Tsuyama College	Year	2020	Course Title	Applied Biology

Course Information

Course Code	0066	Course Category	General / Compulsory
Class Format	Lecture	Credits	School Credit: 1
Department	Department of Integrated Science and Technology Communication and Informations System Program	Student Grade	4th
Term	Second Semester	Classes per Week	2
Textbook and/or Teaching Materials	No textbooks will be specified, and prints will be distributed as appropriate during class.		
Instructor	TAKAGI Kenji		

Course Objectives

Learning purposes: Understand applied fields of biology such as biotechnology, agriculture, and medicine.
Course Objectives:
1. To understand the Central Dogma.
2. To understand biotechnology.
3. To understand the application of life science in the fields of agriculture and medicine.

Rubric

	Excellent	Good	Acceptable	Not acceptable
Achievement 1	Understand the central dogma and be able to explain the advantages of using DNA as genetic information from an engineering perspective.	Understand the central dogma and be able to explain the benefits of using DNA as genetic information	Understand the benefits of using DNA as genetic information	Has not reached the required standards
Achievement 2	Be able to explain the mechanism and proper use of multiple gene amplification technologies and cell line establishment methods	Be able to explain the mechanism of gene amplification technology and cell line establishment method	Understand the mechanism of gene amplification technology and cell line establishment methods	Has not reached the required standards
Achievement 3	Understand infertility treatment, gene therapy, and production of genetically modified crops using biotechnology, and be able to explain their advantages and problems.	Understand infertility treatment and gene therapy using biotechnological methods, production of genetically modified crops, etc., and understand their advantages	Understand infertility treatment, gene therapy, and the production of genetically modified crops using biotechnology.	Has not reached the required standards

Assigned Department Objectives

Teaching Method

Outline	General or Specialized : General Field of learning : Common and basics of natural science Required, Elective, etc. : Must complete subjects Foundational academic disciplines : Biology I, Chemistry I Relationship with Educational Objectives : This class is equivalent to "(2) Acquire basic science and technical knowledge". Relationship with JABEE programs : The main goal of learning / education in this class is "(A), A-1"are involved. Course outline : Advances in life science in the latter half of the 20th century have made it possible to understand life phenomena at the genetic, molecular, and cellular levels. Biology has now become an indispensable academic field not only in the physical field but also as the basis of applied fields such as engineering, agriculture, and medicine. In this lecture, we will explain the application of biology.
Style	Course method : The main points will be explained while projecting materials such as figures and tables with a projector or explaining with a board. Timely, report assignments will be given according to the content of the lesson to encourage review and self-study. Grade evaluation method : The scores of the two 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. As a general rule, grade grades are simply averages of all results.
Notice	Precautions on the enrollment: Since this course is a must complete subjects, it is mandatory to take it (the number of absent hours is less than one-third of the prescribed number of class hours) to complete the course in the fourth grade. Course advice: Instead of memorize biotechnology methods and their application development, understand and acquire the mechanism as rooted in life phenomena. Foundational subjects: Biology I (1st year), Chemistry I (2nd year), Chemistry II (3rd year) Related subjects: Applied Chemistry (4th year) Attendance advice: Strictly adhere to the deadline 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.

Course Plan

			Theme	Goals

2nd Semester	3rd Quarter	1st	Guidance: What is Applied Biology?	Understand what to learn in this course
		2nd	Central dogma : gene	Understand genetic information substances
		3rd	Central dogma : protein	Understand the process of protein synthesis
		4th	Mechanism of DNA replication	Understand the DNA replication that occurs in cells
		5th	Gene amplification method (PCR method)	Understand the principle of PCR method
		6th	Application of PCR method	Understand the applications of PCR methods that are familiar to us
		7th	(mid-term exams)	
		8th	Return of the mid-term exams and explanation of the answers	
	4th Quarter	9th	Cell culture and production of totipotent cells (animal)	Understand the mechanism of cell culture and ES cells and iPS cells
		10th	Cell culture and production of totipotent cells (plant)	Understand plant callus formation
		11th	Understand medical care, agriculture, and industry using cultured cells	Understand medical care, agriculture, and industry using cultured cells
		12th	Various genetic modification technologies	Understand genetic modification technology
		13th	Gene therapy and infertility treatment	Understand medical care using genetic modification technology
		14th	Creation and application development of genetically modified organisms	Understand genetically modified organisms
		15th	(final exams)	
		16th	Return of the final exams and explanation of the answer	

Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total
Subtotal	70	0	0	0	0	30	100
Basic Proficiency	35	0	0	0	0	15	50
Specialized Proficiency	0	0	0	0	0	0	0
Cross Area Proficiency	35	0	0	0	0	15	50