Course Specification

(Postgraduate Programs)

Course Title: Forensic Genetics
Course Code: BIO 6102
Program: Executive Master of Forensic Science
Department: Biology and Chemistry
College: Science
Institution: Imam Mohammad Ibn Saud Islamic University
Version: 1
Last Revision Date: 29 September 2024

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A. General information about the course:

1. Course Identification:

1. Credit hours: 3 (3 lectures, 0 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 1 l Year 1)					
4. Course General Description:					
This course introduces the field of forensic genetics through discussion of genetic and statistical issues emerging since the introduction of DNA profiling. Students develop the skills to interpret the evidence of matching genetic profiles, to perform calculations relevant for parentage determination and the identification of remains, and to consider the implications of familial searching of DNA databases.					
5. Pre-requirements for this course (if any)**:**					
None					
6. Co-requirements for this course (if any)**:**					
None					
7. Course Main Objective(s):					
At the end of the course, the students will be able to 1. Define and interpret genetic profiles from blood groups, Short Tandem Repeat 2. Identify markers and Single Nucleotide Polymorphisms. 3. Calculate likelihood ratios for matching genetic profiles, with allowances for 4. Understand population structure and relatedness. 5. Calculate paternity indexes. 6. Identify risks and benefits of using genetic profiles for human identification. 7. Detect instances of the “prosecutor's fallacy'' in trial transcripts and court rulings.					

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%

No	Mode of Instruction	Contact Hours	Percentage
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**	-
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)……**	-
	Total	45

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	Recognize molecular biology and genetics expertise to new forensic problems	K1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Outline knowledge and understanding of forensic genetics to make accurate statements, describe	K1, K2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps	Written tests Class discussion questions Class

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	complex information, provide detailed explanations, and integrate knowledge		Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	assignments Homework Short research/reports Summaries Presentations
1.3	List forensic genetics findings and concepts fully, appropriately and using a variety of different modalities	K2, K3, K4	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.4	State the conceptual and statistical framework for the interpretation of forensic genetics data theoretically	K2, K4	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Develop the ability to critically analyze and interpret forensic evidence in the light of the related scientific literature	S1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.2	Justify how DNA polymorphisms can be used to identify biological samples and assess kinship	S2, S4	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Reorganize the obtained information	S1, S4	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Illustrate linking between science and technology with society	V1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Use quantitative models and data to solve problems	V2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content:

No	List of Topics	Contact Hours
1.	Introduction / History of DNA	4
2.	DNA comparison and statistics	4

3.	The genetic nature of forensic profiles: blood groups, STRs, SNPs	4
4.	The elements of probability theory. The birthday problem	3
5.	Presenting scientific evidence. Likelihood ratios. Common fallacies	4
6.	Profile matching and partial matching within and between populations	4
7.	Lineage markers: Y-STR and mtDNA profiles	4
8.	Parentage calculations	4
9.	Relatedness. Remains identification	3
10	Cold hits. Familial searching	3
11.	Wildlife forensics	4
12.	Ethical issues	4
Total		**45**

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	30%
2.	Midterm Exam	8th week	30%
3.	Final Exam	16th week	40%

*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	An Introduction to Forensic Genetics, William Goodwin, Adrian Linacre, Sibte Hadi, 2nd Edition, Wiley, 2010, ISBN: 978-0-470-71019-7 Forensic DNA Typing, John M. Butler, 2nd Edition, Elsevier Academic Press; Elsevier. ISBN-13 : 978-0121479527
Supportive References	None
Electronic Materials	None
Other Learning Materials	None

2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories

Items	Resources
Technology equipment (Projector, smart board, software)	Projector and Smart board
Other equipment (Depending on the nature of the specialty)	Forensic Science-related instruments, including safety cabinet, centrifuges, incubators, thermal cyclers, trans-illuminators, gel electrophoresis apparatus

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Direct
Effectiveness of students' assessment	Program Leaders	Direct
Quality of learning resources	Peer Reviewer	Indirect
The extent to which CLOs have been achieved	Program Leaders	Direct
Other	-	-

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**