BIOLOGY 230
Genetics and Molecular Biology

1. Factual information			
Module title	SNCB230 – Genetics and Molecular Biology		
Module tutor	Georgia Tsoulfa, PhD	**Level**	5
Module type	Taught: Lecture/guided discussion/lab	**Credit value**	4 US
Mode of delivery	100% face-to-face		
Notional learning hours	200 notional hours: 49.5 hrs lecture/tutorials, 32 hrs supervised lab work and reporting , 118.5 hrs guided independent study.		

2. Rationale of the module within the degree scheme/Prerequisites/other entry requirements
This is a required module for all Biological Sciences majors. This module is designed to introduce the basic principles of modern genetics and molecular biology, the framework within which new discoveries are interpreted, and the relations among various branches of biological research. Students who are interested in careers in biological sciences, biomedical sciences, and biotechnology should find that the course provides a firm grasp on an understanding of the concepts that will serve them well in their academic track that lies ahead.

3. Aims of the module
The goal of this module is to provide students with an understanding of fundamental concepts in genetics and molecular biology. In this context, the central dogma in molecular biology, cell division, regulation of gene expression, mendelian, non-mendelian and molecular genetics, genes linkage and mapping, mutations, biotechnology, developmental, evolutionary, and population genetics are examined. Additionally, students develop skills, such as sequence analysis, computational methods, and statistics – all of which they will acquire within the lab session of the module, and all of which are highly valued in today's research environment.

4. Pre-requisite modules or specified entry requirements
SNCB112, SNCB113

5. Is the module compensatable?

N/A

6. Are there any PSRB requirements regarding the module?
N/A

7. Intended Learning Outcomes		
A. Knowledge and understanding	**Programme LOs**	**Learning and teaching strategy**
On successful completion of the course, students will be able to A1. Describe the structure and properties of DNA and chromosomes, DNA replication and gene expression and regulation. A2. Understand how mutations occur, their effects and describe the cell's repair mechanisms. A3. Understand mendelian and non-mendelian genetics and their underlying mechanisms. A4. Describe cell cycle, cell division modes and the involved regulatory mechanisms. A5. Understand the techniques of molecular biology and molecular genetics and how they are used to analyze biological structure and function.	A1, A2, A3	Depending on the delivery mode, some or all of the following Learning and Teaching methods ● Scheduled Learning & Teaching Methods ● Lectures, Tutorials, Laboratory, Seminars, Fieldwork ● E-learning & Blended Learning Methods ● eLectures, Computer-based work, Fieldwork ● Project and Placement Learning Methods ● Group project, Site visits, Research project/dissertation

7. Intended Learning Outcomes		
B. Cognitive skills	**Programme LOs**	**Learning and teaching strategy**
On successful completion of the course, students will be able to B1. Investigate the way the techniques of genetics and molecular biology are used in basic research, clinical research, and biotechnology application. B2. Apply analytical thinking and problem-solving skills to logic "puzzles" in genetics. B3. Recognize the power and limitation of bioinformatics methods in answering questions related to biological phenomena.	B1, B2, B3	Depending on the delivery mode, some or all of the following Learning and Teaching methods ● Scheduled Learning & Teaching Methods ● Lectures, Tutorials, Laboratory, Seminars, Fieldwork ● E-learning & Blended Learning Methods ● eLectures, Computer-based work, Fieldwork ● Project and Placement Learning Methods ● Group project, Site visits, Research project/dissertation

7. Intended Learning Outcomes		
C. Practical and professional skills	**Programme LOs**	**Learning and teaching strategy**
On successful completion of the course, students will be able to C1. Solve quantitative genetics problems including the use of bioinformatics, basic statistics and probabilities. C2. Interpret information encoded in sequences, design and use primers and conduct phylogenetic analyses.	C1, C2	Depending on the delivery mode, some or all of the following Learning and Teaching methods ● Scheduled Learning & Teaching Methods ● Lectures, Tutorials, Laboratory, Seminars, Fieldwork ● E-learning & Blended Learning Methods ● eLectures, Computer-based work, Fieldwork ● Project and Placement Learning Methods ● Group project, Site visits, Research project/dissertation

7. Intended Learning Outcomes		
D. Key transferable skills	**Programme LOs**	**Learning and teaching strategy**
On successful completion of the course, students will be able to D1. Establish intellectual, personal and team skills in the context of biological research D2. Develop research ideas, form hypotheses, propose experiments to test them, and interpret data.	D1, D2	Depending on the delivery mode, some or all of the following Learning and Teaching methods ● Scheduled Learning & Teaching Methods ● Lectures, Tutorials, Laboratory, Seminars, Fieldwork ● E-learning & Blended Learning Methods ● eLectures, Computer-based work, Fieldwork ● Project and Placement Learning Methods ● Group project, Site visits, Research project/dissertation

8. Indicative content.
● Mendelian and non-mendelian genetics ● Cell division ● Recombination and gene linkage ● Genetics of bacteria and viruses ● Central Dogma – description and translation ● Regulation of gene expression ● Molecular cloning ● Mutations and DNA repair mechanisms ● Cancer genetics ● Population genetics and molecular evolution

- Multifactorial diseases
- The UCSC Genome Browser (lab)
- Recombinant DNA techniques (lab)
- Homolog searches using NCBI's BLAST tool (lab)
- Phylogenetic analyses (lab)

9. Assessment strategy, assessment methods, their relative weightings and mapping to module learning outcomes

Assessment Strategy: All summative assessments will be written by the teaching faculty, approved by an external examiner, and common learning outcomes and marking criteria will be applied to all students regarding these assessments. Module grade will be based on summative assessments listed in the Assessment Task table below. Formative assessments methods will also be used.

Summative Assessments

1. Homework: 15% (average of five components)
2. Lab reports (written): 10%
3. Midterm examination: 30% ~~(Theory 20% and lab 10%)~~
4. Final Assessment: **45%** (Theory **80%**, Lab **20%**)

Specific Assessment Guidelines and Grading Criteria are provided in due time.

Formative Assessments

Short quizzes
Short diagnostic tests
Short group presentations
Pair or group work in class

Assessment Task	Weight	Week submitted	Grading (P / F / %)	Module Learning Outcome(s) the assessment task maps to
Homework (written, 5 pieces of Homework):	0.15	Evenly distributed throughout the term	%	A1, A2, A3, A4, D1, D2
Lab reports (written, 5 reports)	0.10	Evenly distributed throughout the term	%	B1, B2, B3, C1, C2
Midterm Exam (written, 1 hour):	0.30	Evenly distributed throughout the term	%	A1, A2, A3, A4, B1, B2, B3
Final Assessment (written, 2 hours):	**0.45**	12	%	B1, B2, B3, C1, C2, D1, D2

10. Teaching staff associated with the module	
Tutor's name and contact details	**Contact hours**
Dr Georgia Tsoulfa , American College of Thessaloniki **email: gtsoulfa@act.edu**	(Office Hours)

Mini CV:

Georgia Tsoulfa, PhD, is the director of the Center for Talented Youth at Anatolia College in Greece and a biology professor at the American College of Thessaloniki. Over the course of her career, Georgia has been a medical researcher, a published scientist, given numerous presentations to scientific conferences, and has been teaching in tertiary education for many years. She has collaborated on EU-funded projects and has established European and International partnerships with researchers at universities renowned for their expertise in the field of gifted education. She has served on academic and scientific advisory boards and committees. Georgia is an advocate of sharing ideas and practices with global experts in gifted education and STEM subjects in an aim to promote the empowerment of advanced learners and to support teachers in implementing practices to enhance student engagement and motivation. She received a B.Sc. in Biology from King's College London and obtained a Ph.D. from the Faculty of Medicine of University College London.

11. Key reading list			
Author	**Year**	**Title**	**Publisher**
Daniel Hartl	2020	Essential Genetics: A Genomics Perspective, 7th edition	Jones and Bartlett

Software/Tools		
Name	**URL**	**Type (Open Source / Proprietary)**
Labster – online labs	https://www.labster.com	Proprietary
BLAST: Basic Local Alignment Search Tool	https://blast.ncbi.nlm.nih.gov/Blast.cgi	Open Source
Public databases for molecular typing and microbial genome diversity	https://pubmlst.org/bigsdb?db=pubmlst_plasmid_isolates&page=plugin&name=PCR	Open Source
Expasy - translation tool	https://web.expasy.org/translate/	Open Source

ACTivity Learning Management System (Moodle)

To Login Use the same username and password that you use to log in to ACT computers. Your computer and ACTivity account passwords are synchronized. You can change your ACTivity password by changing your computer account password using a campus computer or via Remote Access & VPN Service (https://vpn.act.edu/). If you forgot your password, you can send a reset password request using: https://forms.gle/1sYKMK2jThctUtPQ9

12. Other indicative text (e.g. websites)
Additional material uploaded on Moodle.

Learning Hub
ACT's Learning Hub offers students assistance with their writing assignments and overall development of language skills. Located on the 2nd floor of the Bissell Library, the Learning Hub also houses the Math Tutoring services, and operates on an appointment or walk-in basis throughout the academic year (https://anatolia.libguides.com/learninghub)

Student Services
The college provides many services to the students, including: ● Clubs and Organizations ● Field Trips ● Food Services ● Health and Counseling Services ● Housing ● Athletics programs and Facilities ● Career Services and Guidance ● Residence Permit Support ● Service learning opportunities ● Study Abroad Advising Most services are free to the student. For more information please refer to Undergraduate student handbook, or email: studentservices@act.edu

13. List of amendments since last (re)validation		
Area amended	**Details**	**Date Central Quality informed**

GRADING SCALE

Grade Description	UK points	US Letter Grade	US point grade
Excellent	70+	A	4.0
Very Good (high)	65-69	A-	3.67
Very Good (low)	60-64	B+	3.33
Good (high)	55-59	B	3.0
Good (low)	50-54	B-	2.67
Satisfactory (high)	45-49	C+	2.33

Satisfactory (low)	40-44	C	2.0
Fail	0-39	F	0

Grade Descriptors: These descriptors outline the typical characteristics of the standard work associated with each grade.

Excellent: Superior performance; a high level of critical analysis and evaluation; incisive and original; exceptionally well researched; high quality presentation; exceptional clarity of ideas; excellent coherence and logic; trivial or very minor errors.

Very Good: Very good performance; a very good level of critical analysis and evaluation; significant originality; well researched; clarity of ideas, thoughtful and effective presentation; very coherent and logical; minor errors only.

Good: A good performance; a good level of critical analysis and evaluation; some evidence of originality; reasonably well researched; ideas generally clear and coherent; some but not significant weakness.

Satisfactory: Satisfactory performance—at least passable; acceptable level of critical analysis and evaluation; little evidence of originality; adequately researched; ideas fairly clear and coherent, though some significant weakness.

Fail: Clearly below the pass standard; lacking substance, knowledge and understanding; ideas confused and incoherent; fundamental weaknesses in most areas; fails to meet the Learning Outcomes.

NOTICE FOR ORAL PRESENTATIONS

Oral presentations are an essential component of the assessment scheme for this course as they fulfill the ability to understand and clearly present and discuss different aspects of the material taught and the knowledge acquired. Oral presentations allow the opportunity for students to master their communication skills, their writing and speaking ability, which necessitates interaction with their classmates who also provide their critique of the speaker's performance (structure, content, visuals and non-verbal delivery skills). When delivering oral presentations, students will be assuming the role of the instructor, i.e., 1) the students will screen share their presentations to be visible by all students, both in-class and remotely attending students, 2) the camera will point to the student(s) presenting who will be visible to both groups, in-class and remotely attending students, and 3) both in-class and remotely attending students will interact via Q&A (questions and answers).

The oral presentations will not be recorded by the institution or/and the instructors, and **will not be** stored by any means; distributed; published; uploaded; or/and disclosed to any third persons or parties.

Students, who attend both in-class and remotely, are prohibited from recording; storing by any means; distributing the online sessions, publishing; uploading; or/and disclosing to any third persons or parties the oral presentation and any related information. It should be reminded that the unlawful and unauthorized processing of personal data is prohibited by the European and Greek laws.

On grounds that are related to your particular situation, you have the right to object to the processing or restrict the processing of your personal data in regard to the oral presentation. The request must be properly justified and submitted to the course instructor.

If you have any Questions in relation to the protection of your personal data or you wish to exercise your legal rights, please contact the Data Protection Officer of Anatolia College by using the following contact details: privacy@anatolia.edu.gr

GRADING & ACADEMIC POLICIES
ASSESSMENT DEADLINES
Students must submit work by the deadlines set in the module outline. Where coursework is submitted late and there are no accepted extenuating circumstances it will be penalized in line with the following tariff: Submission within 6 working days: a 10% reduction for each working day late down to the 40% pass mark and no further. Submission that is late by 7 or more working days is refused, mark of 0. Submission after the deadline will be assumed to be the next working day. Mitigating circumstances will be evaluated by the AS&PC
Assessment of non-degree students taking OU-validated courses (e.g., Study Abroad)
Same method of assessment, i.e. only “summative” assessments determine final grade. However, since those students are not pursuing an OU degree, they are not subject to resits or second marking, and final grade is calculated as the (weighted) average of all “summative” assessments, without requirement of passing all summative assessments to pass the course.
Revised Absence Policy – Effective Fall 2019
Students are expected to attend and participate in all of their courses throughout the term, including the first week. Those who fail to do so may be administratively withdrawn from individual courses of the College. This may affect the students’ scholarship and financial aid eligibility.
Successful Attendance
A student is considered to have successfully attended a course if he/she has attended 75% of the course lectures. Thus, for a typical ACT course with 42 hours of contact time, the maximum number of absences

stands at 10 hours per course. This policy applies to all ACT students, degree-seeking and Study Abroad. Please note that absences are counted on an hourly basis. Absences due to participation in school-related trips and activities may count toward this limit. Absences for any other reason cannot be excused.
ACADEMIC INTEGRITY
A student committing an act of Academic Dishonesty in a given course will receive an F (0 percentage points) in the assignment where the academic infraction took place. If a student commits an act of Academic Dishonesty for a second time in the same course, this student will receive a failing grade in that course.
Special Accommodations
If you have specific physical, psychological, or any other learning disabilities that you believe may require accommodations for this module, you should visit the Dean's office by bringing the appropriate documentation. The Learning Hub (1st floor, Bissell Library) is staffed by experienced English faculty and you are encouraged to use its services.