Course Specification
(Bachelor)

Course Title:	**Comparative Anatomy**
Course Code:	**BIOL_215**
Program:	**Biology**
Department:	**Biology Department**
College:	**College of Science**
Institution:	**Majmaah University**
Version:	3rd
Last Revision Date:	Ref# 7 **10/10/2023**

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A. General information about the course:

1. Course Identification

1. Credit hours: (3 (2+1))			**Equivalent to credit points ECTs :4.5**		
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (4th level/ 2nd year)					
4. Course General Description:					
This course compares the structure and functions of the: skeletal, integumentary, digestive, muscular, circulatory, urinogenital and nervous systems in different Protochordates, Pisces, Amphibians, Reptiles, Aves to Mammals understanding the adaptive changes they have undergo. Also, studying the origin of different organs showing development and evolution from common ancestors.					
5. Pre-requirements for this course (if any): Vertebrate					
BIOL_213					
6. Co-requisites for this course (if any):					
N/A					
7. Course Main Objective(s):					
This course aims to compare the structures and functions of vertebrate's systems showing its origin and developmental adaptation.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	80%
2	E-learning	15	20%
3	Hybrid • Traditional classroom • E-learning	0	0
4	Distance learning	0	0

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	**30**
3.	**Field**	**0**
4.	**Tutorial**	0
5.	**Others (specify)**	**0**
Total		60

Workload (based on the academic semester

No	Activity	Work Load /Hrs
1.	**Contact hrs.**	**60**
2.	**Self-study (Assignments, quizzes, reports, Discussions, Library, research….)**	**60**
	Total Workload	**120**
	Equivalent to credit points ECTs	**4.5**

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.2.1	Mention the relation between species and their internal (physiological) and external environments referring to classification..	K2	Lecture	Quizzes' Midterm and final exams
2.0	**Skills**			
2.2.1	Compare between the different systems and organs in vertebrate animals showing function, origin and evolution.	S2	Solving problem /Brainstorming	Quizzes' Midterm and final exams
2.4.1	Examine the biological slides/Spotters/Specimen	S4	Practical Sessions	Practical exam

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	and perform dissection of the biological samples.			
3.0	**Values, autonomy, and responsibility**			
3.1.1	Committee toward tasks contributing ideas following scientific ethics using scientific concepts.	V1	Team work	Assignments, Homework, Lab report
...				

C. Course Content Theoretical

No	List of Topics	Contact Hours
1.	**Unit:1 Introduction to comparative anatomy** **(Systematics of vertebrates - Principles of the evolution of vertebrates).** **Detailed study on Evolution of Chordates and Characteristics** • Urochordata – *Tunicates* • Cephalochordata – *Amphioxus* • Craniata (formerly vertebrata) • Hagfish • Lamprey • Cartilaginous fishes • Bony fishes • Amphibians • Reptiles • Birds • Mammals **Evolution of Tetrapods':** Transition to Land and their structural adaptation. **Developmental evidences of Evolution:** • Fossils, • Biochemical and • Genetic evidence	4
2.	**Unit:2 Integumentary system of Vertebrates** • Tracing the evidence of Evolutionary adaptations of vertebrate integuments and comparisons. • Skin, Chromophores, Camouflage animals • Feathers, Thermal regulations, Skin Glands, Hair and structure, Fur, Horns, Antlers and Nail, Claws, Hooves and Baleen	4

3.	**Unit:3 Vertebrate Skeletal system comparisons** • Bone composition, development, Functions. • Major Classification of Skeleton (Exoskeleton and Endoskeleton) • Axial Skeleton • Appendicular Skeleton • Neurocranium	4
4.	**Unit: 4 Muscular System of Vertebrates** • General Structure and function • Embryogenic origin **Muscle organization and functions:** • Skeletal Muscles • Visceral Muscle • Cardiac Muscle Specialized muscles in Fishes, Amphibians, Reptiles, Birds and Mammals • Axial Muscles Comparison • Jaw muscles comparison • Appendicular Muscle comparison • Integumentary muscle comparison	4
5.	**Unit: 5 Digestive System of Vertebrates** • Introduction to Digestive system, • Structure and Functions of digestive system of Fishes to Mammals	2
6.	**Unit: 6, Respiratory System of Vertebrates** • Introduction, Respiratory organs of Vertebrates, (Gill, skin, Lungs) • Evolution and Development of respiratory organ from Gills to Mammalian Lung. • Comparison of Respiratory system from Fishes to Mammals	4
7.	**Unit: 7, Circulatory System of Vertebrates** • Introduction, Role of Blood and Blood vessels • Structure and functions of circulatory system. **Types of Blood circulation:** • Pulmonary circulation • Systemic circulation • Coronary circulation • Circulatory systems comparison from fishes to Mammals	2
8.	**Unit: 8, Urogenital System of Vertebrates** • Introduction to Urinary and Reproductive system • Structure of Kidney, Uriniferous tubule- Nephron. • Evolution of Kidney: Archinephros; Pronephros; Mesonephros. • Metanephros.	2

	• Male and Female Reproductive system structure and functions. Copulatory organs.	
9.	**Unit: 9, Nervous system of Vertebrates** • Introduction, Structure and Functions, • Peripheral Nervous system • Central Nervous system • Neurons, Types, Functions • Evolution of Spinal Nerves • Cranial Nerves number and functions • Spinal cord, • Electromagnetic Receptors • Brain Development, Brain, Structure and Functions • Brain- Comparison from Fishes to Mammals (Human brain as reference for mammals)	4
Total		30

C. Course Content (Practical)

1	Histological slides (V.S. in skin of different vertebrates)	8
2	Preserved dissecting Vertebrate specimens or models (Integuments, Muscular system, Respiratory system, Circulatory system, Nervous system, Digestive system, Reproductive and excretory system)	10
3	Skeleton of different Vertebrate (Bony fishes-Amphibia-Aves-Mammals)	10
4	Revision	2
	Total	30

D. Students' Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quiz's, Assignments, Homework	Once every 2 weeks once on as applicable	10%
2.	Mid-term Exam-1	5^{th} -6^{th} week	10%
3.	Mid-term Exam-2	9^{th} -10^{th} week	10%
4.	Black Board, e-Exam	12^{th} week	10%
4.	Practical Exam and lab reports	14^{th} -15^{th} week	20%
5.	Final Exam	16^{th} -18^{th} week	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Comparative Anatomy (2015): Dale W. Fishbeck. Morton Publishing Company. 978-1617310423
Supportive References	Comparative Anatomy and Physiology (2016): Bell F. Jeffrey. e-Kitap Projesi
Electronic Materials	Practical Zoology: Vertebrate By: S.S. Lal; Rastogi Publications, India (ISBN 978-81-7133-925-9) Revised edition: 2009-2010 https://www.mlsu.ac.in/econtents/758_PRACTICAL%20ZOOLOGY%20%20VERTEBRATE%20(%20PDFDrive%20).pdf
Other Learning Materials	https://anatomy-library.com/collection/anatomy-evolution-examples.html http://www.bio.utexas.edu/faculty/sjasper/Bio301M/chordates.html http://www.visualdictionaryonline.com/animal-kingdom/birds/bird/skeleton-bird.php https://www.britannica.com/science/comparative-anatomy

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Existing facilities are satisfactory
Technology equipment (projector, smart board, software)	Existing facilities are satisfactory
Other equipment (depending on the nature of the specialty)	none

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Direct/ Indirect methods through Questionaries and %CLOs
Effectiveness of Students assessment	Dep. reviewer/Students	Direct/indirect
Quality of learning resources	Faculty members/students	Indirect methods through Questionaries
The extent to which CLOs have been achieved	students	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**BIOLOGY DEPARTMENT COUNCIL**

REFERENCE NO.	**7**
DATE	**7/10/2024**