礎科目）を通して 5. 生物及び生物圏に関する先端的な話題や基本的な概念を理解できる。 6. 生物生産学の価値志向性やグローバル化した社会との関わりを理解でき、科学の応用における対話や合意形成の重要性を理解できる。 7. 研究上の不正行為の問題性と研究者・技術者倫理の重要性を理解できる。 本プログラムの専門教育を通して 8. 分子および細胞レベルから個体や生態系に至る微生物・植物・動物の生理・生体の機能について、知識を体系的および階層的に理解することができる。 9. 分子から細胞、細胞から生体機能や生態に関する学問領域において、情報の収集・分析力や研究手法を身につけ、実践的に応用・活用できる。 10. 細胞や生体の機能を分子的な面から考える分野において、身につけた知識・技能・態度等を総合的に活用し、自らが立てた課題を解決し、結論を文章や口頭で論理的に表現し、議論できる。	
4. カリキュラム・ポリシー（教育課程編成・実施の方針）	

For entrants in AY 2018	
Appended Form 1	
Specifications for Major Program	
Name of School (Program) [School of Applied Biological Science comprises]	
Program name (Japanese)	分子細胞機能学主専攻プログラム
(English)	Applied Molecular & Cellular Biology Program
1. Degree to be obtained: Bachelor of Agriculture	
2. Overview In the five major programs of the School of Applied Biological Science (Integrated Ecoscience Program, Fisheries Biology Program, Animal Science Program, Food Science Program, and Applied Molecular and Cellular Biology Program), the aim is to enable students to acquire a wide range of knowledge and wisdom in the realms of natural and social sciences related to applied biology. Specifically, we provide education that allows students to ① acquire basic knowledge regarding biotic resources and food production, biotechnology, and protection of the biological environment; ② gain experience in field science; ③ understand bioethics and engineering ethics; and ④ obtain capabilities in foreign languages such as English and in data processing. In the Applied Molecular and Cellular Biology Program, education is provided by faculty members belonging to five educational subjects (ecological biochemistry, biological chemistry, microbial chemistry, enzyme chemistry, and immunobiology) to enable students to develop the ability to cast light on the functions of organisms from the perspective of low molecule chemical compounds and biopolymers such as genes and proteins. In this program, furthermore, cells and organelles are characterized as an assembly of organic molecules, and students study the biological phenomena generated by those molecules in a cell and an individual organism. This program covers all organisms, including microorganisms, animals, and plants, and the activities of these organisms in terms of their relationship with the ecosystem. The academic areas that constitute the core of this program include molecular biology, biochemistry, organic chemistry, and immunobiology. Students are permitted to begin their study from the basics, learning theories related to organisms and acquiring the ability to apply their knowledge and skills in areas related to foods and the environment. In implementing this program, the faculty members of this course constitute a horizontal network and provide education that is oriented towards the application of biology. Individual faculty members in this course have generated research results that are highly valued globally and, therefore, students are enabled to acquire the basic knowledge and skills while, at the same time, experiencing cutting-edge knowledge and broadening their perspective in areas in which this knowledge can be applied. This program educates students to become experts, who go on to acquire a higher level of expertise in the graduate school after this program, or to become researchers and specialists with an international outlook working in institutions such as the public office for agriculture and fisheries, or in business fields related to foods and chemical/pharmaceutical products.	
3. Diploma policy (policy for awarding degrees and goal of the program) The Applied Molecular and Cellular Biology Program aims to enable students to acquire the basic knowledge, expertise, and skills related to biological phenomena generated by organic molecules, cells, and individual organisms, which constitutes the foundation of applied biology, in order to develop professionals who are capable of working as scientists in such institutions as companies, colleges, and public organizations. Therefore, in this program, the degree of bachelor of agriculture will be awarded to the students who have earned the required credits and certification to satisfy the specified level of achievement, passed the examination that is administered by the School of Applied Biological Science, and acquired the following abilities. Through the liberal arts education, the student is required to acquire: 1. The ability to study independently, collecting, analyzing, and criticizing data, together with the willingness to demonstrate of the use of this ability; 2. Insight from a broad perspective into the essentials and background of phenomena, and the linguistic ability and interest in peace that are required for a citizen of the world; 3. The ability to identify a problem based on broad knowledge, to integrate findings to establish a "knowledge system" that is truly useful for problem solving, and to examine phenomena from a comprehensive perspective; and 4. General and basic knowledge of science that enables the student to develop the knowledge and skills required for application in any of the specialized fields of applied biological science. Through the specialized education (specialized basic subjects), the student is required to acquire: 5. The ability to understand advanced topics and basic ideas related to organisms and the biosphere; 6. The ability to understand the value, orientation, and relevance to the globalized society of applied biology, and the importance of communication and consensus building related to the application of scientific results; and 7. An understanding of the problems regarding research misconduct, and the importance of research and engineering ethics. Through the specialized education in this program, the student is required to acquire: 8. Systematic and hierarchical knowledge and understanding regarding the physiology of microorganisms, plants, and animals, and functions of living bodies from the level of molecules and cells to that of the individual organisms and ecosystems;	

<div>分子細胞機能学主専攻プログラムでは、プログラムが掲げる到達目標を学生に実現させるために、次の方針に従って教育課程を編成し、実践する。</div> <div>1. 教養教育では、平和を希求し、幅広く深い教養と総合的な判断力を培い、豊かな人間性を涵養することを目指し、さらに実用的外国語運用能力、国際的視野や異文化理解能力、情報活用能力やコミュニケーション能力を養成する。また、教養教育の中に基盤科目を配置し、生物生産学の専門領域への応用展開に必要な科学的な基礎知識と技能を理解する能力を養成する。</div> <div>2. 専門教育では、まず、学部共通の「専門基礎科目」を通して、生物及び生物圏に関わる専門基礎力を養成する。この中には、海外演習、インターンシップ、フィールド演習、科学技術倫理学も含まれ、国際社会及び地域社会において指導的な活動をするための想像力と実践性を備えた基礎力、並びに研究上の不正行為の問題性と研究者・技術者倫理の重要性を理解する能力を養成する。</div> <div>3. 本プログラムの専門教育では、生化学、分子生物学、有機化学、免疫生物学等に関する「専門科目」を通して、生物を体系的および階層的に理解することのできる能力、および、当該分野の「演習」や「実験」を通して、実践的に応用・活用できる技能や姿勢を修得する教育を実施する。さらに「卒業論文」により、コミュニケーション・プレゼンテーション・実践的外国語能力も含めた総合的な問題解決能力を身につけた人材を養成する。</div> <div>4. 学修の成果は、各科目の成績評価と共に本プログラムで設定する到達目標への到達度の2つで評価する。</div>	<div>9. Data collection and analysis abilities, and systematic skills for research in academic fields related to molecules, cells, and the functions of living bodies and ecosystems, as well as the ability to practically use and apply these skills; and</div> <div>10. The ability to apply the knowledge, skills, and attitude that he/she has obtained in an integrated manner, in order to solve problems that he/she identifies, logically express conclusions orally or in writing, and engage in discussion in the study of the functionality of cells and living bodies from the molecular perspective.</div>								
<div>5. 開始時期・受入条件</div> <div>生物生産学部では、生物生産学科として一括して入学試験を行う。入学後、1年次前・後期および2年次前期において、全学向けに開講されている教養教育科目（教養ゼミ・平和科目・パッケージ別科目・外国語科目・情報科目・領域科目・健康スポーツ科目）を中心に履修する。分子細胞機能学主専攻プログラムへの実質的な配属時期は、2年次後期である。</div> <div>入学後の1年間、基盤科目を履修し、専門分野を学ぶために必要な基礎的知識を学修する。その後、2年次の前期では、生物生産学部共通に関わる専門基礎科目を中心に履修する。特に、生物生産学部共通の実験科目として、基礎化学実験、基礎物理学実験、基礎生物学実験Ⅰ・Ⅱ（コンピューター演習を含む）を履修し、生物生産学部共通で必要とされる幅広い分野における基礎的な実験トレーニングを行う。この2年次前期までに、幅広い教養と、英語等の語学能力や情報処理能力、生物生産学部として共通の基礎的知識、生命倫理や技術者倫理を修得するとともに、各学生が各主専攻プログラムの教育目標、特徴等を十分理解し、最適なプログラムを選択する。</div> <div>生物生産学部には、生物圏環境学、水産生物科学、動物生産科学、食品科学および分子細胞機能学の5つのコースがあり、それぞれが生物圏環境学、水産生物科学、動物生産科学、食品科学および分子細胞機能学という5つの同名のプログラムを提供している。2年次後期に、本人の希望と成績により、以下の「コース分属方法」によって、5つのコースに分属する。各コースに分属された学生は、同名のプログラムを主専攻プログラムとして履修する。</div> <div>(コースへの分属方法)</div> <div>その年度の分属対象者を各コースの特任教員を除いた教員数を基準に比例配分して各コースに分属することを原則とする。ただし、小数点以下は繰り上げる。</div> <div>参考教員数（平成29.4.1現在）：</div> <div>生物圏環境学（12）、水産生物科学（15）、動物生産科学（15）、食品科学（12）、分子細胞機能学（10）</div> <div>なお、各コースに分属されるためには、規定の「コース分属要件」を満たさなければならない。</div>	<div>4. Curriculum policy (policy for organizing and implementing the curriculum)</div> <div>To enable students to achieve the targets that have been set for the Applied Molecular and Cellular Biology Program, the curriculum is organized and implemented according to the following policies:</div> <div>1. Liberal arts education courses aim to impart wide-ranging and in-depth education and general intelligence, and to foster deep humanity with a desire for peace. They also aim to develop practical foreign language abilities, an international perspective, the ability to understand different cultures, and the ability to utilize information and communication. In addition to this, courses in basic subjects are integrated into the liberal arts education in order to develop the basic scientific knowledge and skills required for application in any of the specialized fields of applied biological science.</div> <div>2. Specialized education courses develop the basic capabilities related to organisms and the biosphere through the "specialized fundamental subjects" that are common to all programs in the School of Applied Biological Science. The courses include overseas exercises, internships, fieldwork, and lectures regarding ethics in science and engineering, in order to develop the imagination and practical basic capabilities required for working in a leading position in the international and/or local community. The courses also aim to develop the ability to understand problems regarding research misconduct, and the importance of research and engineering ethics.</div> <div>3. The courses in specialized education for this program provide the "specialized subjects" related to such topics as biochemistry, molecular biology, organic chemistry, and immunobiology, in order to understand organisms in an integrated manner. Also, the courses in "exercises" and "experimentation and practice" in related areas are provided in order for students to acquire the skills and attitudes to practically apply and make use of their results. In addition to this, students develop general capabilities for problem solving, including skills for communication, presentation, and practical foreign language abilities, while preparing their "graduation thesis."</div> <div>4. The achievement in education is evaluated based on the grade scores for the subjects and the achievement level against the target set for this program.</div>								
<div>6. 取得可能な資格</div> <div>○教育職員免許状の資格</div> <div>1. 高等学校教諭（理科）一種免許</div> <div>○学芸員の資格</div> <div>○食品衛生管理者および食品衛生監視員の任用資格</div> <div>※取得に関する詳細は、「学生便覧」を参照すること。</div>	<div>5. Start time and acceptance conditions</div> <div>The School of Applied Biological Science holds the entrance examination together with the Department of Applied Biological Science. In the first and second semesters of the first year and the first semester of the second year, students mainly take the liberal arts subjects that are common to the whole university (educational seminars, subjects related to peace, package subjects, foreign languages, data processing, area subjects, and subjects related to health and sports). Assignment of students to the Applied Molecular and Cellular Biology Program is conducted in the second semester of the second year.</div> <div>Students study the basic subjects for one year after entering the university, in order to acquire the basic knowledge required for studying the specialized fields. They then mainly study the specialized basic subjects common to all students of the School of Applied Biological Science in the second semester of the second year. In particular, they take the subjects Laboratory Work in General Chemistry, Laboratory Work in General Physics, and Laboratory Work in General Biology I & II (including computer exercises), since these relate to experimentation, are common to all students of the School of Applied Biological Science, and consist of receiving the basic training in a wide range of experimentation procedures that is commonly required for the students of the School of Applied Biological Science. By the first semester of the second year, students acquire a wide-ranging education, ability in foreign languages such as English, data processing skills, the basic knowledge common to students of the School of Applied Biological Science, and an understanding of bioethics and engineering ethics, in order to allow them to understand the aim and characteristics of each major program and select the most appropriate program.</div> <div>The School of Applied Biological Science comprises five courses, i.e. the Integrated Ecoscience Course, the Fisheries Biology Course, the Animal Science Course, the Food Science Course, and the Applied Molecular and Cellular Biology Course, and each of these provides an educational program under the same name as its course name, i.e. the Integrated Ecoscience Program, the Fisheries Biology Program, the Animal Science Program, the Food Science Program, and the Applied Molecular and Cellular Biology Program. The student is allocated to one of the five courses based on his/her wishes and level of achievement, according to the "course allocation method" described below. The allocated student takes the program with the name of the course to which he/she is allocated as his/her major program.</div> <div>(Course allocation method)</div> <div>Students who are to be allocated to the courses in a given year are allocated to each course proportionally to the number of faculty members, excluding specially appointed faculty members, for each course. In making these calculations, digits after a decimal point are rounded up.</div> <div>Number of faculty members (as of April 1, 2017):</div> <div>Integrated Ecoscience Course (12), Fisheries Biology Course (15), Animal Science Course (15), Food Science Course (12), and Applied Molecular and Cellular Biology Course (10)</div> <div>The student must meet the specified "requirements for allocation to the course" in order to be allocated to the course.</div>								
<div>7. 授業科目及び授業内容</div> <div>※授業科目は、別紙1の履修表を参照すること。(履修表を添付する。)</div> <div>※授業内容は、各年度に公開されるシラバスを参照すること。</div>	<div>6. Obtainable qualifications</div> <div>○Educational personnel certification</div> <div>1. Type 1 License for High School Teacher (Science)</div> <div>○Curator License</div>								
<div>8. 学修の成果</div> <div>各学期末に、学修の成果の評価項目ごとに、評価基準を示し、達成水準を明示する。</div> <div>各評価項目に対応した科目の成績評価を S=4, A=3, B=2, C=1 と数値に変換した上で、加重値を加味し算出した評価基準値に基づき、入学してからその学期までの学修の成果を「極めて優秀(Excellent)」、「優秀(Very Good)」、「良好(Good)」の3段階で示す。</div>									
<table><tr><td>学修の成果</td><td>評価基準値</td></tr><tr><td>極めて優秀(Excellent)</td><td>3.00～4.00</td></tr><tr><td>優秀(Very Good)</td><td>2.00～2.99</td></tr><tr><td>良好(Good)</td><td>1.00～1.99</td></tr></table>	学修の成果	評価基準値	極めて優秀(Excellent)	3.00～4.00	優秀(Very Good)	2.00～2.99	良好(Good)	1.00～1.99	
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B（良：70～79 点）	2																		
C（可：60～69 点）	1																		
<p>9. 卒業論文（卒業研究）(位置づけ，配属方法，時期等)</p> <p>○概要と位置づけ</p> <p>学生は，教員が行っている最先端の研究を目の当たりにしながら，選択した研究分野における実験生物学を学修し，3 年次前期までに修得してきた分子・細胞レベルの生物学の知識を整理する。加えて，卒業研究を通して，現状の把握（理解力，情報力）→問題点の発見（分析力，洞察力）→成果の発表（提案力，実行力）のプロセスを経験する。卒業後の進路で通用する専門家としての能力と技能を身につける。</p> <p>学生は，5 つの研究室のいずれかに配属され，それぞれ，指導教員から与えられたテーマのもと，卒業論文研究を行う。研究に必要な基礎的な概念，モラル等を学ぶとともに，指導教員のもと，研究を立案計画後，研究実験手法を学び，研究を実施する。また，得られた研究結果を考察し，次の研究目標を立てる。一連の研究を体験することにより，最先端の研究活動の概要に接する。各研究室で研究の中間報告会を行うとともに，4 年次年度末までに，プログラム全体で卒業論文発表会を実施する。また，卒業論文として冊子にまとめる。</p> <p>○配属方法と時期</p> <p>1. 配属時期は，3 年次後期とする。</p> <p>2. 配属は，各コースが定めた規定の配属方法に従い，担当チューターの指導のもと行う。</p> <p>担当チューターは，2 年次にガイダンスを開催し，各教員の専門を学生に周知させる。また，学生に卒業論文発表会や修士論文発表会に参加するよう指導し，各教員の研究内容を理解させる。3 年次前期には各教員自身が研究内容，研究室の状況を学生に説明する会（研究室配属ガイダンス）を開催する。また，学生は各研究室を訪問し，卒業論文の内容や研究室の状況を把握する。</p> <p>各研究室や各教員への配属人数の上限および下限は担当チューターが各教員と相談し，コース会議で定める。配属は，学生同士で希望調査を行い，学生同士で相談することで決定し，コース会議で了承する。担当チューターが配属人数の調整を行うこともある。</p>	<p>○ Appointment qualification for food sanitation supervisor and food sanitation inspector</p> <p>* For details of acquisition of these qualifications, refer to the "Student Handbook."</p> <p>7. Class subjects and their contents</p> <p>* For the class subjects, refer to the subject table in Attachment 1. (The subject table is to be attached.)</p> <p>* For the details of the class subjects, refer to the syllabus that is published for each academic year.</p> <p>8. Academic achievement</p> <p>The evaluation criteria are specified for each evaluation item for academic achievement, and the level of achievement against the criteria is given at the end of the semester.</p> <p>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 the time the student entered the university to the end of the current semester, is determined using these values while applying weightings. The evaluation standard values correspond to three levels, i.e. Excellent, Very Good, and Good.</p> <table><tr><td>Study achievement</td><td>Evaluation standard</td></tr><tr><td>Excellent</td><td>3.00 - 4.00</td></tr><tr><td>Very Good</td><td>2.00 - 2.99</td></tr><tr><td>Good</td><td>1.00 - 1.99</td></tr></table> <table><tr><td>Achievement evaluation</td><td>Numerical conversion</td></tr><tr><td>S (Excellent: 90 or more points)</td><td>4</td></tr><tr><td>A (Very good: 80 - 89 points)</td><td>3</td></tr><tr><td>B (Good: 70 - 79 points)</td><td>2</td></tr><tr><td>C (Passed: 60 - 69 points)</td><td>1</td></tr></table> <p>* Refer to the relationship between evaluation items and evaluation criteria described in Attachment 2.</p> <p>* Refer to the relationship between evaluation items and class subjects described in Attachment 3.</p> <p>* Refer to the curriculum map in Attachment 4.</p> <p>9. Graduation thesis (graduation research) (meaning, student allocation, timing, etc.)</p> <p>○ Overview and meaning</p> <p>In graduation research, students study experimental biology in their selected area of study, while directly observing the research activities being conducted by faculty members, in order to organize the basic knowledge of the biology of molecules and cells that they have acquired up to the first semester of the third year. In addition to this, through graduation research, students experience the process of understanding of the situation (comprehension ability and intelligence), identifying problems (analytical ability and insight), and presenting their results (proposal ability and implementation). Students acquire the abilities and skills required to work as experts after their graduation.</p> <p>Students are allocated to one of five laboratories to conduct their graduate research on the topic that they have been given by their mentor. In their graduation research, students learn the concepts and ethics fundamentally required for research activities, establish a plan for the research, study the methods needed for the research and experiments, and carry out their research under the instruction of their mentor. Furthermore, students review the results obtained in the research and identify targets for further research. Students experience a series of research processes in person, and have the chance to observe cutting-edge research activities. An interim debriefing session is held in each laboratory. In addition, the graduation thesis presentation assembly for whole the program is held before the end of the fourth academic year. The thesis is required to be organized as a booklet.</p> <p>○ Student allocation method and timing</p> <p>1. Students are allocated to a laboratory in the second semester of the third year.</p> <p>2. Students are allocated to a laboratory under the guidance of the tutor in charge, according to the allocation method stipulated for the course.</p> <p>The tutor holds a guidance seminar for students in their second year to explain the specialties of each faculty member. The tutor also instructs students to attend the presentation assembly for graduation theses and master's theses, in order to understand the details of the research undertaken by each faculty member. A session is held in the first semester of the third year to allow faculty members to explain to students the details of their research and the situation in their laboratory. Students visit laboratories to learn about the details of the graduation thesis and the situation in the laboratories.</p> <p>The upper and lower limits for the number of students allocated to each laboratory and/or faculty are determined in a course meeting after the tutor in charge discusses it with each faculty member. Students express their wishes and discuss with one another to determine the laboratory to which each student is to be allocated, and then the allocation is approved in the course meeting. In some cases, the tutor adjusts the number of students to be allocated to each laboratory.</p> <p>10. Responsibility</p> <p>(1) Responsibility for PDCA (plan, do, check, and act) cycle</p> <p>1. The education affairs committee of school and the faculty members who provide the lectures are engaged in the "plan" and "do" processes.</p> <p>2. Each course has responsibility for planning and executing its major program. A chief faculty member is designated as the supervisor of the course.</p> <p>3. The education affairs committee of the school exercises control over the major programs provided by the</p>	Study achievement	Evaluation standard	Excellent	3.00 - 4.00	Very Good	2.00 - 2.99	Good	1.00 - 1.99	Achievement evaluation	Numerical conversion	S (Excellent: 90 or more points)	4	A (Very good: 80 - 89 points)	3	B (Good: 70 - 79 points)	2	C (Passed: 60 - 69 points)	1
Study achievement	Evaluation standard																		
Excellent	3.00 - 4.00																		
Very Good	2.00 - 2.99																		
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Achievement evaluation	Numerical conversion																		
S (Excellent: 90 or more points)	4																		
A (Very good: 80 - 89 points)	3																		
B (Good: 70 - 79 points)	2																		
C (Passed: 60 - 69 points)	1																		

<p>「社会的効果」に関しては、本プログラムの内容と密接に関連する企業への就職率、公務員試験合格率等を調べ、評価を行う。一定期間毎に、学生の主に就職する企業の人事担当者にプログラムの評価を依頼する。さらに、卒業生にも、当人の自己評価およびプログラムの評価を依頼する。企業および卒業生に依頼するプログラムの評価の内容は、プログラムの各授業科目およびその内容が社会的活動を行う上で有益であったか、授業内容が科学技術の変化や社会の変化に対応しているか、今後必要となる授業科目はないか等について、評価や意見を求める。</p> <p>(c) 学生へのフィードバックの考え方とその方法</p> <p>教育改革推進委員会は、一定期間毎に、学生へのアンケートやヒアリングを行い、プログラムを点検・評価するとともに、プログラム内容の見直し、改善のための助言・勧告を行う。</p>	<p>school.</p> <ol style="list-style-type: none">The education affairs committee of the school consists of five members who are elected from each course, and a chairman who is chosen by the school.The education reform promotion committee is engaged in the process of "check."The education reform promotion committee consists of five members who are elected from each course, a chairman who is chosen by the school, the chairman of the education affairs committee of the school, and an assistant chief of the graduate course.The education reform promotion committee reviews and evaluates the major programs provided in each course, reports the results to the education affairs committee of the school and the courses, and provides advice and recommendations.The course committee that takes the responsibility for execution of the major program is engaged in the process of "act."The course committee and the education affairs committee of the school prepare and execute a plan for improvement taking into consideration the report, advice, and recommendations that are provided by the education reform promotion committee after the “check” process. <p>The course committee, the education affairs committee of the school, and the education reform promotion committee cooperate with one another to execute their roles with responsibility in the "plan", "do", "check", and "act"cycle in order to improve the education provided by the school.</p> <p>(2) Evaluation of program</p> <p>(a) Viewpoint for evaluation of program</p> <p>The program is evaluated from the viewpoints of "educational effectiveness" and "social effectiveness."</p> <p>The "educational effectiveness" is evaluated by the effect of the implementation of the program on the educational achievement of students.</p> <p>The "social effectiveness" is evaluated by the effect of educational achievement in the program on society.</p> <p>(b) Evaluation method</p> <p>Achievement in this program is evaluated from the perspectives described above for students in the second semester of the fourth year.</p> <p>For "educational effectiveness", the results and achievements of the students who took the program are evaluated comprehensively by the group of faculty members who are engaged in the execution of the program. Also, the level of achievement of all the students is evaluated and reviewed.</p> <p>“Social effectiveness" is evaluated based on such things as the rate of employment in corporations that have a close connection with the contents of this program, and the pass rate in public servant examinations. We regularly request a member of human resources staff from a company that mainly employs students from this program to evaluate the program. In addition to this, we request graduates of this program to evaluate their own achievement and that of the program. The staff working in companies and other graduates are requested to provide evaluation and advice regarding whether the class subjects and their contents in this program had a positive effect on their social activities, whether the contents of the classes appropriately corresponded to changes in science, technology, and society, and any additional class subject that may be required in the future.</p> <p>(c) Policy and method for feedback to students</p> <p>The education reform promotion committee regularly conducts surveys and interviews for students to review and evaluate the program, improve the contents of the program, and provide advice and recommendations for improvement.</p>
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**Table of Registration Standards for Major Programs in the Applied Molecular & Cellular
Biology Course
(Specialized Subjects)**

Type	Subject type	Required No. of credits	Class subjects	No. of credits	Year in which the subject is taken							
					1st grade		2nd grade		3rd grade		4th grade	
					Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Specialized Education Subjects	Specialized Subjects	56	Immunobiology	2				○				
			Laboratory Work in Immunobiology	1				○				
			Enzyme Protein Chemistry	2				○				
			Laboratory Work in Enzyme Chemistry	1				○				
			Laboratory Work in Microbial Biochemistry	1				○				
			Biopolymer Sciences	2				○				
			Chemistry of natural organic compounds	2				○				
			Molecular Cell Biology	2				○				
			Microbial Biochemistry	2					○			
			Mammalian Molecular Biology	2					○			
			Laboratory Work in Biological Chemistry	1					○			
			Chemical Ecology	2					○			
			Laboratory Work in Ecological Biochemistry	1					○			
			Animal Cell Technology	2					○			
			Plant Molecular Biology	2					○			

			Graduation Thesis	6							○
			Required subjects: 31 total credits								
			Animal Reproduction	2				○			
			Biotechnology	2				○			
			Topics in Molecular and Cellular Biology	2				○			
			Food Microbiology	2				○			
			Plant Nutritional Physiology	2					○		
			Animal Breeding and Genetics	2					○		
			Nutrition	2					○		
			Fish Pathology	2					○		
			Aquatic biochemistry	2					○		
			Food Biochemistry	2					○		
			Food Hygiene	2					○		
			Food and health sciences	2						○	
			Aquaculture	2						○	
			<p>Elective or required subjects: 12 credits are required from a total of 26 credits.</p> <p>(Credits obtained beyond the 12 credits shall be regarded as credits obtained in elective subjects)</p>								
			<p>Elective subjects: At least 13 credits must be obtained.</p> <ul style="list-style-type: none"> • Specialized subjects from other Applied Biological Science programs outside the table can be included in the elective subjects. • Up to 12 credits obtained from specialized subjects at another School and from subjects offered by the AIMS Program completed at the dispatch destination can be included in the credits required for graduation. • Credits obtained from Liberal Arts Education Subjects and subjects related to the teaching profession cannot be included in the credits required for graduation. 								
	Total	128									

[No. of credits required for graduation]

128 credits (Liberal Arts Education Subjects: 48 credits + Basic Specialized Subjects: 24 credits + Specialized Subjects: 56 credits)

Academic achievements of Applied Molecular and Cellular Biology program

Relationships between the evaluation items and evaluation criteria

Academic achievements			Evaluation criteria		
Evaluation items			Excellent	Very Good	Good
Knowledge and Understanding	(1)	To have and understand the knowledge for considering academically and comprehensively in order to act based on a broad perspective.	The condition of having the basic academic knowledge and advanced comprehension to examine phenomena based on the comprehensive perspective, and having the explanation and application ability on basic	The condition of having the basic academic knowledge and advanced comprehension to examine phenomena based on the comprehensive perspective, and having the explanation ability on the basic academic	The condition of having the basic academic knowledge and comprehension to examine phenomena based on the comprehensive perspective.
	(2)	To have and understand the basic knowledge required for learning specialties.	The condition of having the basic academic knowledge and advanced comprehension to learn specialties, and having the explanation and application ability on basic academic	The condition of having basic academic knowledge and advanced comprehension to learn specialties, and having the explanation ability on basic academic knowledge.	The condition of having the basic academic knowledge and comprehension to learn specialties.
	(3)	To have and understand the knowledge of molecules, cells, individual organisms and ecosystem.	The condition of having the basic academic knowledge and advanced comprehension of molecules, cells, individual organisms and ecosystem, and having the explanation and application ability on the knowledge.	The condition of having the basic academic knowledge and advanced comprehension of molecules, cells, individual organisms and ecosystem, and having the explanation ability on the knowledge.	The condition of having the basic academic knowledge and comprehension of molecules, cells, individual organisms and ecosystem.
Ability and Skills	(1)	To acquire the basic communication, information processing and physical ability and skills, which are required for learning specialties.	The condition of having the enough ability and skills of basic communication, information processing and physical activities, and having the enough application	The condition of having the ability and skills of basic communication, information processing and physical activities, and having the application ability.	The condition of having the adequate ability and skills of basic communication, information processing and physical activities.
	(2)	To acquire the basic experimental ability and skills to learn specialties.	The condition of having the enough basic experiment ability and skills to learn specialties, and having the application	The condition of having the basic experiment ability and skills to learn specialties, and having the application ability.	The condition of having the basic experiment ability and skills to learn specialties.
	(3)	To acquire the intellectual ability and skills needed to learn molecules, cells, individual organisms, and ecosystem.	The condition of having the enough intellectual ability and skills in academic fields related to molecules, cells, individual organisms and ecosystem, and having the	The condition of having the intellectual ability and skills in academic fields related to molecules, cells, individual organisms and ecosystem, and having the application ability.	The condition of having the intellectual ability and skills in academic fields related to molecules, cells, individual organisms, and ecosystem.
	(4)	To acquire the basic English language ability needed to read English scientific papers.	The condition of having the basic English language ability, and having the advanced comprehension and explanation ability for scientific papers in a specialty.	The condition of having the basic English language ability, and having the comprehension and explanations ability for scientific papers in a specialty.	The condition of having the basic English language ability, and having the comprehension ability for scientific papers in a specialty.
Insive Ability	(1)	To acquire the ability for the comprehensive molecular perspective on function of cells, individual organisms and ecosystem, through data collection and complementation for research in academic fields.	The condition of having the ability for the comprehensive perspective on function of cells, individual organisms and ecosystem, based on the integrated knowledge, through data collection and complementation for research in academic fields, and having the explanation and application ability on the basic academic knowledge.	The condition of having the ability for the comprehensive perspective on function of cells, individual organisms and ecosystem, based on the integrated knowledge, through data collection and complementation for research in academic fields, and having the explanation ability on the basic academic knowledge.	The condition of having the ability for the comprehensive perspective on function of cells, individual organisms and ecosystem, based on the integrated knowledge, through data collection and complementation for research in academic fields.

Academic achievements			Evaluation criteria		
Comprehe		With regard to comprehensive perspective on cells, individual organisms and ecosystem, to acquire the ability for summarizing and verifying their opinions, delivering presentations or reports logically, and answering questions.	With regard to the comprehensive perspective on cells, individual organisms and ecosystem, the condition having the ability for summarizing and verifying their opinions, delivering presentations or reports logically and exchanging opinions highly.	With regard to the comprehensive perspective on cells, individual organisms and ecosystem, the condition having the ability for summarizing and verifying their opinions, delivering presentations or reports logically and exchanging opinions sufficiently.	With regard to the comprehensive perspective on cells, individual organisms and ecosystem, the condition having the ability for summarizing and verifying their opinions, delivering presentations or reports logically and exchanging opinions.
	(2)				

Academic achievements	Evaluation criteria
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Placement of the 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. It develops the ability to study independently and scientific intelligence based on the ability to collect, analyze, and critically examine data. It also enhances insight from a broad perspective into the essentials and background of phenomena, and the linguistic ability and concern about peace that are required of a citizen of the world. It enables students to acquire the ability to integrate their findings in order to establish a "knowledge system" that is truly useful for problem solving, and to examine phenomena from a comprehensive

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	
					Knowledge and Understanding						Abilities and Skills								Comprehensive Abilities					
					(1)		(2)		(3)		(1)		(2)		(3)		(4)		(1)		(2)			
					Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items		Weighted values of evaluation items in the subject
Liberal Arts Education	Introductory Seminar for Freshmen	2	Required	1 semester	25	1					50	1										25	1	100
Liberal Arts Education	Peace Science Courses	2	Elective/required	1-2 semester	50	1					50	1												100
Liberal Arts Education	Integrated Courses	6	Elective/required	1-2 semester	50	1					50	1												100
Liberal Arts Education	Foreign Languages	12	Elective/required	1-4 semester	50	1					50	1												100
Liberal Arts Education	Information Literacy	2	Elective/required	1 semester	50	1					50	1												100
Liberal Arts Education	Area Courses	10	Elective/required	1-6 semester	50	1					50	1												100
Liberal Arts Education	Health and Sports Courses	2	Elective/required	1-2 semester	50	1					50	1												100
Liberal Arts Education	Basic Calculus/Elements of Calculus	2	Required	1 semester			80	1														20	1	100
Liberal Arts Education	Organic Chemistry	2	Required	2 semester			80	1														20	1	100
Liberal Arts Education	Species Biology	2	Required	1 semester			80	1														20	1	100
Liberal Arts Education	Cell Science	2	Required	2 semester			80	1														20	1	100
Liberal Arts Education	General Chemistry/Basic Concepts of Chemistry	2	Required	1 semester			80	1														20	1	100
Liberal Arts Education	Experimental Methods and Laboratory Work in Physics	1	Elective/required	1-2 semester			50	1					50	1										100
Liberal Arts Education	Experimental Methods and Laboratory Work in	1	Elective/required	1-2 semester			50	1					50	1										100
Liberal Arts Education	Experimental Methods and Laboratory Work in Biology	1	Elective/required	1-2 semester			50	1					50	1										100
Specialized Education	Introduction to Applied Biological Sciences	2	Required	1 semester			100	1																100
Specialized Education	Introduction to Biochemistry	2	Required	2 semester			100	1																100
Specialized Education	Agricultural Production Resources	2	Required	2 semester			100	1																100
Specialized Education	Physics for Applied Biological Science	2	Required	2 semester			100	1																100
Specialized Education	Ethics of Science and Technology	2	Required	2 semester			50	1					50	1										100
Specialized Education	Environmental Sciences for Bionroduction	2	Required	3 semester			100	1																100
Specialized Education	Basic Molecular Biology	2	Required	3 semester			100	1																100
Specialized Education	Laboratory Work in General Biology I	1	Required	3 semester			50	1					50	1										100
Specialized Education	Laboratory Work in General Biology II	1	Required	3 semester			50	1					50	1										100
Specialized Education	Basic Experiments in Chemistry	1	Required	3 semester			50	1					50	1										100
Specialized Education	Laboratory Work in General Physics	1	Required	3 semester			50	1					50	1										100
Specialized Education	Introduction to Microbiology	2	Elective/required	1 semester			50	1					50	1										100
Specialized Education	Seminer in Field Science	2	Elective/required	2 semester			50	1					50	1										100
Specialized Education	Ecology	2	Elective/required	3 semester			50	1					50	1										100

Subject Classification	Subject Name	Credits	Type of course registration	Grade	Evaluation items																		Total weighted values of evaluation items in the	
					Knowledge and Understanding						Abilities and Skills								Comprehensive Abilities					
					(1)		(2)		(3)		(1)		(2)		(3)		(4)		(1)		(2)			
					Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items		Weighted values of evaluation items in the subject
Specialized Education	Animal Physiology	2	Elective/required	3 semester			50	1					50	1										100
Specialized Education	Genetics	2	Elective/required	3 semester			50	1					50	1										100
Specialized Education	Introduction to Biological Science of Animal	2	Elective/required	3 semester			50	1					50	1										100
Specialized Education	Introduction to Plant Biological Science	2	Elective/required	3 semester			50	1					50	1										100
Specialized Education	Biological Statistics	2	Elective/required	3 semester			50	1					50	1										100
Specialized Education	Biophysical Chemistry	2	Elective/required	3 semester			50	1					50	1										100
Specialized Education	Public Hygiene	2	Elective/required	5semester			50	1					50	1										100
Specialized Education	Enzyme Protein Chemistry	2	Required	4 semester					80	1												20	1	100
Specialized Education	Molecular Cell Biology	2	Required	4 semester					80	1												20	1	100
Specialized Education	Biopolymer Sciences	2	Required	4 semester					80	1												20	1	100
Specialized Education	Chemical Ecology	2	Required	5semester					80	1												20	1	100
Specialized Education	Immunobiology	2	Required	4 semester					80	1												20	1	100
Specialized Education	Microbial Biochemistry	2	Required	5semester					80	1												20	1	100
Specialized Education	Plant Molecular Biology	2	Required	5semester					80	1												20	1	100
Specialized Education	Mammalian Molecular Biology	2	Required	5semester					80	1												20	1	100
Specialized Education	Animal Cell Technology	2	Required	5semester					80	1												20	1	100
Specialized Education	Chemistry of natural organic compounds	2	Required	4 semester					80	1												20	1	100
Specialized Education	Laboratory Work in Enzyme Chemistry	1	Required	4 semester											80	1						20	1	100
Specialized Education	Laboratory Work in Microbial Biochemistry	1	Required	4 semester											80	1						20	1	100
Specialized Education	Laboratory Work in Ecological Biochemistry	1	Required	5semester											80	1						20	1	100
Specialized Education	Laboratory Work in Immunobiology	1	Required	4 semester											80	1						20	1	100
Specialized Education	Laboratory Work in Biological Chemistry	1	Required	5semester											80	1						20	1	100
Specialized Education	Reading of Foreign Literature	2	Required	5semester							25	1	25	1			25	1				25	1	100
Specialized Education	Graduation Thesis	6	Required	6-8semester				10	1						10	1						80	15	100
Specialized Education	Plant Nutritional Physiology	2	Elective/required	6 semester															50	1	50	1		100
Specialized Education	Animal Breeding and Genetics	2	Elective/required	6 semester															50	1	50	1		100
Specialized Education	Biotechnology	2	Elective/required	5semester															50	1	50	1		100
Specialized Education	Topics in Molecular and Cellular Biology	2	Elective/required	5semester															50	1	50	1		100
Specialized Education	Nutrition	2	Elective/required	6 semester															50	1	50	1		100
Specialized Education	Food Microbiology	2	Elective/required	5semester															50	1	50	1		100
Specialized Education	Fish Pathology	2	Elective/required	6 semester															50	1	50	1		100
Specialized Education	Aquatic biochemistry	2	Elective/required	6 semester															50	1	50	1		100

Subject Classification	Subject Name	Credits	Type of course registration	Grade	Evaluation items																		Total weighted values of evaluation items in the		
					Knowledge and Understanding						Abilities and Skills								Comprehensive Abilities						
					(1)		(2)		(3)		(1)		(2)		(3)		(4)		(1)		(2)				
					Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject	Weighted values of evaluation items	Weighted values of evaluation items in the subject				
Specialized Education	Food and health sciences	2	Elective/required	7 semester																50	1	50	1	100	
Specialized Education	Aquaculture	2	Elective/required	7 semester																	50	1	50	1	100
Specialized Education	Animal Reproduction	2	Elective/required	4 semester																	50	1	50	1	100
Specialized Education	Food Biochemistry	2	Elective/required	6 semester																	50	1	50	1	100
Specialized Education	Food Hygiene	2	Elective/required	6 semester																	50	1	50	1	100

Curriculum Maps of Applied Molecular and Cellular Biology program

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
Knowledge and Understanding	(1)To have and understand the knowledge for considering academically and comprehensively in order to act based on a broad perspective.	Introductory Seminar for Freshmen (◎)							
		Peace Science Courses(○)							
		Integrated Courses (○)							
		Area Courses(○)							
		Information Literacy(○)							
		Health and Sports Courses(○)							
		Foreign Languages (◎)	Foreign Languages (◎)	Foreign Languages (◎)	Foreign Languages (○)				
	(2) To have and understand the basic knowledge required for learning specialties.	Basic Calculus/Elements of Calculus (◎)	Organic Chemistry (◎)	Environmental Sciences for Bioreduction (◎)		Public Hygiene (○)			
		Species Biology (◎)	Cell Science (◎)	Basic Molecular Biology (◎)					
		General Chemistry/Basic Concepts of	Introduction to Biochemistry (◎)	Laboratory Work in General Biology I, II (◎)					
		Introduction to Applied Biological Sciences (◎)	Agricultural Production Resources (◎)	Basic Experiments in Chemistry (◎)					
		Introduction to Microbiology (○)	Physics for Applied Biological Science (◎)	Laboratory Work in General Physics (◎)					
			Ethics of Science and Technology (◎)	Ecology (○)					
			Seminar in Field Science (○)	Animal Physiology (○)					
		Experimental Methods and Laboratory Work in Physics (○)		Genetics (○)					
		Experimental Methods and Laboratory Work in Chemistry (○)		Introduction to Biological Science of Animal					
		Experimental Methods and Laboratory Work in Biology (○)		Introduction to Plant Biological Science (○)					
				Biological Statistics (○)					

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
				Biophysical Chemistry(○)					
	(3)To have and understand the knowledge of molecules, cells, individual organisms and ecosystem.				Enzyme Protein Chemistry(◎)	Microbial Biochemistry(◎)	Graduation Thesis (◎)	Graduation Thesis (◎)	Graduation Thesis (◎)
					Molecular Cell Biology(◎)	Plant Molecular Biology(◎)			
					Biopolymer Sciences(◎)	Mammalian Molecular Biology (◎)			
					Immunobiology (◎)	Chemical Ecology (◎)			
					Chemistry of natural organic compounds(◎)	Animal Cell Technology(◎)			

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
Ability and Skills	(1) To acquire the basic communication, information processing and physical ability and skills, which are required for learning specialties.	Introductory Seminar for Freshman (◎)				Reading of Foreign Literature (◎)			
		Peace Science Courses (○)							
		Integrated Courses (○)							
		Area Courses (○)							
		Information Literacy (○)							
		Health and Sports Courses (○)							
		Foreign Languages (◎)	Foreign Languages (◎)	Foreign Languages (◎)	Foreign Languages (○)				
	(2) To acquire the basic experimental ability and skills to learn specialties.	Experimental Methods and Laboratory Work in Physics (○)		Laboratory Work in General Biology I, II (◎)		Public Hygiene (○)			
		Experimental Methods and Laboratory Work in Chemistry (○)		Basic Experiments in Chemistry (◎)		Reading of Foreign Literature (◎)			
		Experimental Methods and Laboratory Work in Biology (○)		Laboratory Work in General Physics (◎)					
		Introduction to Microbiology (○)	Ethics of Science and Technology (◎)	Ecology (○)					
			Seminar in Field Science (○)	Animal Physiology (○)					
				Genetics (○)					
				Introduction to Biological Science of Animal					
				Introduction to Plant Biological Sciences (○)					
				Biological Statistics (○)					
				Biophysical Chemistry (○)					
	(3) To acquire the intellectual ability and skills needed to learn molecules, cells, individual organisms, and ecosystem.				Laboratory Work in Enzyme Chemistry (◎)	Laboratory Work in Ecological Biochemistry (◎)	Graduation Thesis (◎)	Graduation Thesis (◎)	Graduation Thesis (◎)
					Laboratory Work in Microbial Biochemistry (◎)	Laboratory Work in Biological Chemistry (◎)			
					Laboratory Work in Immunobiology (◎)				

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
	(4) To acquire the basic English language ability needed to read English scientific papers.					Reading of Foreign Literature(◎)			
Comprehensive Abilities	(1) To acquire the ability for the comprehensive molecular perspective on function of cells, individual organisms and ecosystem, through data collection and complementation for research in academic fields.					Biotechnology(○)	Aquatic biochemistry(○)	Aquaculture(○)	
						Topics in Molecular and Cellular Biology	Food Biochemistry(○)	Food and health sciences(○)	
						Food Microbiology(○)	Animal Breeding and Genetics(○)		
							Fish Pathology(○)		
					Animal Reproduction(○)		Food Hygiene(○)		
							Plant Nutritional Physiology(○)		
							Nutrition(○)		
	(2) With regard to comprehensive perspective on cells, individual organisms and ecosystem, to acquire the ability for summarizing and verifying their opinions and delivering presentations or reports logically, and answering questions.	Introductory Seminar for Freshman(◎)	Organic Chemistry(◎)		Enzyme Protein Chemistry(◎)	Microbial Biochemistry(◎)	Graduation Thesis(◎)	Graduation Thesis(◎)	Graduation Thesis(◎)
		Calculus/Elements of Calculus(◎)	Cell Science(◎)		Molecular Cell Biology(◎)	Plant Molecular Biology(◎)	Animal Breeding and Genetics(○)	Aquaculture(○)	
		Species Biology(◎)			Biopolymer Sciences(◎)	Mammalian Molecular Biology(◎)	Fish Pathology(○)	Food and health sciences(○)	
					Immunobiology(◎)	Chemical Ecology(◎)	Aquatic biochemistry(○)		
		General Chemistry/Basic Concepts of			Chemistry of natural organic compounds(◎)	Animal Cell Technology(◎)	Food Biochemistry(○)		
					Laboratory Work in Enzyme Chemistry(◎)	Laboratory Work in Ecological Biochemistry(◎)	Food Hygiene(○)		
					Laboratory Work in Microbial Biochemistry(◎)	Laboratory Work in Biological Chemistry(◎)	Plant Nutritional Physiology(○)		
					Laboratory Work in Immunobiology(◎)	Biotechnology(○)	Nutrition(○)		
						Topics in Molecular and Cellular Biology			
						Food Microbiology(○)			
						Reading of Foreign Literature(◎)			

Liberal Arts Education Basic Specialized Science Specialized Education Graduation Thesis (◎)Required (○)Elective/required (△)Free elective