연세대학교 YONSEI UNIVERSITY

IEE1173-01 SCIENCE MEDICINE AND SOCIETY

COURSE TITLE	SCIENCE MEDICINE AND SOCIETY	**COURSE CODE-SECTION**	IEE1173-01
CREDIT	3	**CLASS PERIOD**	P1(09:00~10:40)
OFFICE		**OFFICE HOURS**	
INSTRUCTOR	Jon Soderholm	**EMAIL**	jfsoder@yonsei.ac.kr

[COURSE INFORMATION]

COURSE DESCRIPTION & BRIEF INTRODUCTION OF THE COURSE	This general science education course is designed to provide students not majoring in a life science with knowledge about how biological principles are being applied to solve modern day problems. After an introduction to the properties of life, we will cover current topics that often appear in the media, such as gene editing, genetically modified foods, metabolic engineering, stem cell technologies, synthetic biology, and precision medicine. The overall goal is for students to understand some of the basic science behind these biotechnological applications and to become aware of the strengths and limitations of current technologies. In addition, students will learn about the associated benefits and possible ethical concerns so that they may have informed opinions about the development of such technologies. **Students are encouraged to express their opinions in class and diverse points of view are welcome.**
COURSE GOALS	1. To learn about basic mechanisms associated with life science 2. To understand current problems that may be solved with biotechnology 3. To address specific ethical concerns related to life science and biotechnology 4. To discuss future technologies and their applications

COURSE METHODS (100% TOTAL)	LECTURE	PRACTICE TRAINING	PRESENTATION	DEBATE	TEAM PROJECT
	70%	30%			

GRADING POLICY (100% TOTAL)	MIDTERM	FINAL EXAM	QUIZ	INDIVIDUAL ASSIGNMENT	TEAM ASSIGNMENT	ATTENDANCE	OTHERS
	60 pts	60 pts	40 pts	100 pts			

PREREQUISITE	There are no prerequisites for this course
COURSE REQUIREMENTS	Attendance and in-class assignments are required in addition to the exams and quizzes. In-class participation will also be encouraged.

TEXTS & REFERENCES	Reading material will be provided by the instructor before each new topic is introduced.

[WEEKLY SCHEDULE]

WEEK	DAILY TOPIC & CONTENTS	COURSE MATERIAL & ASSIGNMENTS	REFERENCE
WEEK1 (June 30 to July 3, 2025)	Overview of applied life science Overview of the properties of life I. The structure of cells II. The structure of DNA III. The basics of inheritance V. The Central Dogma of Biology: gene expression VI. The scientific method and how science is conducted		
WEEK 2 (July 7 to July 10, 2025)	Genetic engineering I. In vitro and in vivo manipulation of DNA and transgenics. II. Government oversight of genetic manipulation II. DNA as a data storage medium III. DNA as a computational tool Gene editing. I. Gene therapy and disease II. Gene editing in humans and ethical implications III. Somatic gene editing versus germline gene editing		
WEEK3 (July 14 to July 17, 2025)	Genetically modified organisms (GMOs) and food I. Why produce GMOs? II. Which foods are genetically modified III. How do GMOs behave physiologically? Genetically modified organisms (GMOs) and food		

WEEK	DAILY TOPIC & CONTENTS	COURSE MATERIAL & ASSIGNMENTS	REFERENCE
	I. Are foods derived from GMOs safe? II. Testing and labelling III. The GMO debate Synthetic biology and metabolic engineering I. Industrial applications for producing renewable fuels and medicines II. Modifying endogenous metabolic pathways to generate an exogenous product		
WEEK4 (July 21 to July 23, 2025)	Genomics I. The genetic basis for disease II. What can we learn from a genome sequence? III. Genome projects IV. Genes and intellectual property V. The human genome VI. Genetic information security VII. Precision medicine Molecular forensics I. DNA testing , crime scene investigation, and the legal implications		
WEEK5 (July 28 to July 31, 2025)	Disease and public health I. Infectious diseases II. Vaccines: how they are made III. The vaccine debate Pharmaceuticals I. The basics of the drug discovery process II. How therapeutic drugs work III. The pharmaceutical industry IV. Drug pricing		
WEEK6 (August 4 to August 6, 2025)	Stem cell technologies I. The biology of stem cells II. Potential therapeutic uses for stem cells III. Human embryonic		

WEEK	DAILY TOPIC & CONTENTS	COURSE MATERIAL & ASSIGNMENTS	REFERENCE
	stem cells and controversy Stem cell technologies I. Pathways to obtaining stem cells II. Stem cell therapies Cloning I. Therapeutic cloning II. Reproductive cloning Bioremediation I. Common environmental toxins II. Sources of toxic waste III. Forms of bioremediation (phytoremediation, etc)		