



Course Specifications

Course Title:	Biotechnology of Reproduction
Course Code:	2054108-3
Program:	Biotechnology
Department:	Biotechnology
College:	Science
Institution:	Taif University

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A. Course Identification

1. Credit hours: 3 (2 Lecture, 1 Lab)
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input type="checkbox"/> Elective <input checked="" type="checkbox"/>
3. Level/year at which this course is offered: 11th level, 4th year
4. Pre-requisites for this course (if any): Molecular Developmental Biology, 2053205-3
5. Co-requisites for this course (if any): None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	Blended	.	.
3	E-learning	.	.
4	Distance learning	.	.
5	Other	.	.

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	30
3	Tutorial	0
4	Others (specify)	0
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

This course will introduce the principles of reproductive biology and its relationship to biotechnology applications. It will cover spermatogenesis, oogenesis, principles of animal reproduction, requirements for reproduction, fertilization, pathologies of the reproductive sphere, embryo implantation, formation of the placenta, delivery at full term, techniques and applications of artificial insemination, and the economic impact of biotechnology in animal reproduction. The course will teach assisted reproduction such as In Vitro Fertilization (IVF) and their economic impact. Gamete preservation (banks), sex determination, strain selection (biomarkers) and PGD (pre-implantation genetic diagnosis) will be addressed by this course.

2. Course Main Objective

Recall the principles of reproductive biology and biotechnology and illustrate spermatogenesis and oogenesis processes. Operate in vitro fertilization experiments. Perform pre-implantation genetic diagnosis.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and understanding	
1.1	Recall the basis of reproductive biology for biotechnology	K.1
1.2	Describe various approaches of reproduction in living organisms	K1
1.3	Describe the application of artificial reproduction in living organisms	K.4
2	Skills :	
2.1	Design and analysis of different molecular reproductive techniques in animals and plants	S2
3	Values:	
3.1	Accept the morals of communication via modern technology	V3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to reproductive biology and its relationship to biotechnology applications.	3
2	Spermatogenesis and Oogenesis	3
3	Fertilization in animals	3
4	Embryogenesis in animals	3
5	Pathologies of the reproductive sphere and animal infertility	3
6	Artificial insemination in animals and sperm preservation	3
7	Artificial ovulation and ovum preservation	3
8	Assisted reproduction or In Vitro fertilization (IVF)	3
9	Applications of IVF in biotechnology	3
Total		30

No	List of Topics	Contact hours
1	Reproductive systems in animals	3
2	Structure of sperm and spermatogenesis (histology of testis)	6
3	Structure of ovum and oogenesis (histology of ovary)	3
4	Artificial insemination in animals and sperm preservation	3
5	Artificial ovulation and ovum preservation	3
6	Intracytoplasmic sperm injection (ICSI)	3
7	Pre-implantation genetic diagnosis (PGD)	6
8	Embryo implantation	3
Total		30

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 and Understanding		
1.1	Recall the basis of reproductive biology for biotechnology and describe gamete formation, and fertilization	Lecture	Written exam
1.2	Describe the principles of pre-implantation genetic diagnosis.	Lecture	Written exam
2.0	Skills		
2.1	Design and analysis of different molecular reproductive techniques in animals and plants	Practical lab/project	Practical exam, individual discussion
3.0	Values		
3.1	Practice Leadership, teamwork, and communication via modern technology	Group Discussion/project	Oral exam & Report

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm exam	Week 5	20%
2	Periodical exam	Week 8	10%
3	Group project, oral presentation	Continue	10%
4	Practical Exam	Continue	20%
5	Final Exam	Week 10	40%

*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 :
6 hours per week of office hours are available for each faculty members for consultations and academic advice.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Comparative Reproductive Biology, 2007, Schatten and Constantinescu, Blackwell Publishing Professional, USA Preimplantation Genetic Diagnosis in Clinical Practice, 2014, El-Toukhy and Braude, Springer-Verlag London, UK.
Essential References Materials	None
Electronic Materials	Journal of Reproductive Biotechnology and Fertility. https://journals.sagepub.com/home/rbf Biotechnology. https://scialert.net/jhome.php?issn=1682-296x

Other Learning Materials	None
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2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	One classroom with internet connection for 2 hours a week and one laboratory for 3 hours a week with internet facility.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show and Smart board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	<ul style="list-style-type: none"> • Inverted Microscope equipped with micromanipulator and warming plate., CO2 incubator., Dissection tools • Liquid Nitrogen storage unit., Autoclave. • IVF –Lab plastic-ware and chemicals. • Animal house facilities.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Course management and planning	Students	Indirect
Effectiveness of teaching and assessment	Students	Indirect
Quality of learning resources	Students	Indirect
Effectiveness of Evaluation and exams	Students, Peer Reviewer	Indirect, Direct

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	Department Council
Reference No.	7
Date	16-6-1443