

## COURSE OUTLINE “INTRODUCTION TO COMPUTATIONAL BIOLOGY”

### 1. GENERAL

<b>SCHOOL</b>	HEALTH SCIENCES		
<b>DEPARTMENT</b>	MOLECULAR BIOLOGY AND GENETICS		
<b>LEVEL OF STUDIES</b>	ISCED LEVEL 6		
<b>COURSE CODE</b>	<b>MBG105</b>	<b>SEMESTER</b>	1 <sup>st</sup>
<b>COURSE TITLE</b>	INTRODUCTION TO COMPUTATIONAL BIOLOGY		
<b>TEACHING ACTIVITIES</b> <i>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.</i>		<b>HOURS/WEEK</b>	<b>ECTS CREDITS</b>
		4	6
<b>COURSE TYPE</b> <i>Background, General Knowledge, Scientific Area, Skill Development</i>	SCIENTIFIC AREA		
<b>PREREQUISITES:</b>	NO		
<b>TEACHING &amp; EXAMINATION LANGUAGE:</b>	GREEK		
<b>COURSE OFFERED TO ERASMUS STUDENTS:</b>	NO		
<b>COURSE URL:</b>	<a href="https://eclass.duth.gr/courses/ALEX01105/">https://eclass.duth.gr/courses/ALEX01105/</a>		

### 2. LEARNING OUTCOMES

<b>Learning Outcomes</b> <i>Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.</i>																
<p>Course aims:</p> <ul style="list-style-type: none"> <li>• Gain a basic understanding of Computational Biology</li> <li>• Train on the application of the unix programming environment</li> <li>• Gain experience from solving simple biological problems through programming a computer using the C language.</li> </ul> <p>After completing the course, the student will be able to:</p> <ul style="list-style-type: none"> <li>• use the unix programming environment</li> <li>• program a computing machine using the C programming language</li> <li>• use unix and C to solve simple biologically relevant problems</li> </ul>																
<b>General Skills</b> <i>Name the desirable general skills upon successful completion of the module</i>																
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### 3. COURSE CONTENT

#### LECTURES :

UNIX: history, characteristics, versions, login-logout, filesystem, directories, users and groups, commands cd, ls, chmod, substitution characters, standard input-output and redirection, find, cat, tail, tee, ln, mv, cp, rm, umask, chown, chgrp, mkdir, rmdir, gzip, gunzip, tar, more, who, finger, date, cal, Networks: architecture, TCP/IP, protocols and examples, ssh, ftp, telnet, talk, unix mail, http, introduction to html.

C: variables and types, for, if-else, while, functions: print() and scanf(), characters, encodings, applications

#### 1st PRACTICAL EXERCISE

- login, logout
- The unix shell
- The filesystem
- cd, pwd, ls, mkdir, rmdir
- Editors: vi, joe, nedit, xedit
- cat, more, cp, mv, rm

#### 2nd PRACTICAL EXERCISE

- cd, pwd, ls, mkdir, rmdir, cp, mv, rm, cat, more
- Special substitution characters: ~, \*, ?
- chmod

#### 3rd PRACTICAL EXERCISE

- tar
- grep, find, tail, head, wc
- w, who, finger

#### 4th PRACTICAL EXERCISE

- Unix: the full monty

#### 5th PRACTICAL EXERCISE

- C: introduction
- The compiler
- printf()
- for
- if and if-else
- Types: int, float
- One-dimensional arrays

#### 6th PRACTICAL EXERCISE

- First application: the least-squares program

#### 7th PRACTICAL EXERCISE

- Characters, strings
- Application: calculation of the molecular weight of a protein from its sequence
- Application: calculation of a hydropathy plot of a protein from its sequence, application to bacteriorhodopsin

#### 8th PRACTICAL EXERCISE

- C, the full monty: program writing exercise

### 4. LEARNING & TEACHING METHODS - EVALUATION

<b>TEACHING METHOD</b> <i>Face to face, Distance learning, etc.</i>	Face to face	
<b>USE OF INFORMATION &amp; COMMUNICATIONS TECHNOLOGY (ICT)</b> <i>Use of ICT in Teaching, in Laboratory Education, in Communication with students</i>	Use of ICT in Teaching Use of ICT in Laboratory Education Use of ICT in Communication with students	
<b>TEACHING ORGANIZATION</b>	<b>Activity</b>	<b>Workload/semester</b>

<p>The ways and methods of teaching are described in detail.</p> <p>Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research &amp; analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.</p> <p>The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.</p>	Lectures	40
	Laboratory Exercise	40
	Bibliographic research & analysis	60
	Study / creation (project)	40
	<b>Course Total</b>	<b>180</b>
<p><b>STUDENT EVALUATION</b></p> <p>Description of the evaluation process</p> <p>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</p> <p>Please indicate all relevant information about the course assessment and how students are informed</p>	<p><b>Student evaluation languages</b> Greek</p> <p><b>Method (Formative or Concluding)</b> Formative</p> <p><b>Student evaluation methods</b> Written Exam with Short Answer Questions (14%) Written exam with multiple choice test (56%) Laboratory Report (30%)</p>	

## 5. SUGGESTED BIBLIOGRAPHY

Βιβλίο [13956]: Η ΓΛΩΣΣΑ ΠΡΟΓΡΑΜΜΑΤΙΣΜΟΥ C, BRIAN W. KERNIGHAN, DENNIS M. RITCHIE  
Βιβλίο [68372112]: Μαθαίνετε εύκολα C, Καρολίδης Δημήτριος Α.  
Βιβλίο [50661767]: Πλήρες Εγχειρίδιο της C, 7η Εκδ., Bradley L. Jones, Peter Aitken, Dean Miller  
Βιβλίο [13550]: LINUX ΓΙΑ ΠΡΩΤΑΡΧΕΣ, DEE-ANN LEBLANC, RICHARD K. BLUM  
Βιβλίο [68383623]: C: Από τη Θεωρία στην Εφαρμογή, Γ. Σ. Τσελίκης - Ν. Δ. Τσελίκας  
Βιβλίο [102071593]: Αρχές και τεχνικές προγραμματισμού με τη γλώσσα C, Hanly Jeri R., Koffman Elliot B. (Συγγρ.) - Καρακαπιλίδης Νίκος, Βράκας Δημήτρης, Κυριαζής Δημοσθένης (Επιμ.)  
Βιβλίο [68370518]: Εισαγωγή στη γλώσσα C, με παραδείγματα και ασκήσεις, Αλέξανδρος Καράκος