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|--|---|--|--|---|-----------------------|
| Tsuyama College  |   | Year   | 2021   | Course Title  | Developmental Biology |
| Course Information   |   |  |  |   |                       |
| Course Code  | 0064  |  | Course Category  | Specialized / Compulsory  |                       |
| Class Format   | Lecture   |  | Credits  | Academic Credit: 2  |                       |
| Department   | Department of Integrated Science and Technology Advanced Science Program  |  | Student Grade  | 4th   |                       |
| Term   | First Semester  |  | Classes per Week   | 2   |                       |
| Textbook and/or Teaching Materials   | Textbook: Developmental biology (edited by Koji Murai, Kagaku-Dojin)  |  |  |   |                       |
| Instructor   | MAEZAWA Takanobu  |  |  |   |                       |
| Course Objectives  |   |  |  |   |                       |
| A fertilized egg of only one cell undergoes a developmental process and divides into hundreds of millions and trillions of cells to produce an individual. The mechanism of morphogenesis will be explained. Learn what genes function and induce cell differentiation during development, and understand their ordered mechanism. |   |  |  |   |                       |
| Rubric   |   |  |  |   |                       |
|  | Excellent   | Good   | Acceptable   | Not acceptable  |                       |
| Achievement 1  | The student can better understand gametogenesis and fertilization and explain the character of germ cells   | The student can understand gametogenesis and fertilization and explain the character of germ cells | The student can explain gametogenesis and fertilization            | The student will not try to explain gametogenesis and fertilization       |                       |
| Achievement 2  | The student can better understand the early development of animals and explain their characteristics  | The student can understand the early development of animals and explain their characteristics      | The student can explain the early development of animals           | The student will not try to explain the early development of animals      |                       |
| Achievement 3  | The student can better understand the organogenesis of animals and explain their characteristics  | The student can understand the organogenesis of animals and explain their characteristics          | The student can explain the organogenesis of animals               | The student will not try to explain the organogenesis of animals          |                       |
| Achievement 4  | The student can better understand plant development and explain its characteristics   | The student can understand plant development and explain its characteristics                       | The student can explain plant development                          | The student will not try to explain plant development                     |                       |
| Assigned Department Objectives   |   |  |  |   |                       |
| Teaching Method  |   |  |  |   |                       |
| Outline  | General or Specialized : specialized<br>Field of learning : Biology<br>Required, Elective, etc. : Must complete subjects<br>Foundational academic disciplines : Biology / Basic Biology / Life Sciences<br>Relationship with Educational Objectives : This subject is the learning goals of the Department of Comprehensive Science and Engineering "(1) Cultivate human creative talent, rich in practical abilities", "(2) Acquire basic science and technical knowledge" and "(3) Acquire deep foundation knowledge of the major subject area".<br>Relationship with JABEE programs : The main goal of learning / educational in this class is "(A)".<br>Course outline : A fertilized egg of only one cell undergoes a developmental process and divides into hundreds of millions and trillions of cells to produce an individual. The mechanism of morphogenesis will be explained.   |  |  |   |                       |
| Style  | Course method : Explain the main points while projecting materials such as figures and tables with a projector or explaining with a board according to the textbook. In a timely manner, issue report assignments that match the content of the lesson, and encourage review and self-study. This course is a semi-annual course.<br>Grade evaluation method : The scores of the regular exams are evaluated equally (70%), and the quizzes, reports, and class attitudes up to each regular exam are added to this (30%) and evaluated each time.<br>Textbooks and notebooks are not allowed for the exam.   |  |  |   |                       |
| Notice   | Precautions on the enrollment : This course is a "course that requires study outside of class hours". 15 credit hours open as class hours per credit. In addition to this, 30 credit hours of study will be required. Follow the instructions of your instructor for these studies.<br>Course advice : Instead of memorizing the knowledge of living things, I want you to understand and acquire the mechanism of life phenomena.<br>Foundational subjects : Biology I (1st year), Chemistry I (2nd), Chemistry II (3rd), Experiments in Science (2nd), General biology (2nd), Molecular biology (3rd)<br>Related subjects : Applied biology (4th years) , Experiments in Biology (4th), Biochemistry (4th), Cell Biology (4th), Bioinformatics (5th)<br>Attendance advice : Adhering to deadlines for report assignments. Late arrivals will be treated as absent after half the class time has passed. If you have any questions about the lecture or anything related to it, please actively ask questions and deepen your understanding. |  |  |   |                       |
| Characteristics of Class / Division in Learning  |   |  |  |   |                       |
| <input type="checkbox"/> Active Learning   |   | <input type="checkbox"/> Aided by ICT  |  | <input type="checkbox"/> Applicable to Remote Class                       |                       |
| <input type="checkbox"/> Instructor Professionally Experienced   |   |  |  |   |                       |
| Course Plan  |   |  |  |   |                       |
|  |   |  | Theme  | Goals   |                       |
| 1st Semester   | 1st Quarter   | 1st  | Guidance: What is developmental biology?                           | Explain an overview of developmental biology                              |                       |
|  |   | 2nd  | Cell continuity and meiosis  | Explain cell continuity and meiosis                                       |                       |
|  |   | 3rd  | Early development of animals I : its morphological characteristics | Explain the morphological characteristics of early development of animals |                       |

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|  |             | 4th  | Early development of animals II : Hierarchy of morphogenetic genes             | Explain the hierarchy of morphogenetic genes in early development of animals                      |
|  |             | 5th  | Early development of animals III : Mesoderm induction and nerve induction      | Explain mesoderm induction and nerve induction in early development of animals                    |
|  |             | 6th  | Organogenesis I : Differences between insects and vertebrates in eye formation | Explain the difference between insects and vertebrates in the formation of animal eyes            |
|  |             | 7th  | Organogenesis of animals II: Formation of limbs and gonads                     | Explain the formation of limbs and gonads in animals  |
|  |             | 8th  | 1st semester mid-term exam   |   |
|  | 2nd Quarter | 9th  | Return and commentary of exam answers  |   |
|  |             | 10th | Gametogenesis and fertilization of animals                                     | Explain animal gametogenesis and fertilization  |
|  |             | 11th | Gametogenesis and fertilization of animals                                     | Explain animal gametogenesis and fertilization  |
|  |             | 12th | Early development and vegetative growth of plants                              | Explain the early development and vegetative growth of plants                                     |
|  |             | 13th | Reproductive growth and gametogenesis of plants                                | Explain plant reproductive growth and gametogenesis   |
|  |             | 14th | Commonality and peculiarities of animal and plant developmental principles     | Explain the commonalities and peculiarities of the developmental principles of animals and plants |
|  |             | 15th | (1st semester final exam)  |   |
|  |             | 16th | Return and commentary of exam answers  |   |

#### Evaluation Method and Weight (%)

|                         | Examination | Presentation | Mutual Evaluations between students | Behavior | Portfolio | Other | Total |
|-------------------------|-------------|--------------|-------------------------------------|----------|-----------|-------|-------|
| Subtotal                | 70          | 0            | 0                                   | 0        | 30        | 0     | 100   |
| Basic Proficiency       | 0           | 0            | 0                                   | 0        | 0         | 0     | 0     |
| Specialized Proficiency | 70          | 0            | 0                                   | 0        | 30        | 0     | 100   |
| Cross Area Proficiency  | 0           | 0            | 0                                   | 0        | 0         | 0     | 0     |