



Course Specification

Course title: Experimental embryology **Code:** Z 471

Program (s) on which the course is given: Zoology

Element of programs: Major - Single Double

Department offering the program: Zoology Department

Department offering the course: Zoology Department

Academic year: 4th year – 2nd semester

Date of specification approval: 1/2016

A- Basic information

Academic year: 4 th	Course title: Experimental embryology		Code: Z 471
Lecture: 4 hr/wk	Practical: 4 hr/wk	Tutorial: 0 hr/wk	Total: 8 hr/wk

B- Professional information

1- Overall aims of course	<p>This course aims to provide student with knowledge and understanding of:</p> <ol style="list-style-type: none"> 1. Confirm the role of experimental embryology in scientific research and community development. 2. Apply the scientific facts and theories for analysis and interpretation of fetal abnormalities and infertility. 3. Medical applications of information technology in the fields of tissue culture (cloning – stem cells and the ability of cells to regenerate). 4. Effective participation in collective action through a laboratory experiments and defining roles.
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2-Intended learning outcomes of course (ILOs)

a-Knowledge and understanding	<p>At the end of this course the students must be able to:</p> <p>a1-) Determine complexity and diversity of normal and abnormal developmental stages of mammalian embryos</p> <p>a2-. Explain the theories for interpreting, super ovulation , contraceptives, regeneration and embryonic differentiation.</p> <p>a3-Illustrate the physiological aspects of sex hormonal regulation</p> <p>a.4- Describe the relation between the placental; embryonic development and the environmental teratogens.</p>
b-Intellectual skills	<p>Students must be able to:</p> <p>b1-. Assess qualitative and quantitative designed experiments.</p> <p>b2-Reach several related and integrated information (environmental condition, age of embryo, dose of exposure) to confirm, make evidence and test hypotheses</p> <p>b3-Analyze the subject-related estrus cycle to insure pregnancy.</p> <p>b4 - Interpret embryonic induction and respond to a variety of information sources.</p>
c- Professional and practical skills	<p>Students must be able to:</p> <p>c1-Apply laboratory investigations for experimental animal in an ethical and responsible manner</p> <p>c2- Collect sperms and developmental stages of mice or rats, using appropriate techniques in the laboratory.</p> <p>c3 - Prepar chick embryo, stained skeletal system, samples considering their validity, accuracy and reliability during preparation.</p>
d- General and transferable skills	<p>Students must be able to:</p> <p>d1- Use simple word and IT skills (i.e., data processing, software, internet, and multimedia) and the library to find information.</p> <p>d2-Understand the life's basic processes in relation to the embryo and the ecosystems.</p> <p>d3- Working in team (i.e., sharing presentations, discussions and solving problem).</p> <p>d4- illustrates some modern subjects and bio techniques related to embryology.</p>

3- Contents:

Topic	No. Hours/ week			
	Lecture	Practical	Tutorial	Total
a- History of the early experimental embryologists b- Gametogenesis and hormonal regulation c- Super Ovulation and Contraceptive techniques	4	4	0	8
a- Fertilization and formation of placenta in mammals b-Types of placenta c- Functions of placenta d- Parthenogenesis	4	4	0	8
Cellular differentiation and embryonic induction a-The role of nucleus in differentiation b-The role of cytoplasm in differentiation c- The role of environment on embryonic development d-Origin of the induction concep	4	4	0	8
Regeneration a-Regeneration in invertebrates and in vertebrates b- Mechanism of regeneration c- Regeneration of tail in amphibia	4	4	0	8
Mid termex . 5- <u>Teratology:</u> a-Introduction b-Mutaions as a source of variations Gene mutations Choromosomal aberrations 1- Structural 2-Numercal (during meioses and mitosis)	4	4	0	8
c- Demonstration of abnormal development 1-Periods of susceptibility to abnormal development 2-Faulty inductive tissue interactions 3- Normal and abnormal twins	4	4	0	8
d-Teratogenic factors 1-Maternal 2-Chemical 3-Physical 4-Mechanical	4	4	0	8

Short exam. 6-The tissue culture a Introduction and aim of work b- Equipment required for cell culture.	0	4	0	4
Oral exam 7-Some applications for the cultivation of tissues and embryos a--In Vitro Fertilization and Embryo Transfer b- insemination	4	----	0	4
c-Nuclear transplantation (cloning) d-Stem cell e- Regulation in mammalian embryo Oral exam	4	4	0	8
Total	36	36	0	72

4- Teaching and learning methods:

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| <p>4.1. Lectures</p> <p>4.2. Oral presentation</p> <p>4.3. Research project/ group</p> <p>4.4. Practical</p> |
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5- Student assessment:

5.1. Methods	5.1.1. Written tests (short & final)	- To assess: knowledge & understanding - Intellectual skills
	5.1.2. Oral exam	- To assess: knowledge & understanding - Intellectual skills
	5.1.3. Practical exam	- To assess: Professional & practical skills
	5.1.4. Work sheets and assays	- To assess: General & transferable skills
5.2. Assessment schedule	Assessment 1: Final written exam	- Week: 14
	Assessment 2: Oral exam	- Week: 8&9
	Assessment 3: Final lab exam	- Week: 10
	Assessment 4: Semester work	- Along the term
	Final written exam %	50%

5.3. weighting of assessments	Final lab exam %	30%
	Semester work & short exam %	14%
	Oral exam %	6%
	Total %	100%

6-List of references:

6.1. Course Note (If available)	❖ Note
6.2. Text Book	<p>Carlson, B. M. (2009): Human Embryology and Developmental Biology. 4th Ed. Mosby Elsevier. London, p. 451.</p> <p>Carlson, B. M. (1988): Patten's Foundation of Embryology. 5th Ed. McGaw-Hill. USA, P.64</p> <p>Gilbert, S. F.(2003): Developmental Biology. 7th Ed, Sinauer Associates, Sunderland, pp: 694–696.</p> <p>Gilbert-Barness, E. (2010): Review: Teratogenic Causes of Malformations. Annals of Clinical Laboratory Science, 40(2):99-114.</p>
6.3. Recommended books	
6.4. Periodical Journals,..... etc.	

7- Facilities required for teaching and learning :

<p>7.1. Data- show presentation.</p> <p>7.2. Different types of microscopes.</p> <p>7.3. Whiteboard.</p> <p>7.4. Course note.</p> <p>7.5. Reserved samples</p> <p>7.6. Computers.</p> <p>7.7. Animal house, rat or mice.</p>
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8- Matrix between course specification ILOs and ILOs of Zoology program:

Knowledge and understanding		Intellectual skills		Professional and practical skills		General and transferable skills	
ILOs of course	ILOs of program	ILOs of course	ILOs of program	ILOs of course	ILOs of program	ILOs of course	ILOs of program
a1	A13	b1	B2	c1	C6	d1	D1
a2	A12	b2	B5	c2	C5		
a3	A9	b3	B3	c3	C7	d3	D3
a4	A7	b4	B9			d4	D1

9- Curriculum map:

Contents	Weeks	Course ILOs			
		a	b	c	d
Unit 1		a2	b3		
Unit 2		a2	b3		
Unit 3		a4	b2&b4		
Unit 4		a2	b1		
Unit 5		a1&a4	b1		
Unit 6		a3	b2		
Unit 7		a3	b2		d4

Course coordinator:

Prof. Dr.Nehal Abu El- Naga

Head of Zoology Department