Işık University
Faculty of Arts and Sciences
Department of Physics

BIO 150 – Introduction to Genetics

COURSE SYLLABUS

Course Name	Code	Semester	Theory (hour/week)	Application (hour/week)	Laboratory (hour/week)	Local Credits	ECTS
Introduction to Genetics	BIO 150	Fall	**3**	0	**0**	**3**	5

Prerequisities	None

Course Language	English
Course Type	Elective
Course Level	First Cycle
Course Coordinator	-
Course Lecturer(s)	-
Course Assistants	-
Course Objectives	This course is designed for engineering students to provide fundamental principles of genetics. By the end of the course, students should • grasp the important concepts of classical, molecular, and evolutionary genetics • make logical analysis of observational and experimental data based on the key concepts of genetics. • recognize the way in which the developments in genetics and bioctechnology affects todays society • realize the ethical issues relating to science of genetics and relating biotechnological developments
Course Learning Outcomes	On successful completion of this course students will be able to 1. Understand basic concepts of genetics 2. Differentiate between different modes of inheritance 3. Understand basics of meiosis and linkage 4. Learn chromosomes, chromosomal inheritance and damages 5. Solve genetic problems and quantitative population genetics 6. Grasp genetics application such as biotechnology and genetic counseling 7. Learn the concept of evolutionary genetics 8. Understand the ethical issues in the science of genetics
Course Content	Mendelism; the basic principles and chromosomal basis of inheritance. Linkage, recombination, crossing over. Molecular structure of chromosomes. Structure and function of the genes. Mutations. Elementary principles of population and evolutionary genetics.

WEEKLY SUBJECTS AND RELATED PREPARATION STUDIES

Week	Subject
1	Introduction, Genes, Alleles, Mutations, Variations, Units, and History
2	Basic Mendelian Genetics: Basic Concepts, Crosses, Mendel's Laws
3	Meiosis and Gametogenesis
4	Chromosomes: Structure and Function
5	Crossing over and Linkage
6	Genes and Genetic Variations
7	Central Dogma I: DNA, RNA structure, DNA replication
8	Central Dogma II: Transcription and Translation
9	Modes of Inheritance I: Mendelian Modes of Inheritance
10	Modes of Inheritance II: Complex Mode of Inheritance
11	Evolutionary Genetics
12	Application of Genetics: Biotechnology
13	Genetic Counseling
14	Ethical Issues relating to society
15	Review

TEXTBOOKS

Required Textbook(s)	William S Klug, Micheal R Cummings, Charşotte A Spencer, Micheal A Palladino.*Essentials of Genetics*, Pearson, San Fransisco, 2010 (4Th Edition).
Recommended Readings	- Wilkie AOM (1994): The molecular basis of Dominance. J Med. Genet 31: 89-98 - Lyon (1999) **X-chromosome inactivation.** Curr Biol. 1999,8;9(7):R235-7. - The New Genetics, NIH Publication No. 07-662, http://www.nigms.nih.gov

EVALUATION SYSTEM

Semester Requirements	Number	Percentage of Grade
Attendance/Participation	-	-
Laboratory	-	-
Application	-	-
Field Work	-	-
Special Course Internship (Work Placement)	-	-
Quizzes/Studio Critics	3	6
Homework Assignments	10	16
Presentation/Jury	-	-
Project	-	-
Seminar/Workshop	-	-
Midterms/Oral Exams	2	52
Final/Oral Exam	1	26
Total	16	100

Percentage of Semester Work	15	74
Percentage of Final Work	1	26
Total	16	100

COURSE CATEGORY

ISCED GENERAL FIELD CODE	GENERAL FIELDS	ISCED MAIN AREA CODE	MAIN EDUCATIONAL AREAS	%
1	Eğitim	14	Öğretmen Yetiştirme ve Eğitim Bilimleri	0
2	Beşeri Bilimler ve Sanat	21	Sanat	0
2	Beşeri Bilimler ve Sanat	22	Beşeri Bilimler	0
3	Sosyal Bilimler, İşletme ve Hukuk	31	Sosyal ve Davranış Bilimleri	0
3	Sosyal Bilimler, İşletme ve Hukuk	32	Gazetecilik ve Enformasyon	0
3	Sosyal Bilimler, İşletme ve Hukuk	38	Hukuk	0
4	Bilim	42	Yaşam Bilimleri	0
4	**Bilim**	**44**	**Doğa Bilimleri**	**80**
4	**Bilim**	**46**	**Matematik ve İstatistik**	**20**
4	Bilim	48	Bilgisayar	0
5	Mühendislik, Üretim ve İnşaat	52	Mühendislik	5
5	Mühendislik, Üretim ve İnşaat	54	Üretim ve İşleme	0
5	Mühendislik, Üretim ve İnşaat	58	Mimarlık ve Yapı	0
6	Tarım	62	Tarım, Ormancılık, Hayvancılık ve Su Ürünleri	0
6	Tarım	64	Veterinerlik	0
7	Sağlık ve Refah	72	Sağlık	0
7	Sağlık ve Refah	76	Sosyal Hizmetler	0
8	Hizmet	81	Kişisel Hizmetler	0
8	Hizmet	84	Ulaştırma Hizmetleri	0
8	Hizmet	85	Çevre Koruma	0
8	Hizmet	86	Güvenlik Hizmetleri	0

THE RELATIONSHIP BETWEEN COURSE LEARNING OUTCOMES AND PROGRAM OUTCOMES

Number	Program Outcomes	Level of Contribution*				
		1	2	3	4	5
1	To have a comprehension of the core areas of physics, including classical and quantum mechanics, electromagnetism, statistical and thermal physics.					
2	To have a comprehension of basic mathematics, including differential and integral calculus, linear algebra, differential equations and complex analysis.	X				
3	To have a comprehension of computer programming and chemistry.			X		
4	To have a comprehension of the importance and practice of good ethical standards.			X		
5	To have a recognition of contemporary issues in science and its applications.					X
6	To have an ability to construct theoretical models, solve problems, design and conduct experiments, as well as to analyze and interpret data.			X		
7	To have an ability to demonstrate their understanding of at least one advanced topic in theoretical or experimental physics.					
8	To have an ability to function on multi-disciplinary teams	X				
9	To have an ability to effectively communicate information in both written and verbal form		X			
10	To have a recognition of the need for and an ability to engage in life-long learning.				X	
11	To have an ability to use modern physics techniques, skills, and computing tools necessary for physics practice (use laboratory and workshop equipment to generate data, prepare technical drawings, prepare technical reports, give technical presentations, take notes effectively, write computer programs, use mathematics and/or computational tools and packages to make models) .					

*1 Lowest, 2 Low, 3 Average, 4 High, 5 Highest

Contribution of Course Learning Outcomes to Program Outcomes	The class contributes to the student development in terms of building a foundation of classical and molecular genetics for further study in life sciences. Students should develop problem solving abilities and enhance critical thinking and improve their written communication skills.

ECTS / WORKLOAD TABLE

Activities	Number	Duration (Hour)	Workload (Hour)
Course Hours (Including Exam Week: 16 x Total Hours)	15	3	45
Laboratory	-	-	-
Application	-	-	-
Special Course Internship (Work Placement)	-	-	-
Field Work	-	-	-
Study Hours Out of Class	15	2	30
Presentations / Seminar	-	-	-
Project	-	-	-
Homework Assignments	10	2	20
Quizzes	3	1	3
Midterms / Oral Exams	2	9	18
Final / Oral Exam	1	9	9
		Total Workload	**125**
		Total Workload/25	**5**