



## Course Syllabus

1	<b>Course title</b>	Evolution	
2	<b>Course number</b>	0304465	
3	<b>Credit hours</b>	3	
	<b>Contact hours (theory, practical)</b>	3, 0	
4	<b>Prerequisites/corequisites</b>	Bio 102	
5	<b>Program title</b>	B.Sc. Biological Sciences	
6	<b>Program code</b>	04	
7	<b>Awarding institution</b>	The University of Jordan	
8	<b>School</b>	Science	
9	<b>Department</b>	Biological Sciences	
10	<b>Course level</b>	4 <sup>th</sup> year	
11	<b>Year of study and semester (s)</b>	2023/2024 First semester	
12	<b>Other department (s) involved in teaching the course</b>	N/A	
13	<b>Main teaching language</b>	English	
14	<b>Delivery method</b>	<input type="checkbox"/> Face to face learning           X Blended <input type="checkbox"/> Fully online	
15	<b>Online platforms(s)</b>	X Moodle <input type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....	
16	<b>Issuing/Revision Date</b>	8-10-2023	

### 17 Course Coordinator:

Name: **Dr. Mohammad Abu Baker**

Office number: Biological Sciences Building room # 213

Phone number: 22225

Email: ma.abubaker@ju.edu.jo

**18 Other instructors:**

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

**19 Course Description:**

This course will introduce students to the evolutionary theory as the unifying principle in modern biology. It will open with the historical context within which C. Darwin formulated his ideas is outlined and various lines of evidence in support of this theory are presented. Subsequently, evolution as a process and pattern is examined in light of current biological knowledge including the following topics: the mechanisms and modalities of natural selection, genetic drift and gene flow as evolutionary forces and their consequences for Hardy-Weinberg equilibrium; various models for speciation and the mode and tempo of evolutionary change; phylogenetic reconstruction and evolutionary developmental genetics.

**20 Course aims and outcomes:**

### A- Aims:

By the end of the class the students are expected to learn the following:

1. The position of evolution as the fundamental theoretical foundation of biology.
2. How the theory of evolution provides a most elegant and well-supported explanation for the unity, diversity and adaptability of living forms.
3. The predictive power of the evolutionary theory.
4. The modalities and mechanisms of evolution as a process.
5. The tree-like pattern of interrelationships between taxa and hierarchical nesting of biological grouping which reflects descent with modification.

B- Student Learning Outcomes (SLOs): Successful completion of the course should lead to the following outcomes:

1. Obtain the core knowledge in the theory of evolution including the approaches and evidence in comparative anatomy, ecology, and population genetics.
2. Understand the concepts of fitness, genetic variation, selection, heritability, adaptation and explain the mechanisms of microevolution (natural selection, gene flow, genetic drift, mutation, and nonrandom breeding).
3. Calculate observed allele frequencies and expected Hardy-Weinberg frequencies as means for studying population genetics.
4. Understand the concept of speciation (sympatric and allopatric) and descent with modification (macroevolution) and list the various prezygotic and postzygotic isolation mechanisms.
5. Interpret phylogenetic trees with regards to evolutionary relationships, map characters on a phylogeny and recognize homologous and analogous characters, and explain how new species arise
6. Understand the relationship between evolution and development; how similarities and differences in body plans arose across the tree of life (EvoDevo).
7. Gain the experience with diverse learning methods (reading, discussions, lectures, videos, ....)

SLOs	SLO (1)	SLO (2)	SLO (3)	SLO (4)	SLO (5)	SLO (6)
SLOs of the course						
1	X		X			
2	X					
3	X					
4	X					
5	X		X			
6	X					
7			X			

## 21. Topic Outline and Schedule:

Week	Lecture	Topic	Teaching Methods*/platform	Evaluation Methods**	References
1	1.1	Introduction to the course			
	1.2	The Pattern of Evolution: Evidence!	Lecture	Exam	Ch 2
	1.3				
2	2.1	The Pattern of Evolution: Evidence!	Lecture	Exam	Ch 2
	2.2	Trophy hunting	Discussion	Discussion/homework	Reading
	2.3				
3	3.1	Evolution by Natural Selection	Lecture	Exam	
	3.2	Evolution by Natural Selection	Lecture	Exam	
	3.3				
4	4.1	The Beak of the Finch	Short Movie Evolution in Real Time (hhmi)	Discussion/homework	The Beak of the Finch
	4.2	The Beak of the Finch	Discussion	Discussion/homework	The Beak of the Finch
	4.3				
5	5.1	Population genetics: genetic variation; Hardy-Weinberg	Lecture	Exam	Ch 6
	5.2	Population genetics: genetic variation; Hardy-Weinberg	Lecture	Exam	Ch 6

	5.3				
6	6.1	Population genetics: genetic drift; gene flow.	Lecture	Exam	Ch 7
	6.2	Population genetics	Lecture/Discussion	Homework – Hardy-Weinberg problem set	
	6.3				
7	7.1	Sexual selection	Lecture	Exam	Ch 11
	7.2	Sexual selection	Lecture	Exam	Ch 11
	7.3				
8	8.1	Sexual selection	Movie: what females want and males will do (nature pbs)	Homework	
	8.2	Sexual selection	Discussion	Homework	<b>Reading-</b> Møller, 1994.
	8.3				
9	9.1	Kin selection & Social behavior (Altruism, Cooperation)	Lecture	Exam	
	9.2	Kin selection & Social behavior (Altruism, Cooperation)	Lecture/discussion	Homework	<b>Reading –</b> Making decisions in the family
	9.3				
10	10.1	Speciation	Lecture	Exam	Ch 16
	10.2	Speciation	Lecture/Discussion	Homework – Leopard spots!	Ch 16
	10.3				
11	11.1	Evolutionary trees: phylogeny and taxonomy	Lecture	Exam	Ch 4

	11.2	Evolutionary trees: phylogeny and taxonomy	Lecture/Discussion	Exercise – What are whales?	Ch 4
	11.3				
12	12.1	Evolution and Development	Lecture	Exam	Ch 19
	12.2	Evolution and Development	Lecture	Exam	Ch 19
	12.3				
13	13.1	Human evolution	Lecture	Exam	Ch 20
	13.2	Human evolution	Lecture	Exam	Ch 20
	13.3				
14	14.1				
	14.2				
	14.3				
15	15.1				
	15.2				
	15.3				

- Teaching methods include Synchronous lecturing/meeting; Asynchronous lecturing/meeting, readings from the literature that demonstrate evolution, videos and case studies and readings from popular science that demonstrate the different mechanisms of evolution
- Evaluation methods include Homework, Quiz, Exam, pre-lab quiz...etc. Home works and assignments on population genetics that demonstrate the change of allele frequencies

## 22 Evaluation Methods:



Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	Period (Week)	Platform
Assignments, homework, and participation	30%	Entire course	1-14	Hand-in assignments and oral discussions and in-class exercises
Midterm Exam	30%	Ch 2, 3, 6, 7	1-6	Written exam
Final Exam	40%	Ch 2, 3, 4, 6, 7, 11, 12, 16, 19, 20	1-14	Written exam

### 23 Course Requirements

**(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform...etc):**

Student are **required** to have access to the following:

- A computer (with webcam & microphone)
- Active and dependable internet connection
- E-Learning website (not the mobile application) works smoothly on their computer.
- Make sure to install the application (platform) which will be used by your instructor to conduct the live meetings (Microsoft Teams).

### 24 Course Policies:

A- Attendance policies:

All students are expected to adhere to the rules of conduct outlined in the University of Jordan Student Handbook.

<http://studentaffairs.ju.edu.jo/Pages/PDFGuidestudent.aspx>

Enrolled students are expected to attend the lectures in line with the university of Jordan policy as outlined in the UJ student handbook. Failure to do so will make the student subject to the penalties outlined in the said document. Furthermore, missing classes will have negative repercussions on the student's participation grade.

B- Absences from exams and submitting assignments on time:



Absences from exams and handing in assignments on time: You should talk to your instructor as soon as possible if you miss an exam. All such cases will be dealt with according to the UJ student handbook rules.

C- Health and safety procedures:

N/A

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Honesty policy regarding cheating, plagiarism, misbehavior: All violations pertaining to cheating, plagiarism and misbehavior will be dealt with in accordance to the rules outlined in the UJ student handbook. In order to avoid plagiarism, the sources for the information contained in your homework must be properly cited and verbatim quotations must be limited and explicitly presented as such. To learn more about the procedures for ethical referencing of information and how to assess the credibility of information critically you can consult with the relevant documents in the course UJ e-learning page (see below). You can use any standard citation style (*e.g.*, Chicago or MLA), but in biological sciences we prefer AMA.

E- Grading policy:

F- Available university services that support achievement in the course:

## 25 References:

A- Required book(s), assigned reading and audio-visuals:

Evolutionary Analysis (2014) Herron JC and Freeman S. Pearson.

The Beak of the Finch (2014) Weiner J. Vintage Books.

B- Recommended books, materials and media:

Evolution (2017) Futuyma, D.J. and Kirkpatrick, M. 4th ed. Sinauer Associates.

Biology: A Global Approach (2017) Campbell, N.A., Urry, L.A., Cain, M.L., Wasserman, S.A., Minorsky, P.V. and Reece, J.B. 11<sup>th</sup> Ed. Publisher: Pearson.

C-sources and audiovisuals

1. Rediscovering Biology: Molecular to global perspectives:

<http://www.learner.org/courses/biology/index.html>

2. UC Berkeley's Understanding Evolution webpage: <http://evolution.berkeley.edu/>

3. PBS's evolution library: <http://www.pbs.org/wgbh/evolution/library/index.html>

4. What Darwin Never Knew (Nova documentary, 2010)



## 26 Additional information:

--

Name of Course Coordinator: <b>Dr. Mohammad Abu Baker</b> --Signature: ----- Date: 8-10-2023
Head of Curriculum Committee/Department: ----- Signature: ----- ---
Head of Department: ----- Signature: -----
Head of Curriculum Committee/Faculty: ----- Signature: ----- -
Dean: ----- Signature: -----