COURSE OUTLINE "THE WORLD OF RNA"

1. GENERAL

SCHOOL	HEALTH SCIENCES		
DEPARTMENT	MOLECULAR BIOLOGY AND GENETICS		
LEVEL OF STUDIES	ISCED LEVEL 6		
COURSE CODE	**MBG615**	**SEMESTER**	6th and 8th
COURSE TITLE	THE WORLD OF RNA		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**HOURS/WEEK**	**ECTS CREDITS**
	2	2

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	SCIENTIFIC AREA
PREREQUISITES:	NO
TEACHING & EXAMINATION LANGUAGE:	GREEK ENGLISH FOR ERASMUS STUDENTS
COURSE OFFERED TO ERASMUS STUDENTS:	YES
COURSE URL:	https://eclass.duth.gr/courses/ALEX01259/

2. LEARNING OUTCOMES

Learning Outcomes
Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

The topics of the course are aimed at:

a) getting acquainted with the dominant role of RNA in the creation and evolution of cell life and the complexity of species,

b) the deepening of our understanding in gene expression using innovative research approaches,

c) the extensive description of examples of RNA-mediated regulatory pathways of gene expression and epigenetics, with emphasis on non-RNA coding,

d) understanding the multidimensional and multifunctional role of non-coding RNAs in the evolution and development of cellular diversity and plasticity.

Learning results

Upon successful completion of the course, students will be able to:

- Know the prominent role of RNA in the creation and evolution of life,
- Understand and apply new research approaches to the detailed identification and operation of non-coding transcripts,
- Know the specific classes of small and long non-coding regulatory RNA pathways,
- Propose solutions to RNA-mediated epigenetic problems / questions by formulating hypotheses and designing appropriate methodological approaches.

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information,
ICT Use
Adaptation to new situations
Decision making
Autonomous work
Teamwork
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project design and management
Equity and Inclusion
Respect for the natural environment
Sustainability
Demonstration of social, professional and moral responsibility and sensitivity to gender issues
Critical thinking
Promoting free, creative and inductive reasoning

- Analysis and synthesis of data and information
- Develop the ability to apply knowledge to solve practical problems
- Development of research skills
- Promotion of autonomous work
- Development of criticism and self-criticism
- Production of new research ideas
- Promoting free, creative and inductive thinking
- Development of ability to evaluate and maintain the quality of work at a high level
- Knowledge related to the working environment and the real working conditions in
- Molecular Biology / Genetics with emphasis on RNA

3. COURSE CONTENT

1. RNA as a central biopolymer in the evolution and development of life and the primary product of the genome of any organism. The dominant role of RNA in the biogenesis and evolution of proteins.
2. The function and structure of the RNA double helix. RNA-RNA interactions. The functional classes of RNA biopolymers.
3. The study of RNA species (induction, biogenesis, structure and deposition in subcellular spaces) at the levΑΣΤΗΡel of genome, tissue or organism.
4. New gene classes based on transcriptional and epigenetic experiments. What is the modern definition of a gene?
5. Categories, structure / patterns and functions of non-coding RNA molecules in the transcriptional, posttranscriptional and translational regulation of gene expression.
6. The world of non-coding regions of the genome - Their importance in the evolution of genome complexity and gene evolution.
7. RNA binding proteins. Characteristic functions of ribonucleoprotein complexes in the nucleus and cytoplasm. Membrane-less organelles
8. Epigenetic modification of RNAs in molecular processes of metabolism, immune response, neuronal plasticity and memory function - Targeted against stochastic modification of RNA.
9. The importance of RNA in induction, biogenesis and stabilization of transcriptional levels. Methodologies for the study of the above biological phenomena at the genome level.
10. The transcriptomics of Stress: The study of the response of the genome to biotic and non-biotic stimuli in the environment.

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Face to face
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Teaching Use of ICT in Computational Laboratory Education Use of ICT in Communication with students

TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*	***Activity*** ***Workload/semester*** Lectures 30 Bibliographic research & analysis 30 Assay(s) 30 **Course Total** **90**
STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others* *Please indicate all relevant information about the course assessment and how students are informed*	**Student evaluation languages** Greek, English **Method (Formative or Concluding)** Summative **Student evaluation methods** Written exam with multiple choice test (50%) Written Exam with Short Answer Questions (30%) Written Assignment (20%)

5. SUGGESTED BIBLIOGRAPHY

1. Bioinformatics & Functional Genomics (3rd Edition Wiley-Blackwell, 2015) - Jonathan Pevsner.
2. Long Non-coding RNAs in Human Disease (Springer, 2016) - Kevin V. Morris.
3. Long Non-coding RNA biology (Springer, 2017) - M.R.S. Rao
4. Bibliography recommendation: accessible articles and reviews via Web.
5. Recommendation of educational websites.