Course Specification
(Bachelor)

Course Title:	EMBRYOLOGY
Course Code:	BIO 1415
Program:	Bachelor of Science in Biology
Department:	BIOLOGY
College:	SCIENCES
Institution:	Imam Mohammad Ibn Saud Islamic University
Version:	2
Last Revision Date:	2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 4 (3 Lectures + 2 Lab + 0 Tutorials).

2. Course type

A.	☐University	☐College	☒ Department	☐Track	Others
B.	☒ Required		☐Elective		

3. Level/year at which this course is offered: 8

4. Course General Description:

This On-Line Embryology course is designed to provide MBS students with a foundation in human embryonic and fetal development from fertilization to birth. This course focuses on the morphological changes that take place during development. Underlying molecular mechanisms and relevant congenital anomalies may be briefly considered.

5. Pre-requirements for this course (if any)**:**

Animal Physiology-BIO314

6. Co-requisites for this course (if any)**:**

7. Course Main Objective(s):

By the successful completion of the course the student will be able:

- **To address the developmental events during all stages of prenatal development.**
- **To emphasize human development but with a comparative approach to illustrate key differences in embryological development across animals.**
- **To study the normal cellular and molecular events associated with development.**
- **To examine abnormal development and teratological defects to understand how and why things go wrong during development. Through consideration of birth defects and teratology.**
- **To study the fundamental relationship between structure (anatomy) and function (physiology) will be considered, so that students gain an understanding of the fundamental importance of structure that allows normal physiology, and how anomalies in structure arising from abnormal development adversely affect the normal functioning of a structure.**
- **To devote an introduction to embryology, gametogenesis, fertilization, and the development of embryo from zygote to neural tube formation.**

- **To examine the development of organ systems, including the nervous, respiratory, cardiovascular, urogenital, and digestive systems, as well as a look into the development of sensory organs (eyes and ears).**

To be well an excellent hands-on experience in embryology.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	70 %
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	30
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		75

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	To list basic concepts and principles of Embryology.			1.1
1.2	To tell an understanding and appreciation of Embryo development.			1.1-1.2
…				
2.0	**Skills**			
2.1	To present ideas as well as facts by requiring students to read material on ethical probes that have no easy answers.			2.1-2.2

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.2	To formulate and test hypotheses based on discovery-based activities by the mean of laboratories that emphasize observation and hands-on.			2.1-2.2
2.3	To promote critical thinking by requiring students to evaluate a body of evidence, separate assumptions form observations, and reach some conclusion based on evidence.			2.1-2.2
3.0	**Values, autonomy, and responsibility**			
3.1	To show ability to communicate effectively with class mates and teaching staff. To appraise team work and management of resources and time.			2.2-3.1
3.2	To operate laboratory instruments and computers.			3.3
3.3	To perform biological experiments and handle various slides during laboratory classes.			3.2-3.3

C. Course Content

No	List of Topics	Contact Hours
1	• Introduction & Welcome to Embryology! • The saga of the sex cells: gametogenesis overview. • Female sex cells: oogenesis. • Male sex cells: spermatogenesis & spermatogenesis. Transport of gametes & fertilization.	6
2	Cleavage.	3
3	Gastrulation - becoming trilaminar.	3
4	Implantation Embryonic membranes.	3
5	Twining.	3
6	• Neurulation. Nervous system.	3
7	• Maternal support & fetal interactions. Critical periods in development.	3
8	Determination and Differentiation.	3
9	• Organogenesis. Regeneration.	6
10	• Congenital Malformation. Embryonic cells and Tumor.	3
11	Tissues and Embryonic Cells Culture.	3
12	Stem cells.	3

13	Assisted reproductive technologies.	3
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1	Midterm 1	Around 6th -7th week	15%
2	Midterm 2	Around 11th - 12th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 15th week	15 %
6	Final Exam.	Around 15th - 16th week	40 %
7	Total		100%

*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	• Essentials of Domestic Animal Embryology by Poul Hyttel et al. (Dec 6, 2009) **Published:** SEP-2009 **ISBN 10:** 0-7020-2899-1, ISBN **13:** 978-0-7020-2899-1. Atlas of Descriptive Embryology (Book Review), a Descriptive Embryology Atlas by Gary Schoenwolf and Willis Mathews.2008.
Supportive References	• Scott. f. Gilbert Developmental Biology, 10th ed, (2013). ISBN-13: 978-0878939787. • Bruce M. Carlson MD PhD .Human Embryology and Developmental Biology: With Student Consult Online Access, 5e 5th Edition,(2013). ISBN-13: 978-1455727940 • Pankaj Talwar Manual of Assisted Reproductive Technologies and Clinical Embryology (2012). ISBN-13: 978-9350255063.

	Laboratory Manual: Schoenwolf, G. C. 1995. Laboratory Studies of Vertebrate and Invertebrate Embryos. 7th ed. Prentice Hall. ISBN 0-02-407602-3.
Electronic Materials	Publications and magazine of biological and life sciences.
Other Learning Materials	CD for developmental biology and embryology.

2. Required Facilities and equipment

Items	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's. and connected to data show.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, specific instruments for embryological parameters, centrifuges, incubators, ovens and other glass wares.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Head of biology department
REFERENCE NO.	
DATE	