



NEAR EAST UNIVERSITY

MOLECULAR BIOLOGY AND GENETICS

DEPARTMENT

COURSE CATALOGUE

2021-2022

Contents

Introduction	3
General Information About the Faculty	4
Duration of the Program	5
Education Type	6
General Information about the Program and Teaching Methods	7
Awarded Degree	8
Education Level	9
Registration and Acceptance Conditions	10
Graduation Requirements	11
Conversion of United States Credit System to European Credit	
Transfer And Accumulation System	12
Transfer Regulations	13
Examinations, Assessments and Grading	14
Occupational Profiles of Graduates	15
Program Director	16
Program Competencies	17
Course List	18
Courses and Contents	26
First (1.) Year Courses	26
Second (2.) Year Courses	31
Thrid (3.) Year Courses	34
Fourth (4.) Year Courses	37

Introduction

This course catalog of the Near East University Faculty of Arts and Sciences Department of Molecular Biology and Genetics has been prepared to include basic information regarding the "Molecular Biology and Genetics" program in English for various institutions such as candidate students, academicians, universities and accreditation institutions. The catalog contains general information about the department and the program, its features, duration, language of instruction, courses, internships, grading, admission requirements, and professional profile of graduates.

We hope that relevant persons and organizations will be able to access information about our department from this catalogue.

Prof. Dr. Rasime Kalkan
Head of Department
Molecular Biology and Genetics

General Information About the Faculty

General information about the Faculty of Arts and Sciences is given below:

NEU Faculty of Arts and Sciences started off at the same year which the University was founded. The faculty started off with the Department of English Language and Literature. Later, in 1994, the Department of Turkish Language and Literature and the Department of Psychology were added to the faculty. Then in 2005-2006, the Department of Mathematics and following this, in 2009-2010, the Department of Translation and Interpretation were added. Following these years, History and Translation activated in the 2013-2014 academic year. With the opening of the Geography and Turkish Preparatory School, and the Molecular Biology and Genetics Department in the 2014-2015 academic year, our faculty has reached eight departments.

Mission and Vision

With the help of highly qualified academic staff, the eight departments of the Faculty aim to bring up qualified individuals in their fields and therefore supply the needs of the community. The main goals of the faculty are; to bring up individuals competent in using and interpreting both the Turkish language and the English language by providing language training programs, to train individuals to be authoritative and sound in their fields, to encourage the specialist staff to deal with the psychological problems that a society is likely to face, and to bring up qualified staff who will promote serious studies and thus be a solution to our need of solving mathematical calculations.

Duration of the Program

The duration of the Molecular Biology and Genetics Department is 4 years. English preparatory class is not included in this four years of period; English preparatory class is only required for students who will study in English.

Education Type

Full Time (English)

General Information about the Program and Teaching Methods

Near East University, Molecular Biology and Genetics Department Program started off education in 2014-2015 Fall semester.

Although Molecular Biology and Genetics Department is founded in TRNC and Turkish Universities, the Department many representatives also in European Universities. Molecular Biology and Genetics Department aims to teach the basic principles of genetics and genomics and their applicability to diseases. The main difference between the existing molecular biology and genetics departments and the Department of the Near East University is that our graduates are specializes mainly in human genetics and human biology, knows the molecular basis of diseases and genetic mechanisms, and can establish relationships between clinical and basic sciences. The aim of the department is to train specialist equipped with theoretical and applied knowledge in various sub-branches of Molecular Biology and Genetic Sciences, who can also assimilate ethical values, aims to produce solutions for social needs, gives importance to research and development and adopts the importance of lifelong learning. Our Department has two distinct programs that the language of instruction is English and, Turkish.

The first year of education is mainly on the basic sciences and following years students are concentrating on the topics of genetics, population genetics, cancer genetics, nutrigenetics, nutrigenomics and personalized nutrition, evolution, ecology, bioinformatics, stem cell biology, aging, microbiome, DNA damage and repair mechanisms, developmental genetics. In addition to the variety of the topics offered, our department implements internship and graduation projects. The third year of the education includes a compulsory internship of 45 working days. The graduation project, which is offered in the fourth grade, provides students with the ability to critical thinking, criticize scientifically, to be aware of scientific developments, to create original projects and activities, and to provide a preliminary preparation for graduate studies.

Awarded Degree

Graduates of Molecular Biology and Genetics will receive the title of Molecular Biologist and Geneticist.

Education Level

In accordance with the National Qualifications Framework For Higher Education In Turkey (NQF-HETR), developed by the Republic of Turkey The Council of Higher Education of Republic of Turkey, Molecular Biology and Genetics General and Field Competancies (<http://tyvc.None.gov.tr/?pid=48>)(translated) to be sought in graduates of higher education institutions providing education in the field of life sciences are as follows:

NATIONAL QUALIFICATIONS FRAMEWORK FOR HIGHER EDUCATION IN TURKEY (NQF-HETR)						
6. Level (Bachelor's) Qualifications						
NQF-HETR LEVEL	KNOWLEDGE -Theoretical -Conceptual	SKILLS -Cognitive -Practical	YETKİNLİKLER			
			Competence to Work Independently and Take Responsibility	Learning Competence	Communication and Social Competence	Field Specific Competence
6 BACHELOR'S ----- EQF-LLL: 6. Level ----- QF-EHEA: 1. Cycle	1- Possess advanced level theoretical and practical knowledge supported by textbooks with updated information, practice equipments and other resources.	1- Adapts and transfers the knowledge gained in the field to secondary education. 2- Uses advanced theoretical and applied knowledge acquired in the field.3-Günün koşullarına bağlı olarak bu bilgileri yeniler. 4-Uses the advanced knowledge and skills acquired in the field, interprets and evaluates data, defines and analyzes problems in parallel with current technological developments, and develops solutions based on research and evidence. 5- Have the ability to conceptualize the events and facts related to the field; examines with scientific methods and techniques. 6- Designs and performs experiments to examine problems, collects data, analyzes and interprets results.	1-Conducts independently an advanced study in the field. 2- Takes responsibility to solve unforeseen complex problems encountered in applications related to the field individually and as a team member. 3- He/She plans and manages activities for the development of employees under her/his responsibility within the framework of a project. 4- Plays role in the decision-making process in the problems encountered in different disciplines. 5- Uses time effectively in the process of drawing conclusions using analytical thinking ability.	1- Evaluates the advanced knowledge and skills acquired in the field with a critical approach. 2- Identifies learning needs and directs learning process. 3- Develops a positive attitude towards lifelong learning. 4- Be aware of the necessity of lifelong learning and continuously improve their professional knowledge and skills.	1- Informs relevant people and institutions on issues related to field; expresses thoughts and suggestions for solutions to problems verbally and inscribed 2- Shares thoughts on issues and solution suggestions related to field with experts and non-experts by supporting them with quantitative and qualitative data. 3- With the awareness of social responsibility, organizes and implements projects and activities for the social environment in which he/she lives. 4- Follows the information in the field and communicates with colleagues by using a foreign language from the European Language Portfolio at B1 General Level. 5- Uses information and communication technologies together with computer software at the Advanced Level of the European Computer Usage License as required by the field. 6- Uses her knowledge on human health and environmental awareness in her/his field for the benefit of society.	1- Acts in accordance with social, scientific, cultural and ethical values in the phase of collecting, interpreting, applying and announcing the results of the data related to the field. 2- Has sufficient awareness of the universality of social rights, social justice, quality management and compliance and participation in protection of cultural values, environmental protection, occupational health and safety.

Registration and Acceptance Conditions

A high school diploma is required for candidates to enroll in Molecular Biology and Genetics Department. Student admission in the Republic of Turkey takes place through the university selection and placement exam conducted by Measuring, Selection and Placement Center. Students who are citizens of the Turkish Republic of Northern Cyprus are accepted to the program with the exam and placement made by our university. The admission of international students to the program is based on the evaluation of their high school graduation grades. English proficiency level is also evaluated.

Graduation Requirements

In order to graduate from the Department of Molecular Biology and Genetics, 240 credits and 45 working days of compulsory internship must be completed within 4 years. Students must complete their internship after the third academic year. Internship applications can be done in public or private institutions such as molecular biology/genetics laboratories, hospital laboratories, drug production factories and drug research and development laboratories, food production factories and biotechnology companies located in TRNC or abroad (Republic of Turkey and Europe).

In order to graduate, the cumulative grade point average (CGPA) must be at least 2 (two) out of 4 (four). If a student successfully completes all courses but has a GPA below 2.00, the student may request a Graduation Make-up Exam for up to three courses. The fee of these exams for each course varies each semester.

Conversion of United States Credit System to European Credit Transfer And Accumulation System

The most important difference between ECTS and the US credit system is that ECTS is based on student workload, while the US credit system is based on the student's theoretical and practical hours. Studies concluded that 1 ECTS = 1.67 US credits. However, this rate may vary in different universities in the USA (<http://www.mastersportal.eu/articles/11110/what-you-need-to-know-about-academic-credit-systems-in-the-us.html>).

In order to graduate, students required to be successful in every course and cumulative grade point average (GPA) must be at least 2 (two) out of 4 (four).

Transfer Regulations

Candidates who are willing to transfer from another Molecular Biology and Genetics department to the English Molecular Biology and Genetics program, must prove their English proficiency. Student Placement Exam scores of the candidate transfer students are required not to be lower than the base score of the Molecular Biology and Genetics Department of that year for the registration to the Faculty. The transcript of the candidate student is placed to the appropriate class after being reviewed by the Near East University Faculty of Arts and Sciences Board of Directors. Students willing to transfer are required to complete at least two semesters.

Examinations, Assessments and Grading

In the Department of Molecular Biology and Genetics, the success of the students in the course is evaluated according to midterm exams, final exams (multiple choice, classical etc.), presentations and assignments.

Students who fail in any course with an FF has the right to take Resit-exams. Students with a GPA less than 2 can also take Resit-exams to increase their grade point average. The grade weight of the resit- exam is equal to the grade weight of the final exam of that course. The student's grade is found by adding the other evaluation scores conducted during the relevant semester to the resit- exam raw score.

The final exam of the applied courses which requires attendance is also applied. Accordingly, the resit-exam is not held in the applied courses. At the end of the semester, the scores obtained by the students for each des are reflected in their transcripts as letter grades (course grade). The coefficients of the letter grades and their equivalents out of 100 points are presented below.

Percentage	Course Grade	Coefficient
90-100	AA	4
85-89	BA	3.5
80-84	BB	3
75-79	CB	2.5
70-74	CC	2
60-69	DC	1.5
50-59	DD	1
49 and below	FF	0

Occupational Profiles of Graduates

Graduate students can be employed as researchers in corporate and private institutions such as universities and research centers. Job sectors for graduates can be summarized as follows: clinical and genetic medicine and diagnostic centers, forensic medicine, public institutions and international research centers and laboratories, industry (pharmaceutical, agriculture, food, biomedical, transgenic animal production etc.) sectors. In addition, there is a high demand for graduates of molecular biology and genetics departments in genetic clinics, IVF centers and as a country representation of international biotechnology and biomedical companies.

Program Director

Prof. Dr. Rasime Kalkan (Head of Department)

E-mail: rasime.kalkan@neu.edu.tr

Program Competencies

1. Gains and uses basic knowledge supported by current theory and practice in the field of Molecular Biology and Genetics.
2. Comprehends the basic concepts of human genetics and their applications in Molecular Biology and Genetics.
3. Gains detailed information about the applications of Molecular Biology and Genetics, gene engineering, human genetics, biotechnology and cellular therapies.
4. Evaluates the knowledge and skills gained in the field of gene and cell technologies by taking into account the universal scientific ethics rules and puts them into practice.
5. Gains the ability to apply knowledge and skills related to gene and cell structure and functioning to different disciplines.
6. Is aware of the scientific process, thinks critically, has the ability to ask questions with experimental and theoretical approaches in molecular biology.
7. Gains knowledge and skills to plan and contribute independently to research topics selected in the field of Molecular Biology and Genetics.
8. Applies basic laboratory techniques used in molecular biology, cell biology and genetics.
9. Uses the knowledge about gene and molecular cell biology in the analysis of molecular properties of different organisms.
10. Keen to lifelong learning, ready to overcome new technical and technological challenges.
11. He/she will have the knowledge as a result of the original research that can contribute to the representation of our country and to increase our country's scientific knowledge in the field of Molecular Biology and Genetics.
12. He/She is aware of the issues and scientific developments in the field of Molecular Biology and Genetics, and can organize and implement projects and events for the biological and social awareness where he/she lives with the awareness of social responsibility.
13. Has the ability to act in accordance with social, scientific, cultural and ethical values in the stages of data collection, interpretation, application and announcement of results within the scope of basic competence in the field of Molecular Biology and Genetics.
14. Knows the molecular structure and functioning of genes and cells, control mechanisms and molecular properties of the cell in different organisms.

Course List

Frist Year

Fall Term

Course Code	Course Name	Course Hour/Week	Lab/Study/ Hour/Week	Credit	ECTS
MBG101	General and Cell Biology	3	3	4	6
CHM104	General Chemistry for Biological Sciences and Engineering	3	2	4	5
PHY101	General Physics I	3	1	3	6
COM101	Computer I	0	3	3	4
ENG101	English I	3	0	3	3
AIT 101 /AIT103 (for international students)	History I	2	0	2	2
TUR101/YIT104 (for international students)	Turkish I	2	0	2	2
CAM100	Campuse Orientation	2	0	0	2
Total		18	9	21	30

Spring Term

Course Code	Course Name	Course Hour/Week	Lab/Study/ Hour/Week	Credit	ECTS
MBG104	Molecular Cell Biology	3	2	4	6
MBG105	Basic Principles of Genetics	3	2	4	6
MBG107	Microbiology	3	2	4	5
CHM122	Organic Chemistry	3	0	3	5
AIT 102/AIT104	History II	2	0	2	2
TUR 102/YIT102	Turkish II	2	0	2	2
CAR100	Career Planning	2	0	0	2
CHC100	Cyprus: History and Culture	2	0	2	2
Total		20	6	21	30

Second Year**Fall Term**

Course Code	Course Name	Course Hour/Week	Lab/Study/ Hour/Week	Credit	ECTS
MBG201	Chromosome Dynamics	3	2	4	7
MBG202	Genes and Inheritance	3	0	3	6
MBG209	Biophysics	3	0	3	5
MBG204	Biochemistry	3	0	3	6
MBG205	Biotechnology Techniques	3	2	4	6
Total		15	4	17	30

Spring Term

Course Code	Course Name	Course Hour/Week	Lab/Study/ Hour/Week	Credit	ECTS
MBG207	Human Genetics and Genomics	3	2	4	6
MBG208	Embryology, Developmental Genetics and Teratology	3	0	3	5
MBG203	Anatomy and Physiology	3	0	3	5
MBG210	Introduction to Pharmacology	3	0	3	5
MTH218	Fundamentals of Mathematics	3	0	3	6
ENG202	Academic English and Writing	3	0	3	3
Total		18	2	19	30

Third Year**Fall Term**

Course Code	Course Name	Course Hour/Week	Lab/Study/ Hour/Week	Credit	ECTS
MBG301	Medical Genetics	4	0	4	6
MBG302	Gene Regulation and Epigenetics	3	0	3	6
MBG303	Population Genetics and Genetic Epidemiology	3	0	3	6
MBG304	Bioinformatics	3	2	4	7
MBG311	Biostatistics	3	0	3	5
Total		16	2	17	30

Spring Term

Course Code	Course Name	Course Hour/Week	Lab/Study/ Hour/Week	Credit	ECTS
MBG305	Laboratory Safety and Techniques	3	2	4	5
MBG306	Current Developments in Molecular Biology	3	0	3	5
MBG307	Protein Structure and Function	4	0	4	5
MBG308	Reproductive and Regenerative Medicine	3	0	3	5
MBG310	Immunology for Molecular Biologists	4	0	4	5
MBG504	Nutrigenetics, Nutrigenomics and Personalised Nutrition (Elective course)	3	0	3	5
Total		20	2	21	30

Fourth Year**Fall Term**

Course Code	Course Name	Course Hour/Week	Lab/Study/ Hour/Week	Credit	ECTS
MBG402	Cancer Genetics	3	0	3	5
MBG403	Teratology in Prenatal Development and Counselling	3	0	3	5
MBG503	Aging	3	0	3	5
MBG508	Nanotechnology and modelling in biological systems	3	0	3	5
MBG512	Microbiome	3	0	3	5
MBG513	Ecology	3	0	3	5
Total		18	0	18	30

Spring Term

Course Code	Course Name	Course Hour/Week	Lab/Study/ Hour/Week	Credit	ECTS
MBG401	Graduation Project I	0	18	6	7
MBG406	Graduation Project II	0	18	6	8
MBG519	Evolution	3	0	3	5
MBG520	R- coding	3	0	3	5
MBG521	Stem Cell Biology	3	0	3	5
MBG522	DNA Damage and Repair Mechanisms	3	0	3	5
Total		9	36	21	30

Courses and Contents

First Year Courses

MBG101 General and Cell Biology

Course Description: The aim of this course is to present the basic concepts of living organisms, and biological structures. This course will also provide understanding to the cell biology including organelles, cell communication and cytoskeleton. It will also provide brief introduction to nucleic acids.

Textbooks and/or References: 1) The Molecular Biology of the Cell, Alberts et al. 2008. 2) Medical Cell Biology, Steven R Goodman, 2008.

Assessment: Midterm exam and Final exam

CHM104 General Chemistry For Biological Sciences and Engineering

Course Description: This course is designed as a one-semester course for freshman molecular biology and genetics, food, biomedical and bioengineering students.

Textbooks and/or References: 1) Chemistry Principles and Reactions (7th edition, 2012) by William L. Masterton and Cecile N. Hurley, Brooks/Cole Cengage Learning 2) CHM104 Lab Manual

Assessment: Midterm exam, Lab, Final exam and Attendance

PHY101 General Physics

Course Description: This course will give information about electric field and potential, capacity, current and resistance, magnetism, inductance, Maxwell's equations, electromagnetic waves.

Textbooks and/or References: 1) J. Walker, D. Halliday, R. Resnick, "Principles of Physics", 10th Edition, Wiley, 2) Douglas C. Giancoli, Physics for Scientist and Engineers with Modern Physics, 4th Edition, Printice Hall 3) R. A. Serway and R. J. Beichner , "Physics for Scientist and Engineers with Modern Physics", 8th

Assessment: Midterm exam, Lab, Final exam

COM101 Computer I

Course Description: This course covers the ability of students to use basic information technologies effectively in their courses and professions.

Textbooks and/or References: Lecture notes given by the instructors

Assessment: Quiz, Homework, Midterm exam, Final exam, Attendance

ENG101 English I

Course Description: ENG 101 aims to develop students' awareness of the language used in everyday life situations as well as the vocabulary items used in different topics. The course has been designed to show the students communicatively useful expressions in their immediate environment. Understanding how the language is used to maintain communication or convey meaning in specific situations is prior to how the structures are put together to form the language. The aim is to expose students to some basic functions in some specific situations and topics at A2/B1 level of the CEFR so that the students can easily communicate with the foreign people in their immediate environment and develop their ability to comprehend oral English.

Textbooks and/or References: Videos and materials designed and prepared by Faculty English Programmes Unit

Assessment: Midterm exam and Final exam

AIT101/AIT103 History I

Course Description: This course will give information about the definition of the revolution, and the Turkish Revolution, the collapse of the Ottoman Empire, the National Struggle Period, the wars, congresses, relations with the states, and agreements made during the National Struggle Period.

Textbooks and/or References: 1) Ali Efdal Özkul-Hasan Samani, İmparatorluk'tan Cumhuriyet'e Modern Türkiye'nin Oluşumu Atatürk İlkeleri ve İnkılâp Tarihi, Ankara 2010. 2) Prof. Dr. Afet İnan, A History of The Turkish Revolution And Turkish Republic, çev. A.E. Uysal, Ankara 1981. 3) Mustafa Kemal Atatürk, Nutuk, I, II, III, Ankara 1998. 4) Ergün Aybars, Türkiye Cumhuriyeti Tarihi, Ankara 1994 5) Kazım Özalp, Milli Mücadele, I,II, Ankara 1998 6) Yusuf Hikmet Bayur, Türk İstiklâl Harbi, I,II, Ankara 7) Bernard Lewis, Modern Türkiye'nin Doğuşu, Ankara 1970.

Assessment: Midterm exam and Final exam

TUR101/YIT101 Turkish I

Course Description: Definition and importance of language; language-culture relation; written language and its features, external structure and rules in written expression, spelling rules and punctuation; plan, theme, point of view, and supporting ideas in the writing, paragraph writing; composition concept, composition writing rules and plans; composition roof, theme, and paragraph analysis in the selected writings, composition correction studies, general expression irregularity, thinking and expressing one's thoughts; various writing types (anecdote, stories, criticisms, novels, etc.) formal writings (curriculum vitae, petition, report,

announcement, bibliography, official articles, scientific articles, articles, etc.) and introduction, development and conclusion sections of the articles will be taught.

Textbooks and/or References: To be announced

Assessment: Midterm exam and Final exam

CAM100 Campus Orientation

Course Description: Organized so that our students can get to know university life better, this course consists of various activities aimed at gaining the identity of being a Near Easterner and adapting to university life more easily.

Textbooks and/or References: Video prepared about each module and links and materials shared on the UZEBIM course page.

Assessment: Module* Questions/Tasks

MBG104 Molecular Cell Biology

Course Description: This course will provide an understanding of the structure and the function of nucleic acids. It will also cover gene expression, cell divisions and recombination. It will provide an introduction to germ cell development and fertilisation.

Textbooks and/or References: 1) Molecular Biology of the Cell, 5E, Bruce Alberts, Alexander Johnson, Julian Lewis and Martin Raff, 2008. 2) Molecular Cell Biology: International Edition, Harvey Lodish, Arnold Berk, Chris A. Kaiser, Monty Krieger, Anthony Bretscher, Hidde Ploegh, Angelika Amon and Matthew P. Scott, 2012.

Assessment: Midterm exam and Final exam

MBG105 Basic Principles of Genetics

Course Description: This course will provide an understanding of mutations and polymorphisms, Mendelian genetics, non-Mendelian genetics, biochemical and immunogenetics, cancer genetics and population genetics.

Textbooks and/or References: 1) Principles of Genetics, Sunstad and Simmons 2012. 2) Genetics, Kathleen Simpson, 2009.

Assessment: Midterm exam and Final exam

MBG107 Microbiology

Course Description: This course will focus on the study of some major groups of bacteria and parasites of importance in human infection and on the understanding of the key concepts used in investigating and diagnosing infections in the laboratory.

Textbooks and/or References: 1) Medical Microbiology, F.H. Kayner, K. A. Bienz, J. Eckert, R. M. Zinkernagel, 2005 2) Medical Microbiology, William Irwing, Tim Boswell, Dlawer Ala'Aldeen, 2005.

Assessment: Midterm exam and Final exam

CHM122 Organic Chemistry

Course Description: This course will provide an understanding of the fundamental principles of organic chemistry, including nomenclature, structure, bonding, and the basic principles of stereochemistry. Important reactions related to the common functional groups will be covered with emphasis on reaction mechanisms.

Textbooks and/or References: 1) Organic Chemistry, Jonathan Clayden, Nick Greeves, Stuart Warren, 2012. 2) Organic Chemistry, William Brown, Christopher Foote, Brent Iverson, Eric Ansly, 2012.

Assessment: Quiz, Homework, Group project, Midterm exam, Final exam, Attendance

AIT102/AIT104 History II

Course Description: This course will give information about the relations and agreements with foreign states from the Treaty of Lausanne, the reforms made in legal, political, social, educational and cultural fields, the Turkish foreign policy of the Mustafa Kemal era, and transfer of Atatürk's principles and integral principles and Atatürkist thought to younger generations.

Textbooks and/or References: : 1) Ali Efdal Özkul-Hasan Samani, İmparatorluk'tan Cumhuriyet'e Modern Türkiye'nin Oluşumu Atatürk İlkeleri ve İnkılâp Tarihi, Ankara 2010.
2) Prof. Dr. Afet İnan, A History of The Turkish Revolution And Turkish Republic, çev. A.E. Uysal, Ankara 1981.

Assessment: Midterm exam and Final Exam

TUR102/YIT102 Turkish II

Course Description: This course aims to teach the Turkish language according to the rules.

Textbooks and/or References: To be announced

Assessment: Midterm exam and Final exam

CAR100 Career Planning

Course Description: To introduce students to career methods that will help them adapt to the rapidly changing economic, social, cultural, ethical and legal conditions of the business world and to gain the ability to adapt them to their own lives.

Textbooks and/or References: 1) Öz, Steinberg, S. (2006). Introduction to Communication. Mega Digital Publishing. 2) Lynn, H., West, R. (2019). An Introduction to Communication. Cambridge University Press. 3) Öztemel, K. (2019). Career Planning and Development. Ankara: Pegem Publishing House 4) Atay, S., Çirakoğlu Tanıverdi, B., Gülmez, N., (2019). University Career Centers Handbook. Ankara TC Presidency, Human Resources Office, Salmat Basım Pub. Ankara.

Assessment: -

CHC100 Cyprus: History and Culture

Course Description: Being able to comparatively analyse the variable dynamics of Cyprus across the ages also brings with it an understanding of the dynamics of the Mediterranean basin. Having information about the island of Cyprus and the Mediterranean culture provides us with an opportunity to understand and describe the states established in the Mediterranean, the religious communities operating there, and the socio-cultural interactions between people. This course offers the opportunity to examine in depth the social, economic and cultural dynamics of Cyprus, which acts as a bridge between East and West.

Textbooks and/or References: 1) Cyprus in Ancient Times Alasya F. / Ankara Turkish Culture Research Institute, Published in 1977, 2) Video prepared for each module and links and materials shared on the UZEBIM course page.

Assessment: Midterm exam and Final Exam

Second Year Courses

MBG201 Chromosome Dynamics

Course Description: In this course, students will learn about Mendelian and non-Mendelian inheritance patterns. They will have information about cell division and structural and numerical chromosomal anomalies caused by division. Prenatal diagnosis and basic principles of molecular cytogenetics will be taught.

Textbooks and/or References: 1) Chromosome Biology, Rudi Appels, Rosalind Morris, Bikram S. Gill, Cedric E. May 1998 2) Chromosome Abnormalities and Genetic Counseling (Oxford Monographs on Medical Genetics), R.J. M. Kinlay Gardner, Grant R. Sutherland, Lisa G. Shaffer, 2011. 3) Chromosomes: Organization and Function, Adrian T. Sumner 2003 4) Thompson & Thompson Genetics in Medicine, 8e (Thompson and Thompson Genetics in Medicine) 8th Edition Robert L. Nussbaum MD FACP FACMG (Author), Roderick R. McInnes, Huntington F Willard PhD (Author) 2016

Assessment: Midterm exam and Final exam

MBG202 Genes and Inheritance

Course Description: This course will provide an understanding of basic genetic processes. Inheritance patterns of single-gene traits, pedigree construction, chromosome aberrations, and the multifactorial basis underlying many common traits will be explored.

Textbooks and/or References: 1) Lewin's Genes XI, Jocelyn E. Krebs, Elliot S. Goldstein, Stephen T. Kilpatrick, 2013. 2) Genome, Matt Ridley, 2000.

Assessment: Midterm exam and Final exam

MBG209 Biophysics

Course Description: This course explores the principles of structure formation of biomacromolecules, presenting physical methods for the measurement of molecular forces and molecular structure. It will also deliver insight into membrane physics and transport phenomena.

Textbooks and/or References: 1) An Introduction Biophysics, 2E, Roland Graser, 2012. 2) Biophysics, William Bialeck, 2012.

Assessment: Midterm exam and Final exam

MBG204 Biochemistry

Course Description: In this course, students will learn about nucleic acids, proteins, lipids, carbohydrates and reactions involved.

Textbooks and/or References: 1) Lehninger Principle of Biochemistry, 6E, David L. Nelson and Michael M. Cox, 2013 2) Clinical Biochemistry, Nessar Ahmed, 2010 3) Biochemistry, 7E, Jeremy M. Berg, John L. Tymoczko and Lubert Stryer, 2011

Assessment: Midterm exam and Final exam

MBG205 Biotechnology Techniques

Course Description: In this course students will learn about methods used in biotechnology to investigate the nucleic acids and proteins.

Textbooks and/or References: 1) Molecular Biology Techniques, Susan Carson, Heather Miller, D. Scott Witherow, 2007. 2) Techniques for Molecular Biology, D. Tagu and C. Moussard, 2006. 3) Principles and Techniques Biochemistry and Molecular Biology, 6E, Keith Wilson and John Walker, 2005.

Assessment: Midterm exam and Final exam

MBG207 Human Genetics and Genomics

Course Description: This course will focus human genetic variation, genomic technology and the structure and function of the human genome. This course will also involve different types of DNA damage, the cellular defence mechanisms that preserve genetic integrity and the major repair mechanisms used by human cells to correct different types.

Textbooks and/or References: 1) Lewin's Genes XI, Jocelyn E. Krebs, Elliot S. Goldstein, Stephen T. Kilpatrick, 2013. 2) Genome, Matt Ridley, 2000.

Assessment: Midterm exam and Final exam

MBG208 Embryology, Developmental Genetics and Teratology

Course Description: In this course, the students will learn about the diseases occurring in embryology, developmental genetics and development.

Textbooks and/or References: 1) Developmental Genetics, Gurbachan S. Miglani, 2007. 2) Principles of Developmental Genetics, Sally A Moody, 2007.

Assessment: Midterm exam and Final exam

MBG203 Anatomy and Physiology

Course Description: This course will consider the principal functions of the human gastrointestinal tract and the renal system, explaining how these systems are affected by diseases.

Textbooks and/or References: 1) Principles of Anatomy and Physiology International Student Version, Gerard J. Tortora and Bryan H. Derrickson, 2011. 2) Medical Physiology, 11E, Guyton and Hall, 2005 3) Gray's Anatomy, Richard Drake, A. Wayne Vogl and Adam W.M. Mitchell, 2009

Assessment: Midterm exam and Final exam

MBG210 Introduction to Pharmacology

Course Description: This course will provide a firm foundation in the principles underlying pharmacology and toxicology, including the nature of drug targets, their interaction and response, the fate of drugs within the body, toxicity classification and testing, poisons and antidotes, adverse drug reactions, selective toxicity, drug discovery and development.

Textbooks and/or References: : 1) Introduction to Pharmacology, Mary Kane Asperheim, Justin P. Favaro, 2011. 2) Roach's Introductory Clinical Pharmacology, Susan M. Ford, Sally S. Roach.

Assessment: Midterm exam and Final exam

MTH218 Fundamentals of Mathematics

Course Description: In this course, students will be taught functions, limits, derivatives and integrals.

Textbooks and/or References: Robert A. Adams, Christopher Essex, Calculus, 7th edition

Assessment: Midterm exam and Final exam

ENG202 Academic English and Writing

Course Description: The course starts with summarizing in order to give the students the idea that every piece of writing has a main idea and main points. It then develops into paragraph writing (descriptive & opinion), argumentative essay, report writing, process writing, CV writing and job application letter. The course also aims to develop students' critical thinking and organisation skills while teaching different pieces of writing.

Textbooks and/or References: Materials designed by Faculty English Programme Unit

Assessment: Attendance, Writing activities, Midterm exam, Final exam

Third Year Courses

MBG301 Medical Genetics

Course Description: This course will provide the basic principles in medical genetics and the relation between the current knowledge of genetics and clinical applications. This course will further focus on the clinical relevance of the genome structure, mutations, screening, Mendelian and polygenic inheritance and risk assessments of inherited disorders.

Textbooks and/or References: 1) Essential Medical Genetics, Edward Tobias, Michael Connor, Malcolm Ferguson-Smith, 2011. 2) Medical Genetics, G. Bradley Schaefer, James N. Thompson Jr., 2014.

Assessment: Midterm exam and Final exam

MBG302 Gene Regulation and Epigenetics

Course Description: Students will learn the regulation of gene expression in prokaryotes and eukaryotes, epigenetic modifications and also they also will learn the basics of cancer epigenetics and epigenetic based diseases.

Textbooks and/or References: 1) Molecular Biology of the cell, 5th edition, Bruce Alberts, Alexande Jrohnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter, 2008. 2) Concepts of Genetics 10 th edition, William S. Klug, Michael R. Cummings, Charlotte A. Spencer, Michael A. Palladino, 2012 3) Handbook of Epigenetics The New Molecular and Medical Genetics Edited by Trygve Tollefsbol, 2011 Analysis & Principles, Robert J. Brooker, 5/e, 2015 4) Epigenetics: A Reference Manual, Jeffrey Craig, Nicholas C. Wong, 2011 5) Gene Regulation, David Latchman, 5E, 2005 6) Lewin's Genes XI, Jocelyn E. Krebs, Elliot S. Goldstein, Stephen T. Kilpatrick, 2013

Assessment: Midterm exam and Final exam

MBG303 Population Genetics and Genetic Epidemiology

Course Description: In this course, students will be taught the factors playing a role in the distribution of genetic variation in populations, the Hardy-Weinberg principle, recombination, natural selection, and the effects of diversity and genetic factors on family and society.

Textbooks and/or References: 1) Population Genetics, Matthew Hamilton, 2011. 2) An Introduction to Genetic Epidemiology, Lyle J. Palmer, George Davey Smith, Paul R. Burton, 2011.

Assessment: Midterm exam and Final exam

MBG304 Bioinformatics

Course Description: The course aims to introduce the fundamentals of computational biology and provide skills in computer methods to draw meaningful biological conclusions from sequence data. Students will gain theoretical and practical experience with standard bioinformatics tools and will be able to understand and use more advanced tools when needed. It is also organized by taking into consideration that each of the students should understand the basics of bioinformatics and have the background knowledge to perform bioinformatics analyzes on their own. At the end of the semester, students are expected to do basic bioinformatics analysis.

Textbooks and/or References: 1) M.Zvelebil and J.O.BaumşUnderstanding BioinformaticsşGarland Science,2008. 2) A.M.Lesk Introduction to Bioinformatics Oxford University Press 2002 C.A.Orengo D.T.Jones and J.M.Thornton Bioinformatics

Assessment: Midterm exam and Final exam

MBG311 Biostatistics

Course Description: This course will focus on the application of statistical theory to real-world issues, the practice of designing and conducting biomedical experiments and clinical trials, and the study of related computational algorithms and display of data.

Textbooks and/or References: 1) Bioistatistics, Norman & Streiner, third edition, 2008 2) Medical istatistics, Betty Kirkwood and Jonathan Sterne, 2003.

Assessment: Midterm exam and Final exam

MBG305 Laboratory Safety and Techniques

Course Description: This course aims to deliver information about laboratory safety, regulations and biosafety as well as discussing pros and cons of different laboratory techniques and recent advancements in molecular biology and genetics.

Textbooks and/or References: Current literature

Assessment: Discussion, Attendance

MBG306 Current Developments in Molecular Biology

Course Description: In this course recent advancement in Molecular Biology will be presented and discussed by student presentations.

Textbooks and/or References: Current literature

Assessment: Presentation and Homework

MBG307 Protein Structure and Function

Course Description: This course will provide an understanding of the structural organization of proteins and its relevance to protein function and an awareness of the biophysical methods available to study protein structure.

Textbooks and/or References: 1) Fundamentals of Protein Structure and Function, Engelbert Buxbaum, 2007. 2) From Protein Structure to Function with Bioinformatics, Daniel John Rigden, 2012.

Assessment: Midterm exam and Final exam

MBG308 Reproductive and Regenerative Medicine

Course Description: This course will explore recent advances about how reproduction is controlled, how it is affected by diseases and how reproductive processes can be manipulated by medical and pharmacological intervention..

Textbooks and/or References: Principles of Regenerative Medicine, 2nd Ed. Anthony Atala, Robert Lanza, James A. Thomson, Robert Nerem

Assessment: Midterm exam and Final exam

MBG310 Immunology for Molecular Biologists

Course Description: In this course, it is aimed to introduce the elements, mechanisms and basic concepts of the immune system.

Textbooks and/or References: 1) David Male Jonathan Brostoff David Roth Ivan Roitt, Immunology. 2) M. Murphy (Author), Casey Weaver (Author), Janeway's Immunobiology

Assessment: Midterm exam and Final exam

MBG504 Nutrigenetics, Nutrigenomics and Personalised Nutrition

Course Description: In this course, the association of nutrigenetics and nutrigenomics subjects with personal nutrition and disease will be discussed.

Textbooks and/or References: 1) Ferguson, L.R., 2014. Nutrigenomics and Nutrigenetics in Functional Foods and Personalized Nutrition, Taylor & Francis Group, 6000 Broken Sound Parkway NW, Suite 300

Assessment: Presentation and Final exam

Fourth Year Lectures

MBG402 Cancer Genetics

Course Description: This course will consider the genetic mechanisms underlying specific cancer types, discussing how recent genomic studies have led to the identification of genes that play important roles in cancer formation, and outlining how molecular genetics techniques are facilitating rapid advances in this field.

Textbooks and/or References: 1) Cancer Genetics, Boris Pasche, 2010. 2) Mitochondrial Genetics and Cancer, Gabriel D. Dakubo, 2010.

Assessment: Midterm exam and Final exam

MBG403 Teratology in Prenatal Development and Counselling

Course Description: This course will consider genetic indications for prenatal diagnosis, estimation and calculation of recurrence risks, techniques and their indications: conventional cytogenetics; molecular cytogenetics; mutation analysis; biochemical diagnosis; questionable results; mosaicism and chimaerism. It will also provide a foundation in the growing field of genetic counselling, helping students to determine when to suspect hereditary/genetic conditions, recognise the more common inherited conditions in different clinical settings and develop effective communication skills.

Textbooks and/or References: 1) Atlas of Genetic Diagnosis and Counseling, Harold Chen, 2006. 2) Preimplantation Genetic Diagnosis, Joyce C. Harper, Joy D. A. Delhanty, Alan H. Handyside, 2003.

Assessment: Midterm exam and Final exam

MBG503 Aging

Course Description: This course will focus on the molecular basis of aging.

Textbooks and/or References: Current literature

Assessment: Midterm exam and Final exam

MBG508 Nanotechnology and Modelling in Biological Systems

Course Description: The aim of this course is to understand the principles of nanotechnology and their use in the fields of biology-medicine-genetics, and learn how to create a scientific nano-project.

Textbooks and/or References: 1) Soloviev, Mikhail (ed.). Nanoparticles in Biology and Medicine. Totawa, NJ: Humana Press, 2012. 2) Binns, Chris. Introduction to Nanoscience and Nanotechnology : Tiny Structure, Big Ideas and Grey Goo. Hoboken, NJ: Wiley, 2010. 3) Ngo,

Christian and Voorde, M. H. van de. Nanotechnology in a nutshell. Paris, France: Atlantis Press, 2014.

Assessment: Projects

MBG512 Microbiome:

Course Description:

Textbooks and/or References: 1) Gut Microbiota, Edward Ishiguro Natasha Haskey Kristina Campbell, 2018 2) Fundamentals of Microbiome Science: How Microbes Shape Animal Biology, Angela E. Douglas, 2018

Assessment: Presentation, Assessment, Midterm exam and Final exam

MBG513 Ecology

Course Description: The course aims to provide information about basic ecological concepts. The main focus is to understand the lifeworld, its interactions, and its role in the ecosystem.

Textbooks and/or References: Fundamentals of ecology, Eugene P Odum; Gary W Barrett

Assessment: Presentation and Final exam

MBG401 Graduation Project I

Course Description: Establishing skills during a relatively independent research is aimed.

Textbooks and/or References: Current literature

Assessment: Graduation project

MBG406 Graduation Project II

Course Description: Establishing skills during a relatively independent research is aimed.

Textbooks and/or References: Current literature

Assessment: Graduation project

MBG519 Evolution

Course Description: Evolutionary analysis

Textbooks and/or References: 1) Evolutionary Analysis, Jon Herron & Scott Freeman

Assessment: Midterm exam and Final exam

MBG520 R-coding

Course Description: In this course, it is aimed to handle the use of the open-source code program, which will be used for data analysis and display in biological sciences accompanied by applications.

Textbooks and/or References: 1) <https://www.r-project.org/>, 2) <http://www.r-tutor.com/r-introduction>

Assessment: Midterm exam and Final exam

MBG521 Stem Cell Biology

Course Description: In this course, stem cell concepts, stem cell types, application areas of stem cells in research and treatment will be explained.

Textbooks and/or References: Robert Lanza, Anthony Atala (2012) Handbook of Stem Cells. Academic Press. ISBN: 978-0-12-385942-6

Assessment: Midterm exam and Final exam

MBG522 DNA Damage and Repair Mechanisms

Course Description: In this course, students will learn the concepts of DNA damage and mutagenesis and DNA repair mechanisms.

Textbooks and/or References: 1) DNA Repair and Mutagenesis Errol C. Friedberg . . . [et al.].—2nd ed. p. cm. 2) DNA Replication, Recombination, and Repair Molecular Mechanisms and Pathology, DOI 10. 1007/978-4-431-55873-6, Fumio Hanaoka • Kaoru Sugasawa

Assessment: Midterm exam and Final exam