Course Specifications

Course Title:	**Embryology**
Course Code:	**23074466-3**
Program:	**BSc Biology**
Department:	**Biology**
College:	**Aljumum University College**
Institution:	**Umm Al-Qura University**

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A. Course Identification

1. Credit hours: 3 hours
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 4th year / level 8
4. Pre-requisites for this course (if any)**:** Vertebrates (23072262-3)
5. Co-requisites for this course (if any)**:**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**		70 %
2	**Blended**		
3	**E-learning**		10 %
4	**Correspondence**		10 %
5	**Other**		10 %

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	**28**
2	**Laboratory/Studio**	**42**
3	**Tutorial**	**6**
4	Practical/Field work/Internship	**6**
5	**Others** (specify)	**10**
	Total	**92**
Other Learning Hours*		
1	**Study**	
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

Embryology is designed for the students to understand gamete formation, fertilization and embryo development concepts in animals. Also, comparison of the events of cleavage, blastulation and gastrulation in selected chordate embryos must be covered. Understanding the formation of some selected organs created by ectoderm, endoderm and mesoderm in addition to extra-embryonic membranes and their role in the formation of placenta. Knowing the different stages of pregnancy in humans and the events that happen in each stage with clear idea about multiple births and formation of twins.

2. Course Main Objectives:

 After completing this course, students should be able to:

1. Define the process of embryonic development in general.
2. Describe the major phenomenon of development, growth and differentiation.
3. Explain the process of fertilization.
4. Comparison the events of cleavage, blastulation and gastrulation in selected chordate embryos.
5. Understand the formation of some selected organs created by ectoderm, endoderm and mesoderm.
6. Study the extra-embryonic membranes and their role in the formation of placenta.
7. Know the multiple birth and formation of twins.
8. Gain the scientific terms of embryology which allow the students how to deal with internet, text books and references

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	Define the process of embryonic development in general.	
1.2	Describe the major phenomenon of development, growth and differentiation.	
1.3	Explain the process of fertilization.	
1...	Comparison the events of cleavage, blastulation and gastrulation in selected chordate embryos. Understand the formation of some selected organs created by ectoderm, endoderm and mesoderm. Study the extra-embryonic membranes and their role in the formation of placenta. Know the multiple birth and formation of twins. Gain the scientific terms of embryology which allow the students how to deal with internet, text books and references. Observe the serial embryonic stages in some selected chordate	
2	**Skills :**	
2.1	The student is able to propose solutions to some problems..	
2.2	To use computer and internet.	
2.3	To describe the disorders arise after any organ injury	
2...		

CLOs		Aligned PLOs
3	**Competence:**	
3.1	Developing oral presentations.	
3.2	□ Communicating personal ideas and thoughts.	
3.3	□ Work independently and as part of a team to finish some assignments.	
3...	□ Communicate results of work to others	

C. Course Content

No. of weeks	List of Topics	Contact Hours
1st week	❖ Introduction to the basis of embryology. ❖ Definition of Growth and cell differentiation. ❖ Brief of main embryonic stages. ❖ History of embryology. ❖ Reproduction, types of reproduction (asexual and sexual).	**2**
2nd week	❖ Gametogenesis ❖ Origin of sex cells and formation of gonads ❖ Male reproductive system ❖ Formation of mature spermatozoon ❖ Spermiogenesis	**2**
3rd week	❖ Female reproductive system. ❖ Oogenesis. ❖ Yolk and its role in egg formation. ❖ Types of eggs according to the amount and distribution of yolk granules. ❖ Ovum membranes (primary and secondary). ❖ Formation of eggs in frog, birds, and mammals.	**2**
4th week	❖ Fertilization. ❖ Acrosomal reaction. ❖ Cleavage- blastula. ❖ Fate maps	**2**
5th week	❖ Early embryonic development of amphioxus, frog, chick and mammals.	**2**
6th week	❖ Comparison of male and female gametes ❖ Comparison of fertilization in some studied chordates	**2**
7th week	❖ Comparison of blastula in amphioxus, frog, chick and mammals	**2**
8th week	❖ Gastrulation: formation of gastrula in amphioxus, frog, chick and mammals.	**2**
9th week	❖ Organogenesis in frog: - Neurola stage. - Frog embryo 3mm. - Frog embryo 4-5.5 mm. - Frog embryo 7-10mm.	**2**
10th week	❖ Formation of some ectodermal organs: - Nervous system (central and peripheral system and neural crest). - Sense organs (optic, otic and olfactory organs). ❖ Formation of some mesodermal organs:	**5**

	- Heart and urino-genital systems. ❖ Formation of some endodermal organs: - Alimentary canal, liver and pancreas	
11th week	❖ Embryonic development of chick embryo: - Chock embryos 16, 18, 20, 24, and 33 hrs	**2**
12th week	❖ Embryonic development of chick embryo: - Chick embryo at 33-48 hrs. - Cephalic flexion and embryonic torsion. - Herat formation. - Blood circulation. - Brain formation	**2**
13th week	❖ Extra-embryonic membranes in birds. - Yolk sac. - Amnion and chorion. - Allantois.	**2**
14th week	❖ Placenta: - Definition, function, formation. - Role of extra-embryonic membranes and endomertrium. - Formation of chorio-vitelline and chorio-allantoic placenta. ❖ Types of placenta according to: - Number of parries (epithelochorial, syndesmochorial, endotheliochorial and haemochorial placenta). - Shape (diffuse, cotyledonary, zonary and discoidal). - Fate of placents (non-deciduous and deciduous placednta).	**2**
15th week	❖ Twins: - Definition. - Types , identical, fraternal and Siamese twins. ❖ Embryonic Cloning ❖ Artificial fertilization.	

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
1.1 1.2 ….	□ Define the process of embryonic development in general. □ Describe the major phenomenon of development, growth and differentiation. □ Explain the process of fertilization. □ Comparison the events of cleavage, blastulation and gastrulation in selected chordate embryos. □ Understand the formation of some selected organs created by ectoderm, endoderm and mesoderm. □ Study the extra-embryonic membranes and their role in the formation of placenta. □ Know the multiple birth and formation of twins. □ Gain the scientific terms of embryology which allow the students how to deal with internet, text books and references. □ Observe the serial embryonic stages in	The methodology includes a combination of lectures by the lecturer, seminar presentation by the students and web-interactions. □ All students will be involved in on-line learning process and each student is required to create an E-mail address to facilitate student web interactions. □ Using images and movies. □ Availability of the reference books and	Homework and quizzes. Midterm and final written exams (theoretical and practical). Evaluation of reports. Oral presentation. Course work reports.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	some selected chordate	scientific sites concerning embryological development.	
2.0	**Skills**		
2.1	Developing oral presentations	Application of essential scientific techniques through lectures, classes and essays. □ Small group discussion. □ Ask the students to make small search project during the semester. □ Making connections between different topics across the course.	Course work reports. Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. Midterm and final exams. Checking the homework assignments
2.2	Communicating personal ideas and thoughts.		
…	Work independently and as part of a team to finish some assignments.		
3.0	**Competence**		
3.1	Use information and communication technology	Oral presentations. □ Internet search assignments and essays. □ Incorporating the use and utilization of computer in the course requirements. □ Students will be asked for delivering a summary regarding certain topics related to the course.	Evaluation of student essays and assignments. □ Evaluating the laboratory written reports. □ Marks given to for good reports and presentations □ Evaluating during the discussion in lecture and reports. Part of the grad is put for student's written participation
3.2	Use IT and communication technology in gathering and interpreting information and ideas		
…	Use the internet as a means of communication and a source of information.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Home works, search or presentation**	**4th and 8th weeks**	**10 %**
2	**Midterm "Written Test (1)"**	**8th week**	**30%**
3	**Final Exam "Practical Test"**	**15th week**	**20%**
4	**Final Exam Written Test**		**40%**
5			
6			
7			
8	**Total**		**%100**

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	- Internet search - Software programme (CD, Aimation) - Models
Essential References Materials	- Developmental Biology (8th edition) Gilbert, Scott F. Sunderland (MA): Sinauer Associates, Inc.; c2000 - Cells, Embryos, And Evolution by John Gerhart and Marc Kirschner, 1997, Blackwell Science, ISBN 0-86542-574-4
Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)	- Developmental Biology (8th edition) Gilbert, Scott F. Sunderland (MA): Sinauer Associates, Inc.; c2000 - Cells, Embryos, And Evolution by John Gerhart and Marc Kirschner, 1997, Blackwell Science, ISBN 0-86542-574-4
Electronic Materials	
Other Learning Materials	- Animation programmes (Internet source) - Biological Charts (Prepared by the students)

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms, laboratories
Technology Resources (AV, data show, Smart Board, software, etc.)	data show
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	

Head of Department

Dr. Wessam M. Filfilan

Stamp