National University of Sciences & Technology (NUST)
School of Interdisciplinary Engineering & Sciences (SINES)

Evolutionary Biology

Course Code:	BI-301	**Semester:**	3rd
Credit Hours:	2+1	**Prerequisite Codes:**	
Instructor:		**Class:**	
Office:		**Telephone:**	
Lecture Days:		**E-mail:**	
Class Room:		**Consulting Hours:**	
Lab Engineer:		**Lab Engineer Email:**	
Knowledge Group:		**Updates on LMS:**	

Course Description:

The course focuses on modern evolutionary theory in relation to the origins and dynamics of genetic diversity in time and space, reproductive isolation and evolutionary relationships among organismal groups. Students will investigate how interactions between the evolutionary forces mutation, recombination, selection, migration and genetic drift drive the patterns and processes of biodiversity at different levels of biological organization. The course consists of lectures, computer exercises and independent projects in which students will use empirical and simulated data to develop their evolutionary thinking and to solve problems in evolution, ecology and conservation biology.

Course Objectives:

Course Learning Outcomes (CLOs):

Upon successful completion of the course, the student should be able to:	PLO	BT Level*
CLO-1. Describe evolution, basic genetics, and understand genotype and phenotype function.		
CLO-2. Analyze phylogenetic relationship and coevolution procedures		
CLO-3. Design phenotypic plasticity and norms of reaction		
CLO-4. Conduct experiments as well as analyse and interpret data		

* BT= Bloom's Taxonomy, C=Cognitive domain, P=Psychomotor domain, A= Affective domain

Mapping of CLOs to Program Learning Outcomes

PLOs/CLOs	CLO1	CLO2	CLO3

Mapping of CLOs to Assessment Modules and Weightages (In accordance with NUST statutes)

To be filled in at the end of the course.

Assessments/CLOs	CLO1	CLO2	CLO3
Quizzes: 10-15 %			
Assignments: 5-10 %			
Midterms: 30-40 %			
End Semester Exam: 40-50 %			
Total : 100 %			

Books:

Text Book:

Reference Books:

1. Herron, J. C., and S. Freeman. (2014). Evolutionary Analysis, 5th edition. Pearson Education, Boston, USA. ISBN 0-321-61667
2. Marco Tamborini (2023) The Architecture of Evolution: The Science of Form in Twentieth-Century Evolutionary Biology ISBN 978-0822947356
3. Glenn-Peter Saetre and Mark Ravinet (2019) Evolutionary Genetics: Concepts, Analysis, and Practice ISBN 978-0198830924
4. Michael P. Muehlenbein (2010) Human Evolutionary Biology ISBN 978-0521705103
5. Eva Jablonka and, Marion J. Lamb (2020) Inheritance Systems and the Extended Evolutionary Synthesis ISBN 978-1108716024

Sr. No	Main Topics to be covered	Week	Lecture wise Break up
1	Why study evolution?		
2	The history of, and evidence for, evolution		
3	Basic genetics		
4	Linkage and Recombination		
5	Genotype, phenotype & variation		
6	Quantitative genetics		
7	Pattern, process, and evolutionary inference		
8	Molecular Evolution		
9	**Mid Term Exam**		
10	Fitness and adaptation I		
11	Fitness and adaptation I		
12	Phylogenetic Analysis		
13	Coevolution,		

14	Conservation Genetics		
15	Evolution & development: genes and form,		
16	Phenotypic plasticity and norms of reaction		
17	Molecular systematics		
18	**Final Exam**		

Grading Policy:	
Quiz Policy:	The quizzes will be unannounced and normally last for ten minutes. The question framed is to test the concepts involved in last few lectures. Number of quizzes that will be used for evaluation is at the instructor's discretion. Grading for quizzes will be on a fixed scale of 0 to 10. A score of 10 indicates an exceptional attempt towards the answer and a score of 1 indicates your answer is entirely wrong but you made a reasonable effort towards the solution. Scores in between indicate very good (8-9), good (6-7), satisfactory (4-5), and poor (2-3) attempt. Failure to make a reasonable effort to answer a question scores a 0.
Assignment Policy:	In order to develop comprehensive understanding of the subject, assignments will be given. Late assignments will not be accepted / graded. All assignments will count towards the total (No 'best-of' policy). The students are advised to do the assignment themselves. Copying of assignments is highly discouraged and violations will be dealt with severely by referring any occurrences to the disciplinary committee. The questions in the assignment are meant to be challenging to give students confidence and extensive knowledge about the subject matter and enable them to prepare for the exams.
Plagiarism:	SINES maintains a zero tolerance policy towards plagiarism. While collaboration in this course is highly encouraged, you must ensure that you do not claim other people's work/ ideas as your own. Plagiarism occurs when the words, ideas, assertions, theories, figures, images, programming codes of others are presented as your own work. You must cite and acknowledge all sources of information in your assignments. Failing to comply with the SINES plagiarism policy will lead to strict penalties including zero marks in assignments and referral to the academic coordination office for disciplinary action.

Sr. No	Main Topics to be covered	Estimated Contact Hours
1		
2		
3		
4		
5		
6		
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10		
11		
12		
13		
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15		