



The University of Jordan

Accreditation & Quality Assurance Center

COURSE Syllabus

1	Course title	Muscle Biology
2	Course number	0354961
3	Credit hours (theory, practical)	3 theory
	Contact hours (theory, practical)	3 h lectures /week
4	Prerequisites/corequisites	General Biology 2(0304102)
5	Program title	Biological Sciences
6	Program code	
7	Awarding institution	The University of Jordan
8	Faculty	Science
9	Department	Department of Biological Sciences
10	Level of course	900
11	Year of study and semester (s)	Spring 2017/2018
12	Final Qualification	PhD
13	Other department (s) involved in teaching the course	
14	Language of Instruction	English
15	Date of production/revision	1. 2. 2018

16. Course Coordinator:

Office numbers, office hours, phone numbers, and email addresses should be listed.

Office numbers :Biology Building 311

office hours: Sun Tue Thu: 9-9:30

phone numbers: 0776831802

email: zshraideh@ju.edu.jo

17. Other instructors:

Office numbers, office hours, phone numbers, and email addresses should be listed.

18. Course Description:

As stated in the approved study plan.

Course Description
(Muscle Biology 0354961)

The course focuses on the three major types of mammalian muscles: Cardiac, smooth, and skeletal. Rapid and slow muscles. It concentrates on muscle cell ultrastructure, contractile proteins, structure and function of contractile network, and innervation of different types of muscles. The course focuses also on molecular mechanisms of muscle contraction, excitation-contraction coupling, energetics and control of muscle

contraction, and drugs affecting contractile system. Techniques for studying muscle structure and function are also discussed.

19. Course aims and outcomes:

A- Aims:

Course objectives (Muscle Biology 0354961)

Students will have an understanding of the molecular bases of muscle biology.

Knowledge and Understanding:

Students will have an understanding of the biology of different types of human muscles.

B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to ...

1. Cognitive / Intellectual Analysis:

Students will be able to critically assess primary and applied research relating to The biology of muscles.

2. Subject-specific and practical skills:

Students will be able to discuss topics relating to muscles biology with others in a meaningful way.

3. General transferable skills:

Students will understand the principles underlying the application of several Laboratory techniques in muscle biology research.

20. Topic Outline and Schedule:**Course Lectures**

<u>Lectures</u>	<u>Topics</u>	<u>References</u>
1-3.	Techniques for studying muscle structure: Light microscopy (phasecontrast, polarizing and fluorescent microscopes). Electron microscopy (transmission and scanning E.M.).	13
4-7.	Diversity of muscles: Cardiac muscle. Smooth muscle. Skeletal muscle. Rapid and slow muscle fibers.	4,5,6,8,9,10, 11
8-11.	Muscle cell (A specialized contractile machine): Structure of muscle fibers. Muscle cell proteins. Red and white fibers. Muscle cell membranes. Embryonic origin, development, structural organization of muscles.	4, 8
12-15.	Structural and regulatory proteins of contractile networks: Actin & actin-binding proteins. Myosin & myosin-binding proteins.	6, 7, 11
16-18	Cellular environment for contractile networks: microtubules. 10nm (intermediate) filaments. Connecting filaments. Interaction of contractile networks with the cell membrane. Neuromuscular junction.	4, 5, 10
19.	Midterm Exam	
20-24.	Molecular mechanisms of muscle contraction: Actin-myosin interaction. Molecular mechanics and biochemical function. Cross bridge cycle. Sliding theory of muscle contraction. Isotonic & isometric contractions. Force- velocity relationship.	4, 12
25-26.	Muscle twitch & tetanus.	4, 12
27-30.	Muscle energetics: Energy sources and metabolism.	12
31-35.	Molecular mechanisms of excitation-contraction coupling: Biochemical and physiological implications of muscle ultrastructure. Membrane excitation and intracellular signaling. Transient rise in intracellular Ca ⁺⁺ and regulation of actins-myosin filament interaction. Control of muscle function.	4, 12
36-37.	Drugs affecting contractile systems: Cytochalasins, chaetoglobosins and proformins. Phallotoxins and virotoxins. Calmodulin-binding drugs.	
38-40.	Techniques for studying muscle function: Physiological experiments to measure contractility: physiographs and oscilloscopes. Tensiometers. Non-invasive methods. Cell-free models (glycerinated muscle fibers). Physical methods used in the study of membranes.	

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

1. 2 / 1h lectures/ week
 - Classroom with whiteboard and projection facilities
 - College library
 - Internet resources

22. Evaluation Methods and Course Requirements:

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

1. 3/ 1h exams
2. Reports and discussions

23. Course Policies:

A- Attendance policies:

Attendance of lectures is obligatory

B- Absences from exams and handing in assignments on time:

Not accepted

C- Health and safety procedures:

Strict and are followed up

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Very strong.

E- Grading policy:

50 %(2 one h exams) , 50% final exam

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

Accepted, but not adequate.

24. Required equipment:

Data shows and laptops for lectures

25. References:

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

No.	Title	Author(s)	Year
1.	Physiology P.177-244	Sperelakis & Banks	1993
2.	Human Physiology P466-507 + 543-574	Rhoades & Pflanzer	1996
3.	Molecular Cell Biology 5 rd edn	Lodish et.al.	2004
4.	Textbook of Medical Physiology P.67-100+P.104	Guyton	1991
5.	Cell Fine Structure P.84-102	Lenz	1971
6.	Ganogs Review of Medical Physiology	24e- Net	2013
7.	Harpers Illustrated Biochemistry	28e- Net	2012
8.	Microscopic Anatomy 9e	Douglas et al	1984
9.	Janqueras Basic Histology 12e	Mescher	2011
10.	Cell & Tissue Ultrastructure	Cross & Mercer	1993
11.	Cell Biology	Pollard & Earnshaw	2002
12.	Fundamentals of Anatomy & Physiology 3e	Martini	1989
13.	Becker World of the Cell 8e	Hardin et al	2012

Additional References:

- * Karp (2002). Cell and Molecular Biology. 4th ed. John and Wiley Sons.
- * Alberts *et al* (2013). Molecular Biology of the Cell. 5th ed. Garland Publishing, New York.
- * Ross & Pawlina.(2011). Histology. 6th. Ed.
- * Lodish *et al* (2000). Molecular Cell Biology. 4th ed. Scientific American Books.
- * Lodish *et al* (1995). Molecular Cell Biology. 3rd ed. Scientific American Books.
- * Karp (1999). Cell and Molecular Biology. 2nd ed. John and Wiley Sons.
- * Alberts *et al* (1991). Molecular Biology of the Cell. 2nd ed. Garland Publishing, New York.

* Becker *et al* (2006). The World of the Cell. 6th ed. Benjamin and Cummings Company, California.

26. Additional information:

Name of Course Coordinator: Prof Dr. Ziad Shraideh ---Signature: 

Date: 1.2.2018.

Head of curriculum committee/Department: ----- Signature: -----

Head of Department: ----- Signature: -----

Head of curriculum committee/Faculty: ----- Signature: -----

Dean: ----- Signature: -----

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Head of Department
Assistant Dean for Quality Assurance
Course File

