

Işık University
Faculty of Arts and Sciences
Department of Physics

PHYS 142 – Science and Nature II

COURSE SYLLABUS

Course Name	Code	Semester	Theory (hour/week)	Application (hour/week)	Laboratory (hour/week)	Local Credits	ECTS
Science and Nature II	PHYS 142	Spring	3	0	0	3	5

Prerequisites	None
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Course Language	English
Course Type	Elective
Course Level	First Cycle
Course Coordinator	-
Course Lecturer(s)	-
Course Assistants	-
Course Objectives	<p>This course is designed for science non-majors students to give a multidisciplinary understanding of science and nature. By the end of the course, students should</p> <ul style="list-style-type: none"> * Use critical and analytical thinking to address complex local and global human issues • Explore and identify their broad intellectual interests • Develop skills in discipline-relevant research • Improve students' oral and written communication skills
Course Learning Outcomes	<p>On successful completion of this course students will be able to</p> <ol style="list-style-type: none"> 1. Explain why and how science and technology are socially constructed, using a brief case study from each domain 2. Understand the interrelationships between science, technology, and society 3. Apply analytical and critical thinking skills to a contemporary global issue in science and/or technology
Course Content	<p>Newton's laws of motion.;Electric and magnetic fields; The universe; Perturbation of an equilibrium system;The size and structure of an atom, periodic table;Kinetics of a chemical reaction; Major molecules in living organisms and their functions;The structure of DNA and the mechanism of heredity; Analysis and determination of symmetrical structures in nature, molecular structures and crystals;Interaction and variation of living populations; Biological evolution.</p>

WEEKLY SUBJECTS AND RELATED PREPARATION STUDIES

Week	Subject
1	Ecology, Ecosystems and the environment, Global warming
2	Strategies of life , Classification of living things
3	The living cell, Cell theory, Cellular metabolism, Energy and life, Cell division
4	Molecules of life, Building blocks, Macromolecules, Proteins
5	Universal features of cells
6	Review on natural science I
7	Classical and modern genetics
8	Central dogma of Molecular Biology
9	DNA replication, Transcription, Genetic code
10	Ribosomes, Transfer RNA, Synthesis of proteins
11	Control of gene expression
12	Review on molecular biology and genetics
13	Introduction of recombinant DNA technology
14	Gene technologies; Cloning, PCR, Transgenic animals, GMOs Energy concepts
15	Ethical issues behind modern gene technologies

TEXTBOOKS

Required Textbook(s)	James Trefil, Robert M. Hazen The Sciences: An Integrated Approach Wiley 5 th Edition, 2007
Recommended Readings	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	Eđitim	14	Öđretmen Yetiřtirme ve Eđitim Bilimleri	0
2	Beřeri Bilimler ve Sanat	21	Sanat	0
2	Beřeri Bilimler ve Sanat	22	Beřeri Bilimler	0
3	Sosyal Bilimler, İřletme ve Hukuk	31	Sosyal ve Davranıř Bilimleri	0
3	Sosyal Bilimler, İřletme ve Hukuk	32	Gazetecilik ve Enformasyon	0
3	Sosyal Bilimler, İřletme ve Hukuk	38	Hukuk	0
4	Bilim	42	Yařam Bilimleri	0
4	Bilim	44	Dođa Bilimleri	80
4	Bilim	46	Matematik ve İstatistik	20
4	Bilim	48	Bilgisayar	0
5	Mühendislik, Üretim ve İnřaat	52	Mühendislik	5
5	Mühendislik, Üretim ve İnřaat	54	Üretim ve İřleme	0
5	Mühendislik, Üretim ve İnřaat	58	Mimarlık ve Yapı	0
6	Tarım	62	Tarım, Ormancılık, Hayvancılık ve Su Ürünleri	0
6	Tarım	64	Veterinerlik	0
7	Sađlık ve Refah	72	Sađlık	0
7	Sađlık ve Refah	76	Sosyal Hizmetler	0
8	Hizmet	81	Kiřisel Hizmetler	0
8	Hizmet	84	Ulařtırma 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.	X				
2	To have a comprehension of basic mathematics, including differential and integral calculus, linear algebra, differential equations and complex analysis.					
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

<p>Contribution of Course Learning Outcomes to Program Outcomes</p>	<p>Class aims to explain why and how science and technology are socially constructed, using a brief case study from each domain; the interrelationships between science, technology, and society and apply analytical and critical thinking skills to a contemporary global issue in science and/or technology</p>
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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