

**جامعة أم القرى**

**الكلية الجامعية بالجموم**

**برنامج الماجستير في علم الوراثة**

#### 4. Learning and Teaching:

##### 4/1 Learning Outcomes and Graduate Specifications

4/1/1 Main tracks or specializations covered by the program:

Molecular Genetics, Cytogenetics, Food safety, Gene Resources, DNA Forensic, Biocenology, Environmental genotoxic assessment

##### 4/1/2 Curriculum Study Plan Table

Level	Course Code	Course Title	Sem**	Credit Hours	Theory/ Practical
<b>REQUIRED CORE COURSES</b>					
Level 1	2307610-3 Bio	Biostatistics	Sem I	3	(2+1)
	2307612-3 Bio	Advanced Cytogenetics	Sem.I	3	(2+1)
Level 2	2307620-3 Bio	Advanced Molecular Genetics	Sem.II	3	(2+1)
	2307621-2 Bio	Scientific Research Skills	Sem.II	3	(2+0)
	2307629-1 Bio	Seminar	Sem.II	1	(0+1)
<b>ELECTIVE COURSES</b> (An additional 12 credits hours of elective courses are required, students will select two courses in semester I and two courses in semester II based on intended research project).					
	2307613-3 Bio	Bio-labs Techniques		3	(1+2)
	2307614-3 Bio	Bioinformatics		3	(2+1)
	2307615-3 Bio	Human Genetics		3	(2+1)
	2307616-3 Bio	Genome and Food		3	(2+1)
	2307617-3 Bio	Conservation Genetics		3	(2+1)
	2307618-3 Bio	Immunogenetics		3	(2+1)
	2307622-3 Bio	Functional Genomic and Proteomics		3	(2+1)
	2307625-3 Bio	Microbial Genetics		3	(2+1)
	2307626-3 Bio	Biosafety		3	(2+1)
	2307627-3 Bio	Special Topics in Genetics		3	(2+1)
Level 3	2307688-10 Bio	Thesis		10	
*Level 4	2307688-10 Bio	Thesis			

\*Include additional levels or courses if needed

\*\*Sem. (Semester)

##### 4/1/3 Field or Research Components of the Study Plan

##### 4/1/3/1 Summary of Practical or Medical Clinical Fellowship Components Required by the Program (if any):

a) Brief Description of Field Experience: <b>N/A</b>
b) Program Level (s) of Field Experience: <b>N/A</b>
c) Contact Hours of Field Experience and Time Table (Day / Week / Semester): <b>N/A</b>
d) Field Experience Credit Hours: <b>N/A</b>

##### 4/1/3/2 Requirements of Research Project or Scientific Thesis (if any):

a) Brief Description of Research Project or <b>Scientific Thesis Requirements.</b> A research project that will lead to write up a thesis / dissertation. The research project should be an independent piece of work, appropriately guided and supported by a supervisor or other relevant member of academic staff. The research topic should be selected in consultation with a course director or supervisor, based on the subject specific free elective courses that students will choose and the research interests of the supervisors. <b>A project proposal</b> drawn up with the supervisor at the end of semester 2
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#### 4/1/4. Course Specification: (Sorting as appearing in 4/1/2 curriculums table)

Course Title: **BIOSTATICS.**  
Course Code: **2307610-3 Bio**

Date: <b>30 – 2 -1440</b>	Institution: <b>Umm Al-Qura University</b>
College: <b>Al-Jumoum University College</b>	Department: <b>Biology</b>

#### A. Course Identification and General Information

1. Course title and code: <b>2307610-3 Bio</b>				
2. Credit hours: <b>3</b>				
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)				
4. Name of faculty member responsible for the course: <b>Al-Jumum University college</b>				
5. Level/year at which this course is offered: <b>level-1/Year-1</b>				
6. Pre-requisites for this course (if any): <b>N/A</b>				
7. Co-requisites for this course (if any): <b>N/A</b>				
8. Location if not on main campus: <b>Al-Jumum University College</b>				
9. Mode of Instruction (mark all that apply):				
a. Traditional classroom	√	percentage	60%	
b. Blended (traditional and online)	√	percentage	5%	
c. E-learning	√	percentage	5%	
d. Correspondence		percentage	0%	
f. Other: <b>Computational Applied</b>	√	percentage	30%	
Comments:				

#### B. Objectives

<p><b>1. The main objective of this course</b> <b>After completing this course, students will learn:</b></p> <ol style="list-style-type: none"> <li>1. Identify <b>BIOLOGY</b> research questions that may be answered using statistical methods and to translate the questions into the appropriate analysis procedure.</li> <li>2. Model and solve real world problems, as well as understand the limitations of models in making predictions and drawing conclusions.</li> <li>3. Organize biological data and differentiate it into quantitative or qualitative, communicate the essential features of the data (numerically and graphically), and interpret the data in a meaningful way.</li> <li>4. Perform a critical analysis of scientific and other research.</li> <li>5. Use an appropriate technology to describe and solve quantitative problem by using statistical software packages (e.g., R and SPSS) and online apps for data analysis.</li> </ol>
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<p><b>Describe briefly any plans for developing and improving the course</b> that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>- <b>Regular Updating the content of the course according to the new publications and research in the field</b></li> <li>- <b>Feedback of outcome for this course</b></li> <li>- <b>Build in more active learning into class</b></li> </ul>
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**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

This course concentrates on the design and analysis of experiments, with the goal of equipping the students with the tools to analyze biological research data. Considerable emphasis will be placed on the application of statistical design and analysis for decision-making. Students successfully completing this course should be able to: understand and implement good experimental design in conducting scientific research, choose and carry out appropriate statistical analyses for a variety of data types, provide sound interpretation of statistical analyses, and critically read and interpret the statistical content of scientific journal articles in the biological and biomedical sciences

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
<b>Introduction to Bio-statistics</b> -Definition of Bio-statistics -Importance of statistics in experimental science	1	3
<b>Experimental Designs</b> -Completely Randomized Design -Randomized Complete Block Design -Factorial Design	1	3
<b>Descriptive statistics</b> -Mean -Median -Mode -Sum & Sum of Squares -Standard Deviation (SD) -Standard Error (SE) -Range -Midrange	1	3
<b>Statistics Terminology</b> - Factors - Levels - Interactions - Treatments - Control - Variables - Independent and dependent variables - Replicates - Sample - Population	1	3

<b>Statistical Tests and Significance (Hypothesis testing)</b> -Types of hypothesis - Different statistical tests (e.g. <i>t</i> test, <i>F</i> test ...etc) - T test for one sample mean, two sample means; one population mean, two population means, and more than two means - <i>p</i> value and significance - Degree of Freedom	1	3
<b>Analysis of Variance (ANOVA)</b> - One Way ANOVA and <i>t</i> test - Multiple Comparison ( <i>Tukey's</i> method)	2	6
<b>Analysis of Variance (ANOVA)</b> - Two Ways ANOVA (Two Factors) - N-Way ANOVA (N Factors) - General Linear Model <i>GLM</i> (Studying the interaction between factors)	2	6
<b>Relationships between variables - Correlation - Linear Regression - Non-linear Regression</b> Practical applications on SPSS	2	6
<b>Elements of R Programming,</b> - Introduction to statistical software R, - Data objects in R, - Computations of descriptive statistics measures. - R-Graphics- Histogram, - Box-plot, Stem and leaf plot, Scatter plot, Plot options; Multiple plots in a single graphic window - QQ plot in R - Frequency table, - Plotting of probability distributions and sampling distributions.	2	6
<b>New approach in biostatistics (TopHat CuffLinks protocol)</b> - Overview - RNA-Seq. And TopHat CuffLinks - Transcriptomic analysis by CuffLinks	1	3
<b>Number of Weeks /and Units Per Semester</b>	14	42

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	28	2	6	6	-	42
	Actual						
Credit	Planned	28	2	6	6	-	42
	Actual						

<b>3. Individual study/learning hours expected for students per week.</b> - Additionally, Office hours for faculty member	<b>4</b>
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#### 4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column. **First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

#### Curriculum Map

Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Understanding facts	1. Lecture, support readings, group discussions, writing reports, preparing research papers. 2. Conducting individual tasks, practical training, field training, Talks, 3. Activities and homework	(1)- written MCQ's exams (2)- Paper oral presentation (3)- Papers based essays (4)- Extended literature review
1.2	Understanding and applying theories and concepts		
1.3	Understanding procedures		
2.0	<b>Cognitive Skills</b>		
2.1	Applying skills / procedures of theoretical and concepts learned	1. Lecture, support readings, group discussions, writing reports, preparing research papers. 2. Conducting individual tasks, practical training, field training, Talks, 3. Activities and homework	(1)- written MCQ's exams (2)- Paper oral presentation (3)- Papers based essays (4)- Extended literature review
2.2	Critical thinking		
2.3	Creative thinking		
2.4	Problem solving		
3.0	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Responsibility of own learning	1. Lecture, support readings, group discussions, writing reports, preparing research papers.	(1)- written MCQ's exams (2)- Paper oral presentation (3)- Papers based essays
3.2	Group participation and leadership		
3.3	Act responsibly-personal and professional situation		
3.4	Ethical standards of behavior		

		2. Conducting individual tasks, practical training, field training, Talks, 3. Activities and homework	(4)- Extended literature review
4.0	<b>Communication, Information Technology, Numerical</b>		
4.1	Oral and written communication	1. Lecture, support readings, group discussions, writing reports, preparing research papers. 2. Conducting individual tasks, practical training, field training, Talks, 3. Activities and homework	(1)- written MCQ's exams (2)- Paper oral presentation (3)- Papers based essays (4)- Extended literature review
4.2	Use of IT		
4.3	Basic math and statistics		
5.0	<b>Psychomotor (if any)</b>		
5.1	Carrying out practical experiments in field and laboratory	Attendance and participating in all practical research project and supervising students throughout the lab experiments	(1)- Work on research project leading to write a thesis or a dissertation
5.2	Awareness of laboratory safety issues and experimental ethics	Attendance and participating in all practical research project and supervising students throughout the lab experiments	Work on research project leading to write a thesis or a dissertation

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Exercises & Assignments	All Weeks	5%
2	Project (single\group)	--	3%
3	Participation	All Weeks	2%
4	Quiz (1)	5 <sup>th</sup> Week	10%
5	Written Exam (1)	8 <sup>th</sup> Week	20
6	Quiz (2)	13 <sup>th</sup> Week	10%
7	Final Exam	18 <sup>th</sup> Week	50%



#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

**The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.**

#### E. Learning Resources

1. List Required Textbooks	<p><b>Textbook 1:</b> Graeme D. Ruxton <b>2017</b> Experimental Design for the Life Sciences 4th edition</p> <p><b>Textbook 2:</b> Lecture Textbook 2: <b>2010</b>. Statistics at the Bench: A Step-by-step Handbook for Biologists. By Rebecca W. Doerge and Martina Bremer, Cold Spring Harbor Laboratory Pres, New York.</p> <p><b>Textbook 3:</b> Martina Bremer and Rebecca W. Doerge 2015 Using R at the Bench: Step-by-Step Data Analytics for Biologists</p>
3-Recommended Books and Reference Material (Journals, Reports, etc)	<p><b>Textbook 1:</b> <b>2008</b>. Statistics for Terrified Biologists. By Helmut van Emden. Wiley-Blackwell; 1 edition.</p> <p><b>Textbook 2:</b> <b>2004</b>. Minitab Handbook. By Joiner, B., Cryer, J. and Ryan, B.F. Brooks/Cole; 5th Revised edition.</p>
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.	<p><b>Website 1:</b> Loyola University Chicago, USA, Department of Mathematics and Statistics: <a href="http://webpages.math.luc.edu/~tobrien/courses/new335/course-homepage.html">http://webpages.math.luc.edu/~tobrien/courses/new335/course-homepage.html</a></p>
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.	<p><b>Essential Statistics Packages used in the course are:</b></p> <ul style="list-style-type: none"> <li>- R Software</li> <li>- SPSS Statistical Package</li> <li>- CuffLinks Online: <a href="http://cole-trapnell-lab.github.io/cufflinks/">http://cole-trapnell-lab.github.io/cufflinks/</a></li> <li>- Qq plots online: <a href="http://www.sthda.com/english/wiki/ggplot2-gg-plot-quantile-quantile-graph-quick-start-guide-r-software-and-data-visualization">http://www.sthda.com/english/wiki/ggplot2-gg-plot-quantile-quantile-graph-quick-start-guide-r-software-and-data-visualization</a></li> </ul>

#### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

2. Technology resources (AV, data show, Smart Board, software, etc.)

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

#### G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

- **Student activities.**
- **Student discussions.**



<ul style="list-style-type: none"><li>- <b>Student proposals.</b></li><li>- <b>Student assessment</b></li></ul>
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department <ul style="list-style-type: none"><li>- <b>Regular exams and quiz</b></li><li>- <b>Work questionnaires</b></li><li>- <b>Student interview</b></li></ul>
2. Procedures for Teaching Development <ul style="list-style-type: none"><li>- <b>Continuous updating with the use of all new mechanisms in the field</b></li><li>- <b>Staff members are required to attend training courses, conferences and workshops to improve their learning skills</b></li><li>- <b>communication with faculty members in other colleges to share experiences</b></li></ul>
3. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) <ul style="list-style-type: none"><li>- <b>Comparison of lectures and tests.</b></li><li>- <b>Random review of tests</b></li></ul>
4. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. <ul style="list-style-type: none"><li>- <b>An advisory committee is formed to improve and develop the program's courses</b></li><li>- <b>Adding or removing a subject from a course after approval by the department council</b></li><li>- <b>The university book must be approved by the department council</b></li></ul>

Name of Course Instructor: **Dr. Ayman Shehawy**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_

**Course Title: ADVANCED CYTOGENETICS.**

**Course Code: 2307612-3 Bio**

<b>Date: 30 – 2 -1440</b>	<b>Institution: Umm Al-Qura University</b>
<b>College: Al-Jumum University college</b>	<b>Department: Biology</b>

**A. Course Identification and General Information**

1. Course title and code: <b>ADVANCED CYTOGENETICS / 2307612-3 Bio</b>			
2. Credit hours: <b>3</b>			
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course: <b>Al-Jumum University college</b>			
5. Level/year at which this course is offered: <b>level-1/Year-1</b>			
6. Pre-requisites for this course (if any): <b>N/A</b>			
7. Co-requisites for this course (if any): <b>N/A</b>			
8. Location if not on main campus: <b>Building (B) in Al-Jumum College</b>			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	√	percentage	<b>50%</b>
b. Blended (traditional and online)	√	percentage	<b>15%</b>
c. E-learning	√	percentage	<b>5%</b>
d. Correspondence		percentage	<b>%0</b>
f. Other: <b>Inverted Classroom and Integrated education</b>	√	percentage	<b>30%</b>
Comments:			

**B. Objectives**

<p><b>1. The main objective of this course</b>  <b>After completing this course, students will learn:</b></p> <ul style="list-style-type: none"> <li>- Explain How DNA condensed into a Chromosome and chromosome structure and classification</li> <li>- Understanding how the chromosome transmitted from generation to next</li> <li>- Explain the organization and complexity of human genome at the Cytogenetic Level</li> <li>- Explain the nature of chromosomal abnormalities and associated with cytogenetic disorders</li> <li>- Explain the nature of chromosomal abnormalities in the disorders of sexual differentiation</li> <li>- Evaluate appropriately the family pedigree and the population and ethnic aspects of inherited disorders</li> <li>- Estimate the risk of recurrence of various inherited disorders in affected families</li> <li>- Learn about future application and techniques of molecular cytogenetics</li> <li>- become familiar with some of the molecular cytogenetic tools which available as additional aids in diagnosis</li> <li>- Understand the genome as a whole will be examined by investigating the use of molecular cytogenetics techniques and the use of databases to understand whole genome sequences</li> </ul>
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**Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)**

- Regular Updating the content of the course according to the new publications and research in the field
- Feedback of outcome for this course
- Build in more active learning into class

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

This course will focus on chromosome structure, abnormalities, and techniques for the visualization of chromosome aberrations. Chromosome abnormalities will be discussed from the clinical and cytogenetic viewpoint. The course will also cover current topics in Cytogenetics, including molecular cytogenetics techniques and their use in applied filed and research.

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
Introduction in cytogenetics	1	3
Chromosome Structure	1	3
Mitosis and cell cycle	1	3
Chromosomal Abnormalities (Numerical Abnormalities)	1	3
Chromosomal Abnormalities (Structural Abnormalities)	1	3
Sex chromosome abnormalities and disorders	2	6
Midterm and Report discussion (inverted classroom in library)	1	3
Classical cytogenetic techniques	1	3
Molecular cytogenetic techniques	1	3
Karyotyping analysis and diagnostic syndromes	1	3
Epigenetic mechanisms and genomic analysis	2	6
Cytogenetics and model organisms	1	3
<b>Number of Weeks /and Units Per Semester</b>	<b>14</b>	<b>42</b>

**2. Course components (total contact and credit hours per semester):**

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	28	6	6	12	-	52
	Actual						
Credit	Planned	28	2	6	6	-	42
	Actual						

**2. Individual study/learning hours expected for students per week.**

- Additionally, Office hours for faculty member

**4**

**4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies**

On the table below are the five NQF Learning Domains, numbered in the left column. **First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

## Curriculum Map

Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Known the historical of Cytogenetics and Understanding the terminologies of this course	<ul style="list-style-type: none"> <li>• Lecture,</li> <li>• support readings,</li> <li>• group discussions,</li> <li>• writing reports,</li> <li>• preparing research papers.</li> <li>• Conducting individual tasks,</li> <li>• practical training, field training,</li> <li>• Talks,</li> <li>• Activities and</li> <li>• homework</li> </ul>	<ul style="list-style-type: none"> <li>• Written MCQ's exams</li> <li>• Paper oral presentation</li> <li>• Papers based essays</li> <li>• Extended literature review</li> </ul>
1.2	Understanding and applying theories and concepts of cytogenetics and its tools		
1.3	Understanding procedures and cytogenetics mechanisms		
2.0	<b>Cognitive Skills</b>		
2.1	Applying skills to know chromosomal abnormalities (numerical /structural) procedures of theoretical and concepts of karyotype and analysis pictures	<ul style="list-style-type: none"> <li>• Inverted classroom</li> <li>• preparing reports</li> <li>• support readings</li> </ul>	<ul style="list-style-type: none"> <li>• Oral presentation</li> <li>• Papers based Thinking and ideas</li> <li>• Applied work</li> </ul>
2.2	Thinking in disorders related to chromosomal aberrations		
2.3	Creative thinking for diagnosing syndrome		
2.4	Problem solving for interstation of huge data related to chromosomal abnormalities		
3.0	<b>Interpersonal Skills &amp; Responsibility</b>		

3.1	Responsibility of own learning	<ul style="list-style-type: none"> <li>• Periodical report</li> <li>• Contact office</li> <li>• Preparing presentation</li> <li>• Participation in teach the chapters</li> </ul>	<ul style="list-style-type: none"> <li>• Participation in activities of the course</li> <li>• Commitment with the ethics</li> <li>• Cooperation</li> </ul>
3.2	Group participation and leadership		
3.3	Act responsibly-personal and professional situation		
3.4	Ethical standards of behavior		
4.0	<b>Communication, Information Technology, Numerical</b>		
4.1	Oral and written communication	<ul style="list-style-type: none"> <li>• support readings,</li> <li>• writing reports,</li> <li>• preparing research papers.</li> <li>• practical training,</li> <li>• field training,</li> <li>• Activities and homework</li> </ul>	<ul style="list-style-type: none"> <li>• written reports</li> <li>• oral seminar</li> <li>• Summarized literature</li> <li>• Collecting Data</li> <li>• Labs sections</li> </ul>
4.2	Using Database and apps.		
4.3	Basic hand skills		
5.0	<b>Psychomotor</b>		
5.1	Carrying out practical experiments in field and laboratory	<p>Attendance and participating in all practical research project and supervising students throughout the lab experiments</p>	<p>Work on research project leading to write a thesis or a dissertation</p>
5.2	Awareness of laboratory safety issues and experimental ethics		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Reports of Chapters	3,6,10	5%
2	Assignments	2,12	5%
4	Participation and Discutients	All Weeks	5%
5	Midterm	7 <sup>th</sup> Week	15%
6	Labs Reports	5 Weeks	15%
7	Quizzes	3, 6,10	10%
8	Oral Presentation	14	5%
9	Final Exam	16 <sup>th</sup> Week	40%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

**The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.**

### E. Learning Resources

<p><b>1. List Required Textbooks</b></p>	<p><b>Textbook 1.</b> Mahabal Ram Fundamentals of Cytogenetics and Genetics, <b>2010</b> Kindle Edition  <b>Textbook 2.</b> Gardner RJM &amp; Sutherland GR (2004) Chromosome Abnormalities and Genetic counselling. Oxford University Pres  <b>Textbook 3.</b> Swanson, C.P., Merz, T. and Young, W.J. Cytogenetics: The chromosome in division, inheritance and evolution. Prentice – Hall Inc. <b>1990</b>. 2nd Edition</p>
<p><b>2. Essential References</b></p>	<p><b>Textbook 1.</b> Marilyn S. Arsham and Margaret J. Barch The AGT Cytogenetics Laboratory Manual, <b>2017</b>, 4nd Edition</p>
<p><b>3-Recommended Books and Reference Material (Journals, Reports, etc)</b></p>	<p><b>Textbook 1:</b>J. McGowan-Jordan and A. Simons An International System for Human Cytogenomic Nomenclature (2016) Reprint of: Cytogenetic and Genome Research <b>2016</b>, Vol. 149, No. 1-2  <b>Textbook 2:</b>Susan Mahler Zneimer Cytogenetic Abnormalities: Chromosomal, FISH, and Microarray-Based Clinical Reporting and Interpretation of Result <b>2014</b>  <b>Textbook 3:</b> Steven L. Gersen and Martha B. Keagle The Principles of Clinical Cytogenetics , <b>2004</b>  <b>Website:</b> Molecular Cytogenetics: <a href="https://molecularcytogenetics.biomedcentral.com/">https://molecularcytogenetics.biomedcentral.com/</a>  <b>Website:</b> Cytogenetic Recourses: <a href="http://www.kumc.edu/gec/prof/cytogene.html">http://www.kumc.edu/gec/prof/cytogene.html</a></p>

### F. Facilities Required

<p>Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)</p>
<p>1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)</p>
<p>2. Technology resources (AV, data show, Smart Board, software, etc.)</p>
<p>3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)</p>

### G Course Evaluation and Improvement Procedures

<p>2. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching</p> <ul style="list-style-type: none"> <li>- <b>Student activities.</b></li> <li>- <b>Student discussions.</b></li> <li>- <b>Student proposals.</b></li> <li>- <b>Student assessment</b></li> </ul>
<p>2. Other Strategies for Evaluation of Teaching by the Instructor or the Department</p> <ul style="list-style-type: none"> <li>- <b>Regular exams and quiz</b></li> <li>- <b>Work questionnaires</b></li> <li>- <b>Student interview</b></li> </ul>
<p>5. Procedures for Teaching Development</p>



- |  |
|--|
| <ul style="list-style-type: none"><li>- <b>Continuous updating with the use of all new mechanisms in the field</b></li><li>- <b>Staff members are required to attend training courses, conferences and workshops to improve their learning skills</b></li><li>- <b>communication with faculty members in other colleges to share experiences</b></li></ul>   |
| 6. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) <ul style="list-style-type: none"><li>- <b>Comparison of lectures and tests.</b></li><li>- <b>Random review of tests</b></li></ul>                                      |
| 7. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. <ul style="list-style-type: none"><li>- <b>An advisory committee is formed to improve and develop the program's courses</b></li><li>- <b>Adding or removing a subject from a course after approval by the department council</b></li><li>- <b>The university book must be approved by the department council</b></li></ul> |

Name of Course Instructor: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Dr. Sameer Qari** Signature: \_\_\_\_\_

Date Received: \_\_\_\_\_

**Course Title: ADVANCED MOLECULAR GENETICS****Course Code: 2307620-3 Bio**

<b>Date: 30 – 2 -1440</b>	<b>Institution: Umm Al-Qura University</b>
<b>College: Al-Jumoum University college</b>	<b>Department: Biology</b>

**A. Course Identification and General Information**

1. Course title and code: <b>ADVANCED MOLECULAR GENETICS / 2307620-3 Bio</b>				
2. Credit hours: <b>3</b>				
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)				
4. Name of faculty member responsible for the course: <b>Al-Jumum University college</b>				
5. Level/year at which this course is offered: <b>level-2/Year-1</b>				
6. Pre-requisites for this course (if any): <b>N/A</b>				
7. Co-requisites for this course (if any): <b>N/A</b>				
8. Location if not on main campus: <b>Building (B) in Al-Jumum College</b>				
9. Mode of Instruction (mark all that apply):				
a. Traditional classroom	√	percentage	<b>50%</b>	
b. Blended (traditional and online)	√	percentage	<b>15%</b>	
c. E-learning	√	percentage	<b>5%</b>	
d. Correspondence		percentage	<b>%0</b>	
f. Other: <b>Inverted Classroom and Integrated education</b>	√	percentage	<b>30%</b>	
Comments:				

**B. Objectives****1. The main objective of this course****After completing this course, students will learn:**

- Describe structure of nucleic acids and proteins and modulate the specificity of binding between them.
- Distinguish between different molecular biology techniques that are used to isolate, separate, and quantify nucleic acids.
- Compare the mechanisms of bacterial and eukaryotic DNA replication, transcription, and translation.
- Explain how DNA topology and chromatin structure affects the processes of DNA replication, repair, and transcription.
- Describe how pre-mRNA splicing occurs and explain how alternative splicing generates protein diversity.
- Discuss the process of protein biosynthesis and post-translational peptide modification in the cell.
- Explain the molecular mechanisms behind different modes of gene regulation in bacteria.
- Compare various ways in which gene expression is regulated.
- Demonstrate the molecular basis of mutation and mechanisms of DNA repair.
- Define the basic concepts and features of genetic engineering and its tools.

**Describe briefly any plans for developing and improving the course** that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- **Regular Updating the content of the course according to the new publications and research in the field**
- **Feedback of outcome for this course**
- **Build in more active learning into class**

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

The lectures and subsequent tutorials and/or discussions will allow in-depth survey and critical analysis of molecular genetics, beginning with basic principles and extending to modern approaches and special topics. The module will draw on examples from various systems such as *Drosophila*, *C. elegans*, yeasts, human, plants and bacteria. The module encompasses advanced treatment of the Central Dogma of molecular biology and covers recent developments in the molecular understanding of genetic information transfer from DNA to RNA to protein, using current examples. Building upon this platform, the module will then proceed to special topics such as epigenetics, modular signaling cascades, ion channels, membrane dynamics and cellular energetics. It will also provide a broad overview of Protein folding and function

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
<b>The genetic material</b> - Reviewing Structure of DNA, RNA	1	3
<b>DNA replication</b> - Events of DNA replication - Enzymes involved in DNA replication - DNA polymerases, proof reading - Distinguishing features of DNA replication between prokaryotes and eukaryotes. - Topological properties, DNA packaging	1	3
<b>The central dogma and flow of genetic information</b> - An overview of transcription process - Structure of genes-promoters - RNA polymerase-structure and mode of action - Transcription initiation, elongation and termination processes - Post transcriptional modifications, RNA processing	2	6
<b>Machinery of protein synthesis (translation)</b> - Basic features of the genetic code - Structural features of RNA - Structure of ribosomes - Initiation, elongation and termination of translation - Post transnational modifications, molecular chaperone	2	6

<b>Regulation of gene expression</b> - Positive and negative regulation - Mechanism of Induction and Repression - Operon concept - Catabolite repression	2	6
<b>Mechanisms of gene transfer</b> - Evidence that DNA is the transforming agents - Processes of gene recombination - Transformation - Conjugation - Transudation	2	6
<b>Genetic mutation</b> - Mutation and mutants - Isolation of mutants - Mutagenesis and Carcinogenesis (Ames test)	1	3
<b>Overview of genetic engineering</b> - Introduction to genetic engineering and relation to Molecular Biotechnology - Tools of genetic engineering	2	6
<b>Epigenetics</b>	1	3
<b>Number of Weeks /and Units Per Semester</b>	14	42

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	28	6	6	12	-	52
	Actual						
Credit	Planned	28	2	6	6	-	42
	Actual						

<b>2. Individual study/learning hours expected for students per week.</b> - Additionally, Office hours for faculty member	<b>4</b>
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<b>4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies</b>
<b>On the table below are the five NQF Learning Domains, numbered in the left column. <u>First</u>, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). <u>Second</u>, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. <u>Third</u>, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)</b>

**Curriculum Map**

Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Known the structure of Nucleic acids and Understanding the terminologies of this course	<ul style="list-style-type: none"> <li>Lecture,</li> <li>support readings,</li> <li>group discussions,</li> <li>writing reports,</li> <li>preparing research papers.</li> <li>Conducting individual tasks,</li> <li>practical training, field training,</li> <li>Talks,</li> <li>Activities and</li> <li>homework</li> </ul>	<ul style="list-style-type: none"> <li>Written MCQ's exams</li> <li>Paper oral presentation</li> <li>Papers based essays</li> <li>Extended literature review</li> </ul>
1.2	Understanding and applying theories and concepts of Gene expiration and regulation		
1.3	Understanding procedures and molecular biology mechanisms		
2.0	<b>Cognitive Skills</b>		
2.1	Applying skills to know different between prokaryote and eukaryotes Promoters work and concepts of influence in proteomics module	<ul style="list-style-type: none"> <li>Inverted classroom</li> <li>preparing reports</li> <li>support readings</li> </ul>	<ul style="list-style-type: none"> <li>Oral presentation</li> <li>Papers based Thinking and ideas</li> <li>Applied work</li> </ul>
2.2	Thinking in the traits how controlled by macronucleus		
2.3	Creative thinking for genes errors.		
2.4	Problem solving in modern application depend on molecular biology		
3.0	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Responsibility of own learning	<ul style="list-style-type: none"> <li>Periodical report</li> <li>Contact office</li> <li>Preparing presentation</li> <li>Participation in teach the chapters</li> </ul>	<ul style="list-style-type: none"> <li>Participation in activities of the course</li> <li>Commitment with the ethics</li> <li>Cooperation</li> </ul>
3.2	Group participation and leadership		
3.3	Act responsibly-personal and professional situation		
3.4	Ethical standards of behavior		
4.0	<b>Communication, Information Technology, Numerical</b>		
4.1	Oral and written communication	<ul style="list-style-type: none"> <li>support readings,</li> <li>writing reports,</li> </ul>	<ul style="list-style-type: none"> <li>written reports</li> <li>oral seminar</li> </ul>
4.2	Using Database and apps.		

4.3	Basic hand skills	<ul style="list-style-type: none"> <li>preparing research papers.</li> <li>practical training,</li> <li>field training,</li> <li>Activities and homework</li> </ul>	<ul style="list-style-type: none"> <li>Summarized literature</li> <li>Collecting Data</li> <li>Labs sections</li> </ul>
5.0	<b>Psychomotor</b>		
5.1	Carrying out practical experiments in field and laboratory	Attendance and participating in all practical research project and supervising students throughout the lab experiments	Work on research project leading to write a thesis or a dissertation
5.2	Awareness of laboratory safety issues and experimental ethics		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Reports of Chapters	3,6,10	5%
2	Assignments	3,10	5%
4	Participation and discussions	All Weeks	5%
5	Midterm	7 <sup>th</sup> Week	15%
6	Labs Reports	5 Weeks	15%
7	Quizzes	3, 6,10	10%
8	Oral Presentation	14	5%
9	Final Exam	16 <sup>th</sup> Week	40%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

**The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.**

#### E. Learning Resources

1. List Required Textbooks	<p><b>Textbook 1.</b> Molecular Biology of the Cell, 6th edition. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter. New York: Garland Science; <b>2015</b>.</p> <p><b>Textbook 2.</b> Molecular Biology-Understanding the Genetic revolution. Clark, D.P. <b>2005</b>. Elsevier Academic Press.</p> <p><b>Textbook 3.</b> Madigan, M.T. and Martinko, J.M. (2012). Brock, Biology of Microorganisms. Pearson Education International</p>
2. Essential References	<p><b>Textbook 1.</b> Karp: Cell and Molecular Biology: Concepts and Experiments, <b>2004</b> 4th Edition</p>



	<b>Textbook 2</b> Bruce Alberts and Dennis Bray. <b>2013. Essential Molecular Biology, Fourth edition,</b>
3-Recommended Books and Reference Material (Journals, Reports, etc) (Attach List) List Electronic Materials, Web Sites, Facebook, Twitter, etc.	<b>Website 1:</b> <a href="http://www.ncbi.nlm.nih.gov/guide/">http://www.ncbi.nlm.nih.gov/guide/</a> <b>Journals 1:</b> Biotechnology. Publisher: the Asian Network for Scientific Information. Start Year: 2002 <a href="http://www.ansinet.org/c4p.php?j_id=biotech">http://www.ansinet.org/c4p.php?j_id=biotech</a> <b>Journals 2:</b> Genetics & Molecular Biology. Publisher: Brazilian Society for Genetics. Start Year: 1998
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.	-Different Molecular Kits -Online labs

### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
2. Technology resources (AV, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

### G Course Evaluation and Improvement Procedures

3. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
- <b>Student activities.</b>
- <b>Student discussions.</b>
- <b>Student proposals.</b>
- <b>Student assessment</b>
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
- <b>Regular exams and quiz</b>
- <b>Work questionnaires</b>
- <b>Student interview</b>
8. Procedures for Teaching Development
- <b>Continuous updating with the use of all new mechanisms in the field</b>
- <b>Staff members are required to attend training courses, conferences and workshops to improve their learning skills</b>
- <b>communication with faculty members in other colleges to share experiences</b>
9. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
- <b>Comparison of lectures and tests.</b>
- <b>Random review of tests</b>
10. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.
- <b>An advisory committee is formed to improve and develop the program's courses</b>

Kingdom of Saudi Arabia

Ministry of Education

Umm Al-Qura University

Deanship of Graduate Studies



المملكة العربية السعودية

وزارة التعليم

جامعة أم القرى

عمادة الدراسات العليا

- **Adding or removing a subject from a course after approval by the department council**
- **The university book must be approved by the department council**

Name of Course Instructor: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Sameer Qari**

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_

**Course Title: SCIENTIFIC RESEARCH SKILLS.**

**Course Code: 2307621-3 Bio**

<b>Date: 30 – 2 -1440</b>	<b>Institution: Umm Al-Qura University</b>
<b>College: Al-Jumum University college</b>	<b>Department: Biology</b>

**A. Course Identification and General Information**

1. Course title and code: <b>SCIENTIFIC RESEARCH SKILLS/ 2307621-3 Bio</b>			
2. Credit hours: <b>3</b>			
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course: <b>Al-Jumum University college</b>			
5. Level/year at which this course is offered: <b>Level-2/Tear-1</b>			
6. Pre-requisites for this course (if any): <b>N/A</b>			
7. Co-requisites for this course (if any): <b>N/A</b>			
8. Location if not on main campus: <b>Building (B) in Al-Jumum College</b>			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	√	percentage	<b>40%</b>
b. Blended (traditional and online)	√	percentage	<b>15%</b>
c. E-learning	√	percentage	<b>15%</b>
d. Correspondence		percentage	<b>%0</b>
f. Other: <b>Inverted Classroom and Integrated education</b>	√	percentage	<b>30%</b>
Comments:			

**B. Objectives**

<p><b>1. The main objective of this course</b>  <b>After completing this course, students will learn:</b></p> <ul style="list-style-type: none"> <li>- Construct a research problem from relevant literature</li> <li>- Create hypotheses</li> <li>- Design a research study</li> <li>- Select and apply appropriate data analysis methods</li> <li>- Write and present a research report</li> <li>- Gain knowledge on lab ethics and honesty in carrying out the experiments</li> <li>- engage research graduate students in reading, considering, and discussing the responsible conduct of integrity of research.</li> </ul>
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<p>Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>- <b>Regular Updating the content of the course according to the new publications and research in the field</b></li> <li>- <b>Feedback of outcome for this course</b></li> <li>- <b>Build in more active learning into class</b></li> </ul>
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**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

<b>Course Description:</b>
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The course will introduce students to the concepts of scientific research methodology and ethical issues in scientific research and publication. The course will engage students in reading and discussing the responsible conduct of science. The course will include topics in ethics, such as fabrication, falsification, and plagiarism; error vs. intentional misconduct; identifying misconduct and procedures for reporting misconduct. Also, this course is to engage research graduate students in reading, considering, and discussing the responsible conduct of integrity of research.

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
<b>scientific research: definition and steps</b> <ul style="list-style-type: none"> <li>- Research scientific methodology</li> <li>- Determination of research problem</li> <li>- Literature review related to the problem</li> <li>- Develop a hypothesis (Methods of study, Collection of data)</li> <li>- Results Interpretation</li> </ul>	2	6
<b>Writing up reports/scientific papers Scientific writing components (scientific paper)</b> <ul style="list-style-type: none"> <li>- The title of the paper</li> <li>- Abstract - Introduction</li> <li>- Materials and methods</li> <li>- Results</li> <li>- Discussion and conclusions</li> <li>- References</li> </ul>	2	6
<b>References citation</b> <ul style="list-style-type: none"> <li>- Information resources</li> <li>- References within the text</li> <li>- Reference list</li> <li>- Reference software</li> </ul>	1	3
<b>Methods of Scientific Publication</b> <ul style="list-style-type: none"> <li>- Scientific paper</li> <li>- Theses (e.g., MSc and PhD)</li> <li>- Reports</li> <li>- Books</li> </ul>	1	3
<b>Presentation of research results</b> <ul style="list-style-type: none"> <li>- Poster presentation</li> <li>- Designing a poster</li> <li>- Oral presentation</li> <li>- Designing and preparing of slides</li> <li>- Skills of presentation</li> </ul>	2	6

<b>Ethics in scientific research (Research Documentation)</b> <ul style="list-style-type: none"> <li>- Plagiarism</li> <li>- Falsification</li> <li>- Fabrication</li> <li>- Authorship: Responsibilities of authors</li> <li>- Duplicate publication</li> </ul>	2	6
<b>Ethics in scientific research (Roles)</b> <ul style="list-style-type: none"> <li>- Ethical Issues in Research with Animals</li> <li>- Ethical Issues in Research with Human</li> <li>- Intellectual Property Rights</li> </ul>	1	3
<b>Research Integrity</b> <ul style="list-style-type: none"> <li>- Overview</li> <li>- Recordkeeping</li> <li>- Ownership of Data</li> <li>- Conflicts of Interest</li> <li>- Use of Animal Subjects</li> <li>- Mentoring</li> <li>- Authorship and Peer Review</li> <li>- Use of Human Subjects</li> <li>- Genetic Technology</li> </ul>	2	
<b>Ethical and Legal Issues</b> <ul style="list-style-type: none"> <li>- In Genetic Testing</li> <li>- In Genetic Screening Programmes</li> </ul>	1	3
<b>Number of Weeks /and Units Per Semester</b>	14	42

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	28	6	6	12	-	52
	Actual						
Credit	Planned	28	2	6	6	-	42
	Actual						

<b>3. Individual study/learning hours expected for students per week.</b> <ul style="list-style-type: none"> <li>- Additionally, Office hours for faculty member</li> </ul>	<b>4</b>
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<b>4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies</b>
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On the table below are the five NQF Learning Domains, numbered in the left column. **First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

## Curriculum Map

Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Understanding facts	<ul style="list-style-type: none"> <li>• Lecture,</li> <li>• support readings,</li> <li>• group discussions,</li> <li>• writing reports,</li> <li>• preparing protocols sheets.</li> <li>• practical training,</li> <li>• Lab training,</li> <li>• Attendees</li> <li>• homework</li> </ul>	<ul style="list-style-type: none"> <li>• Written MCQ's exams</li> <li>• oral presentation</li> <li>• Papers based essays</li> <li>• Extended literature review</li> </ul>
1.2	Understanding and applying theories and concepts		
1.3	Understanding procedures and Methodologies		
2.0	<b>Cognitive Skills</b>		
2.1	Applying skills / procedures of theoretical and concepts learned	<ul style="list-style-type: none"> <li>• Inverted classroom</li> <li>• preparing reports</li> <li>• support readings</li> </ul>	<ul style="list-style-type: none"> <li>• Oral presentation</li> <li>• Papers based Thinking and ideas</li> <li>• Applied work</li> </ul>
2.2	Critical thinking of labs Precautions and developments		
2.3	Creative thinking for reading results		
2.4	Problem solving		
3.0	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Responsibility of own learning	<ul style="list-style-type: none"> <li>• Periodical report</li> <li>• Contact office</li> <li>• Preparing presentation</li> <li>• Participation in teach the chapters</li> </ul>	<ul style="list-style-type: none"> <li>• Participation in activities of the course</li> <li>• Commitment with the ethics</li> <li>• Cooperation</li> </ul>
3.2	Group participation and leadership		
3.3	Act responsibly-personal and professional situation		
3.4	Ethical standards of behavior		
4.0	<b>Communication, Information Technology, Numerical</b>		



4.1	Oral and written communication	<ul style="list-style-type: none"> <li>• support readings,</li> <li>• writing reports,</li> <li>• preparing research papers.</li> <li>• practical training,</li> <li>• field training,</li> <li>• Activities and homework</li> </ul>	<ul style="list-style-type: none"> <li>• written reports</li> <li>• oral seminar</li> <li>• Summarized literature</li> <li>• Collecting Data</li> <li>• Labs sections</li> </ul>
4.2	Using Database and apps.		
4.3	Basic hand skills		
5.0	<b>Psychomotor</b>		
5.1	Carrying out practical experiments in field and laboratory	Attendance and participating in all practical research project and supervising students throughout the lab experiments	Work on research project leading to write a thesis or a dissertation
5.2	Awareness of laboratory safety issues and experimental ethics		

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Oral presentation	4 Weeks	5%
2	Reports (write paper)	2 Weeks	10%
3	Participation	All Weeks	5%
4	Quizzes	2 Weeks	10%
5	Med Exam	8 <sup>th</sup> Week	10%
6	Online training	13 <sup>th</sup> Week	10%
7	Final Exam	18 <sup>th</sup> Week	50%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

**The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.**

#### E Learning Resources

1. List Required Textbooks	<p><b>Textbook 1:</b> Kate L. Turabian, Wayne C. Booth, Gregory G. Colomb and Joseph M. Williams <b>2018</b> A Manual for Writers of Research Papers, Theses, and Dissertations, Ninth Edition: Chicago Style for Students</p> <p><b>Textbook 2:</b> Robert Yin, <b>2009</b> Case Study Research: Design and Methods. 4th Ed., Sage Publishers.</p> <p><b>Textbook 3:</b> Mark Israel <b>2014</b> Research Ethics and Integrity for Social Scientists</p>
2. Other learning material such as computer-based programs/CD, professional	<p><b>Textbook 1:</b> European commission, "European Textbook on Ethics in Research," - <b>2010</b></p> <p><b>Online: Integrity course</b></p>

standards or regulations and software.	<a href="https://www.ucd.ie/graduatestudies/currentgradstudents/researchphdsupport/researchintegritytrainingforphdstudents/">https://www.ucd.ie/graduatestudies/currentgradstudents/researchphdsupport/researchintegritytrainingforphdstudents/</a>
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#### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
2. Technology resources (AV, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

#### G Course Evaluation and Improvement Procedures

4. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching <ul style="list-style-type: none"> <li>- <b>Student activities.</b></li> <li>- <b>Student discussions.</b></li> <li>- <b>Student proposals.</b></li> <li>- <b>Student assessment</b></li> </ul>
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department <ul style="list-style-type: none"> <li>- <b>Regular exams and quiz</b></li> <li>- <b>Work questionnaires</b></li> <li>- <b>Student interview</b></li> </ul>
11. Procedures for Teaching Development <ul style="list-style-type: none"> <li>- <b>Continuous updating with the use of all new mechanisms in the field</b></li> <li>- <b>Staff members are required to attend training courses, conferences and workshops to improve their learning skills</b></li> <li>- <b>communication with faculty members in other colleges to share experiences</b></li> </ul>
12. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) <ul style="list-style-type: none"> <li>- <b>Comparison of lectures and tests.</b></li> <li>- <b>Random review of tests</b></li> </ul>
13. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. <ul style="list-style-type: none"> <li>- <b>An advisory committee is formed to improve and develop the program's courses</b></li> <li>- <b>Adding or removing a subject from a course after approval by the department council</b></li> <li>- <b>The university book must be approved by the department council</b></li> </ul>

Name of Course Instructor: **Dr. Kamal Attia**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_

Course Title: **SEMINAR**

Course Code: 2307629-1 Bio

Date: 20 – 6 -1440	Institution: Umm Al-Qura University
College: Al-Jumum University college	Department: Biology

**A. Course Identification and General Information**

1. Course title and code: <b>SEMINAR/ 2307629-1 Bio</b>			
2. Credit hours: <b>1</b>			
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course: <b>Al-Jumum University college</b>			
5. Level/year at which this course is offered: <b>Level-2/Year-1</b>			
6. Pre-requisites for this course (if any): <b>N/A</b>			
7. Co-requisites for this course (if any): <b>N/A</b>			
8. Location if not on main campus: <b>Building (B) in Al-Jumum College</b>			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	√	percentage	<b>0%</b>
b. Blended (traditional and online)	√	percentage	<b>10%</b>
c. E-learning	√	percentage	<b>20%</b>
d. Correspondence		percentage	<b>0%</b>
f. Other: <b>Meeting and discussion</b>	√	percentage	<b>70%</b>

Comments:

**B. Objectives****1. The main objective of this course**

After completing this course, students will learn:

- Write the research proposal for dissertation
- To provide students with strong science communication skills
- To understand the research methodology adopted by various researchers
- To mathematically model a problem, critically analyses it and adopt strategies to solve
- To understand and present a well-documented research
- To provide students with a broad overview of research in genetics branches

Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- **Regular Updating the content of the course according to the new publications and research in the field**
- **Feedback of outcome for this course**
- **Build in more active learning into class**

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)**Course Description:**

In this course, students are expected to deepen their knowledge in their fields of specialization through reading of necessary literature, which includes technical papers in the relevant field. Students are able to deepen their knowledge by making presentations

on the literature they read and holding questions and answering sessions (in a round-table). These presentations will be open to other students from other related graduate programme. The widening of students' perceptive and awareness of topics of interest to management through seminars offered by faculty, graduating thesis students, and invited guests from industry, research centers and academia

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
<p><b>Guidelines for conducting 2307629-1 Bio Seminar:</b></p> <ol style="list-style-type: none"> <li>1. Upon registering for the course, the student must identify a subdomain of the degree specialization that is of interest to the student and start collecting research papers as many as possible.</li> <li>2. After collecting sufficient number of researches papers the student must peruse all the papers, meet the course faculty and discuss on the salient aspects of each and every paper.</li> <li>3. The course faculty, after discussion with the student will approve TWO research papers that is appropriate for presentation.</li> <li>4. The student must collect additional relevant reference materials to supplement and compliment the two research papers and start preparing the presentation.</li> <li>5. Each student must present a 15-minute presentation on each of the approved research paper to the panel of evaluators.</li> <li>6. The presenter must present one research paper within the first half of the semester (6 weeks) and another research paper in the next half of the semester (6 weeks) as per the schedule.</li> <li>7. All other students registered for the course will form the audience.</li> <li>8. The audience as well as the evaluators will probe the student with appropriate questions and solicit response from the presenter.</li> <li>9. The presentation will be evaluated against 7 to 8 assessment criteria by 4 to 5 evaluators.</li> <li>10. The score obtained through the presentations of TWO research papers will be converted to appropriate percentage of marks. This course is 100% internal continuous assessment.</li> </ol>	14	6
<b>Number of Weeks /and Units Per Semester</b>	14	--

### 2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	2	2	-	-	2	6
	Actual						
Credit	Planned	2	2	-	-	2	6
	Actual						

4. Individual study/learning hours expected for students per week. - Additionally, Office hours for faculty member	4
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**4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies**

On the table below are the five NQF Learning Domains, numbered in the left column. **First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map			
Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Understanding of the subject	<ul style="list-style-type: none"> <li>Consulting</li> <li>Round table discussion</li> <li>Training</li> </ul>	<ul style="list-style-type: none"> <li>Seminars</li> <li>Report</li> <li>Proposal paper</li> </ul>
1.2	Understanding and applying theories and concepts		
1.3	Understanding procedures and Methodologies		
2.0	<b>Cognitive Skills</b>		
2.1	Clarity of presentation	<ul style="list-style-type: none"> <li>Consulting</li> <li>Round table discussion</li> <li>Training</li> </ul>	<ul style="list-style-type: none"> <li>Seminars attendance</li> <li>Writing Proposal</li> <li></li> </ul>
2.2	Appropriate use of Audio-visual aids		
2.3	Whether cross references have been consulted		
2.4	Problem solving		
3.0	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Ability to respond to questions on the subject	<ul style="list-style-type: none"> <li>Consulting</li> <li>Round table discussion</li> <li>Training</li> </ul>	<ul style="list-style-type: none"> <li>Seminars</li> <li>Report</li> <li>Proposal paper</li> </ul>
3.2	Time scheduling		
3.3	Completeness of preparation		
3.4	Ethical standards of behavior		
4.0	<b>Communication, Information Technology, Numerical</b>		

4.1	Oral and written communication	<ul style="list-style-type: none"> <li>Consulting</li> <li>Round table discussion</li> <li>Training</li> </ul>	<ul style="list-style-type: none"> <li>Attendance local and international Seminars</li> <li>Briefs of the seminars</li> </ul>
4.2	Using Database and apps.		
4.3	Basic hand writes skills		
5.0	<b>Psychomotor</b>		
5.1	Carrying out practical experiments in field and laboratory	<ul style="list-style-type: none"> <li>Consulting</li> <li>Advising</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Student motility</li> <li>Student responses</li> </ul>
5.2	Awareness of laboratory safety issues and experimental ethics		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Oral presentation-1	1 Weeks	20%
2	Reports (write proposal)	2 Weeks	30%
3	Oral presentation-2	All Weeks	50%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

**The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.**

#### E Learning Resources

1. List Required Textbooks	<b>Depend on advisor and work research</b>
2. Other learning material such as computer-based programs/CD, professional standards or regulations and software.	<b>Depend on advisor and work research</b>

#### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

2. Technology resources (AV, data show, Smart Board, software, etc.)

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)



### G Course Evaluation and Improvement Procedures

11. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching <ul style="list-style-type: none"><li>- <b>Student Responsibility.</b></li><li>- <b>Student discussions.</b></li><li>- <b>Student proposals.</b></li><li>- <b>Student assessment</b></li></ul>
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department <ul style="list-style-type: none"><li>- <b>Oral presentations</b></li><li>- <b>Reports</b></li></ul>
14. Procedures for Teaching Development <ul style="list-style-type: none"><li>- <b>Continuous updating with the use of all new mechanisms in the field</b></li><li>- <b>Staff members are required to attend training courses, conferences and workshops to improve their learning skills</b></li><li>- <b>communication with faculty members in other colleges to share experiences</b></li></ul>
15. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) <ul style="list-style-type: none"><li>- <b>Comparison of Reading and mentality of student.</b></li><li>- <b>Good point understanding</b></li></ul>
16. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. <ul style="list-style-type: none"><li>- <b>An advisory committee is formed to improve and develop the program's courses</b></li><li>- <b>Adding or removing a subject from a course after approval by the department council</b></li><li>- <b>The university plan must be approved by the department council</b></li></ul>

Name of Course Instructor: **Staff of Biology Dept**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_

Course Title: **BINFORMATICS**

Course Code: **2307614-3 Bio**

<b>Date: 20 – 6 -1440</b>	<b>Institution: Umm Al-Qura University</b>
<b>College: Al-Jumoum University college</b>	<b>Department: Biology</b>

**A. Course Identification and General Information**

1. Course title and code: <b>BINFORMATICS / 2307614-3 Bio</b>				
2. Credit hours: <b>3</b>				
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)				
4. Name of faculty member responsible for the course: <b>Al-Jumoum University college</b>				
5. Level/year at which this course is offered: <b>Elective-1or2 Level/Year-1</b>				
6. Pre-requisites for this course (if any): <b>N/A</b>				
7. Co-requisites for this course (if any): <b>N/A</b>				
8. Location if not on main campus: <b>Building (B) in Al-Jumoum College</b>				
9. Mode of Instruction (mark all that apply):				
a. Traditional classroom	√	percentage	<b>40%</b>	
b. Blended (traditional and online)	√	percentage	<b>15%</b>	
c. E-learning	√	percentage	<b>15%</b>	
d. Correspondence		percentage	<b>%0</b>	
<b>f. Other: Inverted Classroom and Integrated education</b>	√	percentage	<b>30%</b>	

Comments:

**B. Objectives**

<p><b>1. The main objective of this course</b>  <b>After completing this course, students will learn:</b></p> <ul style="list-style-type: none"> <li>- Know about databases and their use</li> <li>- Understand sequence alignment and programming</li> <li>- Analyze the protein sequence using bioinformatics tools</li> <li>- Understand the use of PERL, Python in programming</li> <li>- Gain exposure to R and learn to use in day- to- day research</li> </ul>
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<p>Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>- <b>Regular Updating the content of the course according to the new publications and research in the field</b></li> <li>- <b>Feedback of outcome for this course</b></li> <li>- <b>Build in more active learning into class</b></li> </ul>
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**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

<p><b>Course Description:</b>          This course imparts fundamental knowledge of bio informatics, algorithms, tools and their applications. The study and learning on PERL, R and Python would enable the students to understand the scripting and programming which help in executing day- to- day research in biological data analysis and interpretations.</p>
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<b>1. Topics to be Covered</b>		
<b>List of Topics</b>	<b>No. of Weeks</b>	<b>Contact hours</b>
<b>Biological Databases</b> Biological databases – primary sequence databases Composite sequence databases - Secondary databases composite protein pattern databases - structure classification databases	<b>2</b>	<b>6</b>
<b>Genome Information Resources:</b> DNA sequence databases - specialized genomic resources Gene prediction - tools and principles	<b>1</b>	<b>3</b>
<b>Sequence Alignment</b> Database searching-algorithms and programs-comparing two sequences identity, similarity, gap penalties, edit distance	<b>1</b>	<b>3</b>
<b>BLAST -Variants</b> Global alignments: Needleman - Wunsch Algorithm, local alignments: Smith Waterman Algorithm, PAM and BLOSUM scoring matrices	<b>1</b>	<b>3</b>
Goal of multiple sequence Alignment - Computational complexity - manual Methods-Simultaneous methods progressive methods - viewing MSA	<b>1</b>	<b>3</b>
<b>Phylogenetic analysis:</b> Concepts of trees, distance matrix methods, character-based methods, construction of dendrogram - rooted and un - rooted tree representation - Phylogenetic trees - PHYLIP	<b>2</b>	<b>6</b>
<b>Protein Analysis</b> Conserved domain analysis, Protein visualization tools Prediction of protein structure and function-secondary and tertiary structure, motifs and patterns Ramachandran plot - validation of the predicted structure using- Ramachandran plot and other stereochemical properties	<b>2</b>	<b>6</b>
<b>Bioperl and Biopython</b> Using PERL to facilitate biological analysis - strings, numbers, variables- scalar, arrays and hashes Basic input and output- File handles- Conditional Blocks and loops- Pattern matching- Arrays-Hashes. Biopython- variables, programming structure, scripts, examples with various applications	<b>2</b>	<b>6</b>
<b>Using R</b> Introduction about R, Vectors, Matrices, Arrays, Lists, Data frames, factors and tables R programming structure, input output, string manipulation, doing math and simulations in R Introduction to Bioconductor R packages- use of different R packages for various applications- examples	<b>2</b>	<b>6</b>
<b>Number of Weeks /and Units Per Semester</b>	<b>14</b>	<b>42</b>

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	28	6	6	12	-	52
	Actual						
Credit	Planned	28	2	6	6	-	42
	Actual						

2. Individual study/learning hours expected for students per week. - Additionally, Office hours for faculty member	4
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#### 4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column. **First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

##### Curriculum Map

Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Understanding facts	<ul style="list-style-type: none"> <li>Lecture,</li> <li>support readings,</li> <li>group discussions,</li> <li>writing reports,</li> <li>preparing protocols sheets.</li> <li>practical training,</li> <li>Lab training,</li> <li>Attendees</li> <li>homework</li> </ul>	<ul style="list-style-type: none"> <li>Written MCQ's exams</li> <li>oral presentation</li> <li>Papers based essays</li> <li>Extended literature review</li> </ul>
1.2	Understanding and applying theories and concepts		
1.3	Understanding procedures and Methodologies		
2.0	<b>Cognitive Skills</b>		
2.1	Applying skills / procedures of theoretical and concepts learned	<ul style="list-style-type: none"> <li>Inverted classroom</li> <li>preparing reports</li> <li>support readings</li> </ul>	<ul style="list-style-type: none"> <li>Oral presentation</li> <li>Papers based Thinking and ideas</li> <li>Applied work</li> <li>Lab reports</li> </ul>
2.2	Critical thinking of labs Precautions and developments		

2.3	Creative thinking for reading results		<ul style="list-style-type: none"> <li>• Lab sheets</li> <li>• Lab follow-up</li> </ul>
2.4	Problem solving		
3.0	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Responsibility of own learning	<ul style="list-style-type: none"> <li>• Periodical report</li> <li>• Contact office</li> <li>• Preparing presentation</li> <li>• Participation in teach the chapters</li> </ul>	<ul style="list-style-type: none"> <li>• Participation in activities of the course</li> <li>• Commitment with the ethics</li> <li>• Cooperation</li> </ul>
3.2	Group participation and leadership		
3.3	Act responsibly-personal and professional situation		
3.4	Ethical standards of behavior		
4.0	<b>Communication, Information Technology, Numerical</b>		
4.1	Oral and written communication	<ul style="list-style-type: none"> <li>• support readings,</li> <li>• writing reports,</li> <li>• preparing research papers.</li> <li>• practical training,</li> <li>• field training,</li> <li>• Activities and homework</li> </ul>	<ul style="list-style-type: none"> <li>• written reports</li> <li>• oral seminar</li> <li>• Summarized literature</li> <li>• Collecting Data</li> <li>• Labs sections</li> </ul>
4.2	Using Database and apps.		
4.3	Basic hand skills		
5.0	<b>Psychomotor</b>		
5.1	Carrying out practical experiments in field and laboratory	Attendance and participating in all practical research project and supervising students throughout the lab experiments	Work on research project leading to write a thesis or a dissertation
5.2	Awareness of laboratory safety issues and experimental ethics		

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Oral presentation	4 Weeks	5%
2	Reports (write paper)	2 Weeks	10%
3	Participation	All Weeks	5%
4	Quizzes	2 Weeks	10%
5	Med Exam	8 <sup>th</sup> Week	10%
6	Online training	13 <sup>th</sup> Week	10%
7	Final Exam	18 <sup>th</sup> Week	50%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)
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The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.

### E Learning Resources

1. List Required Textbooks	<p><b>Textbook 1:</b> Strachan, N.T., Read, A., "Human Molecular Genetics", 4th edition, Garland Science, 2010</p> <p><b>Textbook 2:</b> Introduction to Bioinformatics by Arthur Lesk   Jan 1, 2014, 5th edition</p> <p><b>Textbook 3:</b> Matloff. N., "The Art of R Programming", No Starch Press, 2011</p> <p><b>Active learning:</b> Philip, C &amp; Pavel P 2018 Bioinformatics Algorithms: An Active Learning Approach 3th edition</p>
2. Recommended Reading and other sources	<p><b>Textbook 1:</b> Murthy.C.S.V., "Bioinformatics", 1st Edition, Himalaya Publishing House.2003.</p> <p>Rastogi.S.C., Namita., M., Parag,R., "Bioinformatics- Concepts, Skills, and Applications", CBS Publishing. 2009</p> <p><b>Online Sources:</b>  <a href="https://wiki.python.org/moin/BeginnersGuide/Programmers">https://wiki.python.org/moin/BeginnersGuide/Programmers;</a>  <a href="https://en.wikibooks.org/wiki/Perl_Programming">https://en.wikibooks.org/wiki/Perl_Programming</a></p>

### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
2. Technology resources (AV, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

### G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
<ul style="list-style-type: none"> <li>- <b>Student activities.</b></li> <li>- <b>Student discussions.</b></li> <li>- <b>Student proposals.</b></li> <li>- <b>Student assessment</b></li> </ul>
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
<ul style="list-style-type: none"> <li>- <b>Regular exams and quiz</b></li> <li>- <b>Work questionnaires</b></li> <li>- <b>Student interview</b></li> </ul>
17. Procedures for Teaching Development
<ul style="list-style-type: none"> <li>- <b>Continuous updating with the use of all new mechanisms in the field</b></li> <li>- <b>Staff members are required to attend training courses, conferences and workshops to improve their learning skills</b></li> <li>- <b>communication with faculty members in other colleges to share experiences</b></li> </ul>
18. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic



exchange and remarking of tests or a sample of assignments with staff members at another institution)

- **Comparison of lectures and tests.**
- **Random review of tests**

19. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

- **An advisory committee is formed to improve and develop the program's courses**
- **Adding or removing a subject from a course after approval by the department council**
- **The university book must be approved by the department council**

Name of Course Instructor: **Staff from KAU (Partnership)**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_

**Course Title: BIO-LABS TECHNIQUES****Course Code: 2307613-3 Bio**

<b>Date: 30 – 2 -1440</b>	<b>Institution: Umm Al-Qura University</b>
<b>College: Al-Jumoum University college</b>	<b>Department: Biology</b>

**A. Course Identification and General Information**

1. Course title and code: <b>BIO-LABS TECHNIQUES / 2307613-3 Bio</b>				
2. Credit hours: <b>3</b>				
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)				
4. Name of faculty member responsible for the course: <b>Al-Jumoum University college</b>				
5. Level/year at which this course is offered: <b>Elective-1or2 Level/Year-1</b>				
6. Pre-requisites for this course (if any): <b>N/A</b>				
7. Co-requisites for this course (if any): <b>N/A</b>				
8. Location if not on main campus: <b>Building (B) in Al-Jumoum College</b>				
9. Mode of Instruction (mark all that apply):				
a. Traditional classroom	<input checked="" type="checkbox"/>	percentage	<b>50%</b>	
b. Blended (traditional and online)	<input checked="" type="checkbox"/>	percentage	<b>15%</b>	
c. E-learning	<input checked="" type="checkbox"/>	percentage	<b>5%</b>	
d. Correspondence	<input type="checkbox"/>	percentage	<b>%0</b>	
f. Other: <b>Inverted Classroom and Integrated education</b>	<input checked="" type="checkbox"/>	percentage	<b>30%</b>	
Comments:				

**B. Objectives**

<p><b>1. The main objective of this course</b></p> <p><b>After completing this course, students will learn:</b></p> <ul style="list-style-type: none"> <li>- Discuss the DNA replication, transcription, gene expression and regulation, recombinant DNA and RNA techniques such as gene cloning, transformation, RT-PCR, DNA sequencing</li> <li>- Explain the principles of cloning and genetic manipulation and their application in genetic analysis.</li> <li>- Apply the fundamental rules for occupational safety in the laboratory, with the proper use and maintenance of equipment.</li> <li>- Keep records on results obtained and observations made in a laboratory journal.</li> <li>- Independently use various devices, centrifuges, measuring instruments and optical aids in laboratory work.</li> <li>- Independently execute a laboratory experiment using the standard methods and techniques in molecular biology, with the appropriate analysis and interpretation of results obtained.</li> <li>- Process the results obtained in the conducted experiments using computer processing and display the results in the form of a written report.</li> </ul>
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<p><b>Describe briefly any plans for developing and improving the course</b> that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>- <b>Regular Updating the content of the course according to the new publications and research in the field</b></li> </ul>
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- **Feedback of outcome for this course**
- **Build in more active learning into class**

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

The course imparts practical knowledge on nucleic acid isolation, digestion and ligation. This course also gives knowledge on transformation and recombinant selection. This module interested with laboratory techniques in molecular biology ether classical technique i(e: southern & western blot, singer sequencing and Hybridization) and Modern (i e: comet assay, RFLP, RAPD, SSRP, Microarray and RNA-seq.) with an emphasis on DNA isolation, analysis, gel electrophoresis and protein study, recombinant DNA and RNA techniques such as gene cloning, transformation, RT-PCR, DNA sequencing. This course also deals with the protein – protein interaction and protein sequencing methods.

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
<p>Techniques overview</p> <ul style="list-style-type: none"> <li>- Basic of Laboratory Techniques in Molecular Biology</li> <li>- <b>Modern molecular techniques</b></li> <li>- <b>Genetic engineering technique &amp; Cloning</b></li> </ul>	2	6
<p>Lab skills and safety</p> <ul style="list-style-type: none"> <li>- Introduction to micropipette handling, pH measurement,</li> <li>- Stoichiometry and buffer preparation</li> <li>- Counting concentration of the reagents</li> <li>- General rules - personal precautions</li> </ul>	2	6
<p>Nucleic Acid Isolation and Agarose Gel Electrophoresis</p> <ul style="list-style-type: none"> <li>- Conventional and kit methods for isolation of plasmid DNA</li> <li>- Conventional and kit methods for isolation of Genomic DNA from bacterial cells, plant cells and animal cells</li> <li>- Spectrophotometric quantification of genomic DNA</li> <li>- RNA isolation and mRNA purification.</li> <li>- Agarose gel electrophoresis, Staining techniques</li> <li>- Pulsed field gel electrophoresis (PFGE)</li> </ul>	2	6
<p>PCR Techniques</p> <ul style="list-style-type: none"> <li>- Principle of polymerase chain reaction (PCR) - Components of PCR reaction</li> <li>- Optimization of PCR</li> <li>- Gene specific and degenerate primers</li> <li>- Gene specific and degenerate primers</li> <li>- Reverse transcription PCR</li> <li>- Real time PCR</li> </ul>	2	6

<p><b>Hybridization Methods</b></p> <ul style="list-style-type: none"> <li>- Introduction to probes</li> <li>- Radioactive probe labeling</li> <li>- Non-radioactive probe labeling</li> <li>- Southern hybridization</li> <li>- Northern hybridization</li> <li>- Western blotting</li> </ul>	2	6
<p><b>DNA Sequencing and Gene Synthesis</b></p> <ul style="list-style-type: none"> <li>- Automated DNA sequencing by Sanger's method</li> <li>- Pyrosequencing</li> <li>- Nanopore sequencing.</li> <li>- Methods of gene synthesis</li> <li>- RNA sequencing</li> </ul>	2	6
<p><b>Protein Techniques</b></p> <ul style="list-style-type: none"> <li>- Isolation of total protein from bacteria/ legume seeds</li> <li>- Estimation of total protein concentration using Lowry's/ Bradford's method</li> <li>- SDS PAGE analysis of total protein</li> <li>- Denaturing SDS PAGE</li> <li>- Native Non-denaturing PAGE</li> <li>- ELISA</li> <li>- Yeast one hybrid system</li> </ul>	2	6
<b>Number of Weeks /and Units Per Semester</b>	14	42

**2. Course components (total contact and credit hours per semester):**

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	14	3	14	14	3	48
	Actual						
Credit	Planned	14	3	14	28	3	62
	Actual						

<b>5. Individual study/learning hours expected for students per week.</b>	<b>4</b>
- Additionally, Office hours for faculty member	

<b>4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies</b>
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**On the table below are the five NQF Learning Domains, numbered in the left column. First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)**

**Curriculum Map**

Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Understanding facts	<ul style="list-style-type: none"> <li>• Lecture,</li> <li>• support readings,</li> <li>• group discussions,</li> <li>• writing reports,</li> <li>• preparing protocols sheets.</li> <li>• practical training,</li> <li>• Lab training,</li> <li>• Attendees</li> <li>• homework</li> </ul>	<ul style="list-style-type: none"> <li>• Written MCQ's exams</li> <li>• oral presentation</li> <li>• Papers based essays</li> <li>• Extended literature review</li> </ul>
1.2	Understanding and applying theories and concepts		
1.3	Understanding procedures and Methodologies		
2.0	<b>Cognitive Skills</b>		
2.1	Applying skills / procedures of theoretical and concepts learned	<ul style="list-style-type: none"> <li>• Inverted classroom</li> <li>• preparing reports</li> <li>• support readings</li> </ul>	<ul style="list-style-type: none"> <li>• Oral presentation</li> <li>• Papers based Thinking and ideas</li> <li>• Applied work</li> <li>• Lab reports</li> <li>• Lab sheets</li> <li>• Lab follow-up</li> </ul>
2.2	Critical thinking of labs Precautions and developments		
2.3	Creative thinking for reading results		
2.4	Problem solving		
3.0	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Responsibility of own learning	<ul style="list-style-type: none"> <li>• Periodical report</li> <li>• Contact office</li> <li>• Preparing presentation</li> <li>• Participation in teach the chapters</li> </ul>	<ul style="list-style-type: none"> <li>• Participation in activities of the course</li> <li>• Commitment with the ethics</li> <li>• Cooperation</li> </ul>
3.2	Group participation and leadership		
3.3	Act responsibly-personal and professional situation		
3.4	Ethical standards of behavior		
4.0	<b>Communication, Information Technology, Numerical</b>		

4.1	Oral and written communication	<ul style="list-style-type: none"> <li>• support readings,</li> <li>• writing reports,</li> <li>• preparing research papers.</li> <li>• practical training,</li> <li>• field training,</li> <li>• Activities and homework</li> </ul>	<ul style="list-style-type: none"> <li>• written reports</li> <li>• oral seminar</li> <li>• Summarized literature</li> <li>• Collecting Data</li> <li>• Labs sections</li> </ul>
4.2	Using Database and apps.		
4.3	Basic hand skills		
5.0	<b>Psychomotor</b>		
5.1	Carrying out practical experiments in field and laboratory	Attendance and participating in all practical research project and supervising students throughout the lab experiments	Work on research project leading to write a thesis or a dissertation
5.2	Awareness of laboratory safety issues and experimental ethics		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Experiments	7 Weeks	40%
2	Reports	7 Weeks	5%
3	Attendance	All Weeks	5%
4	Quizzes	2 Weeks	5%
5	Written Exam	1 Week	5%
7	Final Exam	18 <sup>th</sup> Week	40%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

**The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.**

#### E Learning Resources

1. List Required Textbooks	<p><b>Textbook 1:</b> Rakesh S. Sengar, Amit Kumar, Reshu Chaudhary, Ashu Singh <b>2018</b> Advances in Molecular Techniques 1st Edition</p> <p><b>Textbook 2:</b> Sean R. Gallagher and Emily A. Wiley <b>2012</b> Current Protocols Essential Laboratory Techniques</p> <p><b>Lab Manual:</b> "Molecular Biology Techniques" S. O'Grady <i>et al</i> <b>2012</b>. ISBN: BITC2441F</p>
<b>Supplies:</b> Laboratory Notebook, Scientific Calculator with statistics and linear regression capability, Sharpie labeling pens (fine tip).	<p><b>Textbook 1:</b> Shendure. J., Ji. H., Next-generation DNA sequencing, Nature Biotech., 26, 1135 – 1145, <b>2008</b></p> <p><b>Textbook 2:</b> Valones et al., Principles and applications of polymerase chain reaction in medical diagnostic fields: a review Braz. J. Microbiol., 40, 1–11, <b>2009</b>.</p>



	<b>Textbook 3:</b> Daniel. C.L., "Introduction to Proteomics", Humana Press. 2002.
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.	<b>Website 1:</b> Future Learning for courses in Molecular techniques: <a href="https://www.futurelearn.com/courses/molecular-techniques">https://www.futurelearn.com/courses/molecular-techniques</a>

**F. Facilities Required**

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
2. Technology resources (AV, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

**G Course Evaluation and Improvement Procedures**

2. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching	<ul style="list-style-type: none"> <li>- <b>Student activities.</b></li> <li>- <b>Student discussions.</b></li> <li>- <b>Student proposals.</b></li> <li>- <b>Student assessment</b></li> </ul>
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department	<ul style="list-style-type: none"> <li>- <b>Regular exams and quiz</b></li> <li>- <b>Work questionnaires</b></li> <li>- <b>Student interview</b></li> </ul>
20. Procedures for Teaching Development	<ul style="list-style-type: none"> <li>- <b>Continuous updating with the use of all new mechanisms in the field</b></li> <li>- <b>Staff members are required to attend training courses, conferences and workshops to improve their learning skills</b></li> <li>- <b>communication with faculty members in other colleges to share experiences</b></li> </ul>
21. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)	<ul style="list-style-type: none"> <li>- <b>Comparison of lectures and tests.</b></li> <li>- <b>Random review of tests</b></li> </ul>
22. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.	<ul style="list-style-type: none"> <li>- <b>An advisory committee is formed to improve and develop the program's courses</b></li> <li>- <b>Adding or removing a subject from a course after approval by the department council</b></li> <li>- <b>The university book must be approved by the department council</b></li> </ul>

Name of Course Instructor: **Biology Staff**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Dr. Sameer Qari**

Signature: \_\_\_\_\_

**Course Title: HUMAN GENETICS****Course Code: 2307615-3 Bio**

<b>Date: 30 – 2 -1440</b>	<b>Institution: Umm Al-Qura University</b>
<b>College: Al-Jumoum University college</b>	<b>Department: Biology</b>

**A. Course Identification and General Information**

1. Course title and code: <b>2307615-3 Bio</b>				
2. Credit hours: <b>3</b>				
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)				
4. Name of faculty member responsible for the course: <b>Al-Jumoum University college</b>				
5. Level/year at which this course is offered: <b>Elective-1or2 Level/Year-1</b>				
6. Pre-requisites for this course (if any): <b>N/A</b>				
7. Co-requisites for this course (if any): <b>N/A</b>				
8. Location if not on main campus: <b>Building (B) in Al-Jumoum College</b>				
9. Mode of Instruction (mark all that apply):				
a. Traditional classroom	<input checked="" type="checkbox"/>	percentage	<b>40%</b>	
b. Blended (traditional and online)	<input checked="" type="checkbox"/>	percentage	<b>15%</b>	
c. E-learning	<input checked="" type="checkbox"/>	percentage	<b>15%</b>	
d. Correspondence	<input type="checkbox"/>	percentage	<b>%0</b>	
f. <b>Other: Inverted Classroom and Integrated education</b>	<input checked="" type="checkbox"/>	percentage	<b>30%</b>	
Comments:				

**B. Objectives**

<p><b>1. The main objective of this course</b>  <b>After completing this course, students will learn:</b></p> <ul style="list-style-type: none"> <li>- Understand inheritance patterns in simple and complex genetic disorders.</li> <li>- Learn and gain knowledge on the human genome.</li> <li>- Understand the cause and effect of alterations in chromosome number and/or structure</li> <li>- Gain knowledge on identifying disease genes for new diseases using mapping techniques, linkage analysis and positional cloning.</li> <li>- Gain knowledge on genetic testing.</li> </ul>
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<p>Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>- <b>Regular Updating the content of the course according to the new publications and research in the field</b></li> <li>- <b>Feedback of outcome for this course</b></li> <li>- <b>Build in more active learning into class</b></li> </ul>
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**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

<p><b>Course Description:</b>  This course presents an overview of the principles of human genetics, students will gain an in-depth understanding of the human genome, inheritance and genetic diseases. As well students will gain an in-depth understanding of the human genome, inheritance and</p>
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genetic diseases, as well research methods in human genetics. Students will also acquire or improve their critical reading skills of primary scientific literature.

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
<b>Human Inheritance-1</b> History of Human Genetics Monogenic inheritance; multifactorial inheritance Mendelian pedigree patterns – five basic pedigree patterns X-inactivation, mosaicism due to X-inactivation	2	6
<b>Human Inheritance-2</b> Complications to basic Mendelian pedigree patterns – incomplete dominance, codominance, uniparental disomy, penetrance, expressivity, late-onset diseases, phenocopy Polygenic theory for quantitative traits Hardy-Weinberg equilibrium – relating genotype and gene frequencies	2	6
<b>Human Genome-1</b> Human genome organization – an overview Protein-coding genes RNA genes and microRNA	1	3
<b>Human Genome-2</b> Heterochromatin and transposon repeats Variation between human genomes – Causes and types Pathogenic DNA variations and their effects	1	3
<b>Chromosome Abnormalities in Humans-1</b> Human chromosomes – banding and cytogenetic analysis Polyploidy, aneuploidy and mixoploidy – clinical consequences	1	3
<b>Chromosome Abnormalities in Humans-2</b> Chromatid breaks and their consequences Chromosome translocations and their consequences Chromosomal disorders - Down syndrome, Turner syndrome, Klinefelter syndrome etc	1	3
<b>Genetic Mapping and Disease Gene Identification-1</b> Role of recombination in genetic mapping Markers for human genetic mapping Linkage analysis – two-point mapping and multi point mapping	2	6
<b>Genetic Mapping and Disease Gene Identification-2</b> Positional cloning, Position dependent cloning strategies Position independent cloning strategies Genome-wide association studies to identify disease genes	1	3
<b>Genetic Testing and Diagnosis-1</b> Genetic testing – an introduction Gene tracking Clinical tests, Personalized medicine	2	6

<b>Genetic Testing and Diagnosis-2</b> Prenatal diagnosis of genetic disorders Congenital defects, construction of pedigree, proband Population screening	<b>1</b>	<b>3</b>
<b>Number of Weeks /and Units Per Semester</b>	14	42

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	28	6	6	12	-	52
	Actual						
Credit	Planned	28	2	6	6	-	42
	Actual						

<b>3. Individual study/learning hours expected for students per week.</b> - Additionally, Office hours for faculty member	<b>4</b>
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#### 4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column. **First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map			
Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Understanding facts	<ul style="list-style-type: none"> <li>• Lecture,</li> <li>• support readings,</li> <li>• group discussions,</li> <li>• writing reports,</li> <li>• preparing protocols sheets.</li> <li>• practical training,</li> <li>• Lab training,</li> <li>• Attendees</li> <li>• homework</li> </ul>	<ul style="list-style-type: none"> <li>• Written MCQ's exams</li> <li>• oral presentation</li> <li>• Papers based essays</li> <li>• Extended literature review</li> </ul>
1.2	Understanding and applying theories and concepts		
1.3	Understanding procedures and Methodologies		
2.0	<b>Cognitive Skills</b>		

2.1	Applying skills / procedures of theoretical and concepts learned	<ul style="list-style-type: none"> <li>Inverted classroom</li> <li>preparing reports</li> <li>support readings</li> </ul>	<ul style="list-style-type: none"> <li>Oral presentation</li> <li>Papers based Thinking and ideas</li> <li>Applied work</li> <li>Lab reports</li> <li>Lab sheets</li> <li>Lab follow-up</li> </ul>
2.2	Critical thinking of labs Precautions and developments		
2.3	Creative thinking for reading results		
2.4	Problem solving		
3.0	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Responsibility of own learning	<ul style="list-style-type: none"> <li>Periodical report</li> <li>Contact office</li> <li>Preparing presentation</li> <li>Participation in teach the chapters</li> </ul>	<ul style="list-style-type: none"> <li>Participation in activities of the course</li> <li>Commitment with the ethics</li> <li>Cooperation</li> </ul>
3.2	Group participation and leadership		
3.3	Act responsibly-personal and professional situation		
3.4	Ethical standards of behavior		
4.0	<b>Communication, Information Technology, Numerical</b>		
4.1	Oral and written communication	<ul style="list-style-type: none"> <li>support readings,</li> <li>writing reports,</li> <li>preparing research papers.</li> <li>practical training,</li> <li>field training,</li> <li>Activities and homework</li> </ul>	<ul style="list-style-type: none"> <li>written reports</li> <li>oral seminar</li> <li>Summarized literature</li> <li>Collecting Data</li> <li>Labs sections</li> </ul>
4.2	Using Database and apps.		
4.3	Basic hand skills		
5.0	<b>Psychomotor</b>		
5.1	Carrying out practical experiments in field and laboratory	Attendance and participating in all practical research project and supervising students throughout the lab experiments	Work on research project leading to write a thesis or a dissertation
5.2	Awareness of laboratory safety issues and experimental ethics		

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Oral presentation	4 Weeks	5%
2	Reports (write paper)	2 Weeks	10%
3	Participation	All Weeks	5%
4	Quizzes	2 Weeks	10%
5	Med Exam	8 <sup>th</sup> Week	10%
6	Online training	13 <sup>th</sup> Week	10%
7	Final Exam	18 <sup>th</sup> Week	50%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

**The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.**

#### E Learning Resources

1. List Required Textbooks	<p><b>Textbook 1:</b> Strachan, N.T., Read, A., "Human Molecular Genetics", 4th edition, Garland Science, <b>2010</b></p> <p><b>Textbook 2:</b> Pasternak, J., "An Introduction to Human Molecular Genetics", 2nd edition, John Wiley &amp; Sons, Inc., <b>2005</b></p> <p><b>Textbook 3:</b> Korf, B.R., "Human Genetics and Genomics", 3 rd edition, Blackwell Science Ltd, <b>2006</b></p>
3. Recommended Reading	<p><b>Textbook 1:</b> Human Genetics <b>2012 Sameer Qari</b> and Jamil jabor, Al obican publisher.</p> <p><b>Textbook 2:</b> Human Genetics by Ricki Lewis   Jan 1, <b>2017</b></p>

#### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

2. Technology resources (AV, data show, Smart Board, software, etc.)

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

#### G Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

- **Student activities.**
- **Student discussions.**
- **Student proposals.**
- **Student assessment**

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

- **Regular exams and quiz**
- **Work questionnaires**
- **Student interview**

23. Procedures for Teaching Development

- **Continuous updating with the use of all new mechanisms in the field**
- **Staff members are required to attend training courses, conferences and workshops to improve their learning skills**
- **communication with faculty members in other colleges to share experiences**

24. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic



exchange and remarking of tests or a sample of assignments with staff members at another institution)

- **Comparison of lectures and tests.**
- **Random review of tests**

25. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

- **An advisory committee is formed to improve and develop the program's courses**
- **Adding or removing a subject from a course after approval by the department council**
- **The university book must be approved by the department council**

Name of Course Instructor: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_

**Course Title: GENOME AND FOOD****Course Code: 2307616-3 Bio**

<b>Date: 20 – 6 -1440</b>	<b>Institution: Umm Al-Qura University</b>
<b>College: Al-Jumum University college</b>	<b>Department: Biology</b>

**A. Course Identification and General Information**

1. Course title and code: <b>Genome and Food / Code: 2307616-3 Bio</b>				
2. Credit hours: 42 hrs.				
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)				
4. Name of faculty member responsible for the course: <b>Al-Jumum University college</b>				
5. Level/year at which this course is offered: level-1				
6. Pre-requisites for this course (if any): N/A				
7. Co-requisites for this course (if any): N/A				
8. Location if not on main campus: <b>Building (B) in Al-Jumum College</b>				
9. Mode of Instruction (mark all that apply):				
a. Traditional classroom	√	percentage	<b>50%</b>	
b. Blended (traditional and online)	√	percentage	<b>20%</b>	
c. E-learning	√	percentage	<b>20%</b>	
d. Correspondence		percentage	<b>%0</b>	
f. Other: <b>Inverted Classroom and Integrated education</b>	√	percentage	<b>10%</b>	
Comments:				

**B. Objectives**

<p><b>1. The main objective of this course</b>  <b>After completing this course, students will learn:</b></p> <ul style="list-style-type: none"> <li>- Integrate and discuss the role of macro and micronutrients in the regulation of gene expression.</li> <li>- Analyze how an individual's genotype may influence their nutritional requirements and be involved in the development of chronic disease.</li> <li>- Synthesize the multiple roles that dietary food play in development of chronic disease including their role in nutrigenomics.</li> </ul>
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<p><b>Describe briefly any plans for developing and improving the course</b> that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>- <b>Regular Updating the content of the course according to the new publications and research in the field</b></li> <li>- <b>Feedback of outcome for this course</b></li> <li>- <b>Build in more active learning into class</b></li> </ul>
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**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

<p><b>Course Description:</b>  This course is designed to provide the student with an understanding of the fundamental concepts involved in how nutrients regulate gene expression (nutrigenomics) and how an individual's genotype influences their nutrient requirements (nutrigenetics). In addition, it is designed to provide the student with an understanding of unique roles that dietary fatty</p>
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acids play in chronic disease with a focus on the role of lipids in nutritional genomics. Our investigation into the science of nutritional genomics will begin with an overview, defining Nutrigenomics and Nutrigenetics. Then we will go through specific examples of how genotype can affect dietary influence on particular disease processes, and how in turn, diet also affects genetic expression.

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
<b>Nutrigenomics overview</b> definitions, genetic approaches, impact in personalized nutrition and health.	2	3
<b>Genetics Review: Single Nucleotide Polymorphisms and Nutrigenetics</b>	1	3
<b>Evolution and Nutrition</b>	1	3
<b>Nutrigenomics: Nutrient Regulation of Gene Expression</b>	1	3
<b>Polygenic Diseases: T2DM, Cancer</b>	2	6
<b>Personalized Nutrition</b>	1	3
<b>Ethical and Legal Considerations in Nutritional Genomics</b>	1	3
<b>Beyond Genetics: Epigenetics</b>	1	3
<b>Beyond Genomics:</b> Metabolomics, Proteomics, Microbiome	2	6
<b>Nutritional Genomics and the Food Industry</b>	2	6
<b>Number of Weeks /and Units Per Semester</b>	14	42

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	21	7	7	7	-	42
	Actual						
Credit	Planned	21	7	7	7	-	42
	Actual						

2. Individual study/learning hours expected for students per week. - Additionally, Office hours for faculty member	4
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4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies
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**On the table below are the five NQF Learning Domains, numbered in the left column. First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). Second, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. Third, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)**

### Curriculum Map

Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Understanding the role of macro and micronutrients in the regulation of gene expression. understand the relationship between nutrigenomics, nutrigenetics and nutritional systems biology and how these novel knowledges is incorporated in nutrition and health research	1. Lectures with the help of data show and power point slide show. 2. Discussions and Class activities. 3. Microscopical demonstration of slides. 4. Practical training 5. Internet data collection. 6. Inverted class rooms 7. E-Learning	(1). Announced Quizzes (2). Activities will include laboratory reports, homework, and movie quizzes. (3) Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving. (4)- Papers based essays (5) Oral exam consisting of a presentation of one of topics taught
1.2	Aquired knowledge about nutrigenomics and nutrigenetics, personalized diet in order to prevent nutritionally related diseases, such as cancer, obesity, type 2 diabetes, cardiovascular disease, and inflammatory diseases.		
1.3	demonstrates how diet and lifestyle affect health by altering the expression of genes and the structure of an individual's genome		
2.0	<b>Cognitive Skills</b>		
2.1	Recognize how an individual's genotype may influence their nutritional requirements and	1. Lectures with the help of data show and	(1). Announced Quizzes (2). Activities will

	be involved in the development of chronic disease.	power point slide show.	include laboratory reports, homework, and movie quizzes.
2.2	Recognize how nutrients affect gene expression, and how genetic variants are associated with a dietary response.	<ol style="list-style-type: none"> <li>2. Discussions and Class activities.</li> <li>3. Microscopical demonstration of slides.</li> <li>4. <b>Practical</b> training</li> <li>5. Internet data collection.</li> <li>6. Inverted class rooms</li> <li>7. E-Learning</li> </ol>	<ol style="list-style-type: none"> <li>(3) Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving.</li> <li>(4)- Papers based essays</li> <li>(5) Oral exam consisting of a presentation of one of topics taught</li> </ol>
3.0	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Awareness with the technologies related with nutrigenomics and nutrigenetics.	1. Lectures with the help of data show and power point slide show.	<ul style="list-style-type: none"> <li>• Announced Quizzes</li> <li>• Activities will include laboratory reports, homework, and movie quizzes.</li> <li>• Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving.</li> <li>• Papers based essays</li> <li>• Oral exam consisting of a presentation of one of topics taught</li> </ul>
3.2	Work in groups and/or individually on several class/home assignments	<ol style="list-style-type: none"> <li>2. Discussions and Class activities.</li> <li>3. Microscopical demonstration of slides.</li> </ol>	
3.3	Methods to study cellular responses to nutritional changes: Functional Nutrigenomics: Transcriptomics and Proteomics (Expression microarrays, data analysis, applications)	<ol style="list-style-type: none"> <li>4. <b>Practical</b> training</li> <li>5. Internet data collection.</li> <li>6. Inverted class rooms</li> <li>7. E-Learning</li> </ol>	
4.0	<b>Communication, Information Technology, Numerical</b>		
4.1	knowledge of genetics and the cutting-edge technologies to understand how diet interacts with our genes, so as to be able to interpret the test results for personalized nutrition advice.	1. Lectures with the help of data show and power point slide show.	(1). Announced Quizzes (2). Activities will include laboratory reports, homework, and movie quizzes. (3) Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving.
4.2	Search literature and learn how to use genomic databases	<ol style="list-style-type: none"> <li>2. Discussions and Class activities.</li> <li>3. Microscopical demonstration of slides.</li> <li>4. <b>Practical</b> training</li> </ol>	
4.3	Discuss concepts and ideas with other students in the class	<ol style="list-style-type: none"> <li>5. Internet data collection.</li> <li>6. Inverted class rooms</li> </ol>	

		7.E-Learning	(4)- Papers based essays (5) Oral exam consisting of a presentation of one of topics taught
5.0	<b>Psychomotor (if any)</b>		
5.1	Design nutritional strategies for prevention of chronic diseases such as cardiovascular disease, obesity, type-2 diabetes and cancer	<ol style="list-style-type: none"> <li>1. Lectures with the help of data show and power point slide show.</li> <li>2. Discussions and Class activities.</li> <li>3. Microscopical demonstration of slides.</li> <li>4. Practical training</li> <li>5. Internet data collection.</li> <li>6. Inverted class rooms</li> <li>7. E-Learning</li> </ol>	<ul style="list-style-type: none"> <li>• Activities will include laboratory reports, homework, and movie quizzes.</li> <li>• Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving.</li> <li>• Papers based essays</li> <li>• Oral exam consisting of a presentation of one of topics taught</li> </ul>
5.2	Actively participate in preparing specific lecture topics		

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Class Participation	All Weeks	10%
2	Assignment #1	Week 4	10%
3	Assignment #2	Week 6	10%
4	Group Presentation	Week 10	25%
5	Research Proposal	Week 12	45%
6	Total	13 <sup>th</sup> Week	100%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

**The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.**



### E Learning Resources

1. List Required Textbooks	<b>Textbook 1:</b> Lynnette R Ferguson <b>2016</b> <b>Nutrigenomics and Nutrigenetics in Functional Foods and Personalized Nutrition.</b> <b>Textbook 2:</b> Nutrition” <b>2014</b> Taylor and Francis Group LLC, CRC Press, ISBN 978-1-4398 -7680-0
2. Essential References	<b>Textbook 1:</b> M.P.G. Barnett, L.R. Ferguson, <b>Nutrigenomics in Molecular Diagnostics (Third Edition), 2017</b>
3-Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)	<b>Website:</b> Research papers about nutrigenomics freely available online: <b>Textbook 1:</b> Laursen, L. (2010). Interdisciplinary research: Big science at the table. [10.1038/468S2a. Nature, 468(7327), S2-S4. <b>Textbook 2:</b> Froot, A. (2010). Technology: A flavour of the future. [10.1038/468S21a. Nature, 468(7327), S21-S22.]

### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
2. Technology resources (AV, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

### G Course Evaluation and Improvement Procedures

2. Strategies for Obtaining Student’s Feedback on Effectiveness of Teaching
- <b>Student activities.</b>
- <b>Student discussions.</b>
- <b>Student proposals.</b>
- <b>Student assessment</b>
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
- <b>Regular exams and quiz</b>
- <b>Work questionnaires</b>
- <b>Student interview</b>
26. Procedures for Teaching Development
- <b>Continuous updating with the use of all new mechanisms in the field</b>
- <b>Staff members are required to attend training courses, conferences and workshops to improve their learning skills</b>
- <b>communication with faculty members in other colleges to share experiences</b>
27. Procedures for Verifying Standards of Student’s Achievement (e.g. check marking by an independent member teaching staff of a sample of student’s work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
- <b>Comparison of lectures and exam results</b>
- <b>Random assessment of exam results</b>



28. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.
- **An advisory committee is formed to improve and develop the program's courses**
  - **Adding or removing a subject from a course after approval by the department council**
  - **The university book must be approved by the department council**

Name of Course Instructor: **Kamal Attia**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_

**Course Title: IMMUNOGENETICS****Course Code: 2307618-3 Bio**

<b>Date:</b> 20 – 6 -1440	<b>Institution:</b> Umm Al-Qura University
<b>College:</b> Al-Jumum University College	<b>Department:</b> Biology

**A. Course Identification and General Information**

1. Course title and code: <b>Immunogenetics / Code:2307618-3 Bio</b>				
2. Credit hours: 42 hrs.				
3. Program(s) in which the course is offered: MSc. Genetics (If general elective available in many programs indicate this rather than list programs)				
4. Name of faculty member responsible for the course: <b>Al-Jumum University College</b>				
5. Level/year at which this course is offered: <b>Elective in Level1 or2/year1</b>				
6. Pre-requisites for this course (if any): N/A				
7. Co-requisites for this course (if any): N/A				
8. Location if not on main campus: Building (B) in Al-Jumum College				
9. <b>Mode of Instruction (mark all that apply):</b>				
a. Traditional classroom	√	percentage	<b>50%</b>	
b. Blended (traditional and online)	√	percentage	<b>20%</b>	
c. E-learning	√	percentage	<b>20%</b>	
d. Correspondence		percentage	<b>%0</b>	
f. Other: Inverted Classroom and Integrated education	√	percentage	<b>10%</b>	
Comments:				

**B. Objectives****1. The main objective of this course****After completing this course, students will learn:**

- understanding of basic aspects of the structure and functions of the immune system
- Define the genetic systems that encode molecules with integral roles in immune regulation
- understand the cellular and molecular interaction of the immune responses.
- Assess the impact of allelic polymorphism in certain genes on features such as gene expression and MHC restriction
- Define the basic mechanisms for expansion of the immunologic repertoire of antigen receptors
- Understand the implications of population differences in the frequencies of genes involved in immune responses

Describe briefly any plans for developing and improving the course that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- **Regular Updating the content of the course according to the new publications and research in the field**
- **Feedback of outcome for this course**
- **Build in more active learning into class**

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

In the first section of this modules, the current understanding of the cellular and molecular interactions in the inductions, expression, and regulation of the cellular and humoral immune responses. Also, this course will present the genetic basis of immune responsiveness. Reviews the genetic mechanisms responsible for generation of diversity in the genes for immunoglobulins, the T cell receptor molecules, the major histocompatibility molecules, and other key molecules of the immuno-globulin superfamily. Discusses mechanisms and statistical evaluation of immunogenetic associations with susceptibility or resistance to disease.

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
<b>Introduction</b> <ul style="list-style-type: none"> <li>Principle concept of immunology</li> <li>Humoral immune response</li> <li>Immunoglobulins</li> <li>Antigen-antibody interaction</li> </ul>	1	3
<b>Immunogenetics and immunogenomics:</b> <ul style="list-style-type: none"> <li>Immunogenetics definition</li> <li>Immunological tolerance and memory</li> </ul>	1	3
<b>Overview of Immunogenetics:</b> <ul style="list-style-type: none"> <li>Structure,</li> <li>Organization,</li> <li>Polymorphism,</li> <li>Evolution</li> <li>Selection</li> <li>Associations with disease.</li> </ul>	2	6
<b>Genetic control of immune responses.</b>	1	3
<b>Genetics of transplantation</b>	1	3
<b>Molecules at the host and pathogen inter-phase and their genes.</b>	2	6
<b>Genetics of antigen presentation</b>	1	3
<b>Immunogenomic and its analysis.</b>	1	3
<b>Immunogenetics of vaccination.</b>	1	3
<b>Immunogenetics of tumors.</b>	1	3
<b>Immunogenetics of reproduction.</b>	1	3
<b>Applications of Immunogenetics techniques</b>	1	3
<b>Number of Weeks /and Units Per Semester</b>	14	42

**2. Course components (total contact and credit hours per semester):**

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact	Planned	14	7	7	14	-	42

<b>Hours</b>	<b>Actual</b>						
<b>Credit</b>	<b>Planned</b>	14	7	7	14	-	42
	<b>Actual</b>						

<b>3. Individual study/learning hours expected for students per week.</b>	<b>4</b>
- Additionally, Office hours for faculty member	

<b>4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies</b>			
<p><b>On the table below are the five NQF Learning Domains, numbered in the left column. <u>First</u>, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). <u>Second</u>, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. <u>Third</u>, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)</b></p>			
<b>Curriculum Map</b>			
Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Understanding Basis of inheritance	1. Lectures with the help of data show and power point slide show. 2. Discussions and Class activities. 3. Microscopical demonstration of slides. 4. Practical training 5. Internet data collection. 6. Seminars 7. Inverted class rooms 8. E-Learning	(1). Announced Quizzes (2). Activities will include laboratory reports, homework, and movie quizzes. (3) Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving. (4)- Papers based essays (5) Oral exam consisting of a presentation of one of topics taught
1.2	Understanding Different mechanisms of chromosomal aberrations and its reflection on phenotype of Individual.		
1.3	Understanding characteristics of genetic material and different methods of its manipulation and applications.		
2.0	<b>Cognitive Skills</b>		
2.1	Standup thinking to find out a relationship between different	1. Lectures with the help of data show and	(1). Announced Quizzes

	immune responses and their Genetic control	power point slide show.	(2).Activities will include laboratory reports, homework, and movie quizzes.
2.2	Learn the Relationship between the genetic material, diseases, immunity and the control of these diseases.	2. Discussions and Class activities. 3. Microscopical demonstration of slides.	(3)Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving.
2.3	Recognize Characteristics of Immunogenetics of vaccination, teamers and reproduction	4 .Practical training 5. Internet data collection. 6. Seminars 7.Inverted class rooms 8.E-Learning	(4)- Papers based essays (5)Oral exam consisting of a presentation of one of topics taught
3.0	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Recognition and Detection of similarities and differences between different species based on DNA polymorphism.	1.Lectures with the help of data show and power point slide show.	(1) .Announced Quizzes
3.2	Ability to diagnose phenotypic malformation and sterility problems associated with Immunogenetic disorders	2. Discussions and Class activities. 3. Microscopical demonstration of slides. 4 .Practical training 5. Internet data collection. 6. Seminars 7.Inverted class rooms 8.E-Learning	(2).Activities will include laboratory reports, homework, and movie quizzes. (3)Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving. (4)- Papers based essays (5)Oral exam consisting of a presentation of one of topics taught
4.0	<b>Communication, Information Technology, Numerical</b>		
4.1	Experience in immunogenetic procedures for different species by using different materials (blood, bone, marrow, etc).	1.Lectures with the help of data show and power point slide show.	(1) .Announced Quizzes
4.2	Isolation of DNA from different organs.	2. Discussions and Class activities. 3. Microscopical demonstration of slides.	(2).Activities will include laboratory reports, homework, and movie quizzes. (3)Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving.
4.3	Internet Searching.	4 .Practical training 5. Internet data collection. 6. Seminars	



		7. Inverted class rooms 8. E-Learning	(4)- Papers based essays (5) Oral exam consisting of a presentation of one of topics taught
5.0	<b>Psychomotor</b>		
5.1	Carrying out practical experiments in field and laboratory	<ul style="list-style-type: none"> <li>Lectures with the help of data show and power point slide show.</li> <li>Discussions and Class activities.</li> <li>Microscopical demonstration of slides.</li> <li>Practical training</li> <li>Seminars</li> <li>Inverted class rooms</li> </ul>	<ul style="list-style-type: none"> <li>Announced Quizzes</li> <li>Activities will include laboratory reports, homework, and movie quizzes.</li> <li>Oral exam consisting of a presentation of one of topics taught</li> </ul>
5.2	Awareness of laboratory safety issues and experimental ethics	Attendance and participating in all practical research project Supervising students throughout the lab experiments 3. Microscopical demonstration of slides.	Announced Quizzes Activities will include laboratory reports, homework, and movie quizzes. Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving. Papers based essays Oral exam consisting of a presentation of one of topics taught

#### 5. Assessment Task Schedule for Students During the Semester

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Exercises & Assignments	All Weeks	5%
2	Project (single\group)	--	3%
3	Participation	All Weeks	2%
4	Quiz (1)	5 <sup>th</sup> Week	10%
5	Written Exam (1)	8 <sup>th</sup> Week	20
6	Quiz (2)	13 <sup>th</sup> Week	10%
7	Final Exam	16 <sup>th</sup> Week	50%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

**The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.**

### E Learning Resources

1. List Required Textbooks	<b>Textbook 1:</b> Immunogenomics and Human Disease by Andras Falus (Editor), <b>2006</b> , Wiley. <b>Textbook 2:</b> Immunogenetics: Advances and Education: The First Congress of the Slovak Foundation by J a Madrigal (Editor), Tibor Nanasi, Margita Bencova (Editor), <b>2013</b> , Springer
2. Essential References	<b>Textbook 1:</b> Immunogenetics: Methods and Applications in Clinical Practice, by Frank T Christiansen (Editor), Brian D Tait (Editor), <b>2012</b> , Humana Press Inc.
3-Recommended Books and Reference Material	<b>Textbook 1:</b> Immunogenetics of Autoimmune Disease by Jorge R Oksenberg (Editor), David Brassat (Editor), <b>2014</b> , Springer
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.	<b>Website 1:</b> <a href="http://www.ncbi.nlm.nih.gov/guide/Journals/">http://www.ncbi.nlm.nih.gov/guide/Journals/</a> <b>Website 2:</b> Biotechnology. Publisher: the Asian Network for Scientific Information. Start Year: <b>2002</b> <b>Website 3:</b> <a href="http://www.ansinet.org/c4p.php?j_id=biotech">http://www.ansinet.org/c4p.php?j_id=biotech</a> <b>Website 4:</b> Genetics & Molecular Biology. Publisher: Brazilian Society for Genetics.
4. Other learning material	<b>Online labs:</b> Arlene Locke International Cell Exchange UCLA Immunogenetics Center Department of Pathology & Laboratory Medicine

### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

2. Technology resources (AV, data show, Smart Board, software, etc.)

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

### G Course Evaluation and Improvement Procedures

3. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

- **Student activities.**
- **Student discussions.**
- **Student proposals.**

- <b>Student assessment</b>
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department <ul style="list-style-type: none"><li>- <b>Regular exams and quiz</b></li><li>- <b>Work questionnaires</b></li><li>- <b>Student interview</b></li></ul>
29. Procedures for Teaching Development <ul style="list-style-type: none"><li>- <b>Continuous updating with the use of all new mechanisms in the field</b></li><li>- <b>Staff members are required to attend training courses, conferences and workshops to improve their learning skills</b></li><li>- <b>communication with faculty members in other colleges to share experiences</b></li></ul>
30. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) <ul style="list-style-type: none"><li>- <b>Comparison of lectures and tests.</b></li><li>- <b>Random review of tests</b></li></ul>
31. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. <ul style="list-style-type: none"><li>- <b>An advisory committee is formed to improve and develop the program's courses</b></li><li>- <b>Adding or removing a subject from a course after approval by the department council</b></li><li>- <b>The university book must be approved by the department council</b></li></ul>

Name of Course Instructor: **Staff from KAU**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_

**Course Title: FUNCTIONAL GENOMICS AND PROTEOMICS****Course Code: 2307622-3 Bio**

<b>Date: 20 – 6 -1440</b>	<b>Institution: Umm Al-Qura University</b>
<b>College: Al-Jumoum University College</b>	<b>Department: Biology</b>

**A. Course Identification and General Information**

1. Course title and code: <b>Functional Genomics and Proteomics/Code: 2307622-3 Bio</b>			
2. Credit hours: <b>42 hs</b>			
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course: <b>Al-Jumum University College</b>			
5. Level/year at which this course is offered: <b>Elective- Level-1or2/Year-1</b>			
6. Pre-requisites for this course (if any): <b>N/A</b>			
7. Co-requisites for this course (if any): <b>N/A</b>			
8. Location if not on main campus: <b>Building (B) in Al-Jumum College</b>			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	√	percentage	<b>50%</b>
b. Blended (traditional and online)	√	percentage	<b>20%</b>
c. E-learning	√	percentage	<b>20%</b>
d. Correspondence		percentage	<b>%0</b>
f. Other: Inverted Classroom and Integrated education	√	percentage	<b>10%</b>
Comments:			

**B. Objectives**

<b>1. The main objective of this course</b> <b>After completing this course, students will learn:</b> The study of cells at the physiological level including the structure and function of organelles and membranes, the study of enzymes, energy relations and metabolic control, response to radiation, excitation and contractions and regulation of cell growth and differentiation
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**Describe briefly any plans for developing and improving the course** that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- **Regular Updating the content of the course according to the new publications and research in the field**
- **Feedback of outcome for this course**
- **Build in more active learning into class**

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

<b>Course Description:</b> This course imparts advanced knowledge on the methods to study gene expression at the genome and proteome levels using traditional methods to latest RNA sequencing technology. The detailed analysis of the techniques involved for quantifying gene and protein expression will enable students to perform the assays for detection of gene expression. Additionally, they would be able to study genome organization, comparison and the application of the genomic and proteomic techniques in various fields.
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1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
<b>Introduction,</b> <ul style="list-style-type: none"> <li>Genome organization,</li> <li>Genetic elements</li> <li>Control on gene expression</li> </ul>	1	3
<b>Gene expression</b> <ul style="list-style-type: none"> <li>Constitutive and inducible</li> <li>Correlation between mRNA and protein abundance</li> <li>Functional genomic analysis using forward genetics and reverse genetics</li> </ul>	1	3
<b>Genome study</b> <ul style="list-style-type: none"> <li>Genome size, content</li> <li>Gene order</li> <li>Orthologs and paralogs</li> </ul>	1	3
<b>Comparative genomics</b> <ul style="list-style-type: none"> <li>Bacteria genomic and horizontal gene transfer</li> <li>Mitochondrial genomes and plastids</li> <li>Nuclear genomes of eukaryotes</li> <li>Applications of comparative genomics</li> </ul>	2	6
<b>Transcriptomics</b> <ul style="list-style-type: none"> <li>Introduction to transcriptome and gene expression studies with mRNA</li> <li>Traditional approaches for the analysis of gene expression – Semi quantitative RT PCR, quantitative PCR (real time PCR), differential display PCR, Northern hybridization</li> </ul>	2	6
<b>Genome analysis of gene expression –</b> <ul style="list-style-type: none"> <li>SAGE,</li> <li>RNA Sequencing using NGS methods</li> <li>Gene expression analysis using Microarrays</li> </ul>	2	6

<b>Proteomics</b> <ul style="list-style-type: none"> <li>Protein databases</li> <li>2D gel electrophoresis, MALDI-TOF and ESI analysis with applications in proteomics, MASCOT analysis Mass spectroscopy</li> <li>Peptide mass fingerprinting, peptide sequence analysis by tandem mass spectrometry, SELDI protein chip technology</li> <li>Proteomic analysis of post translational modifications, Experimental approaches for protein-protein interaction mapping</li> <li>Differential and quantitative proteomics</li> </ul>	3	3
<b>Applications of genomics</b> <ul style="list-style-type: none"> <li>Understanding basis of monogenic and polygenic disorders</li> <li>Pharmacogenomics, Medical proteomics-biomarker discovery and its importance</li> <li>Pharmaceutical proteomics-role of proteomics in drug development, applications of proteomics for the analysis of genetically modified plants</li> </ul>	2	6
<b>Number of Weeks /and Units Per Semester</b>	14	42

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	14	7	7	14	-	42
	Actual						
Credit	Planned	14	7	7	14	-	42
	Actual						

2. Individual study/learning hours expected for students per week. - Additionally, Office hours for faculty member	4
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<b>4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies</b>
<p>On the table below are the five NQF Learning Domains, numbered in the left column. <b>First</b>, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). <b>Second</b>, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. <b>Third</b>, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)</p>



## Curriculum Map

Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Know about the functional organization of the genomes, genetic elements control on gene expression and functional genetics	1. Lectures with the help of data show and power point slide show. 2. Discussions and Class activities.	(1). Announced Quizzes (2). Activities will include laboratory reports, homework, and movie quizzes. (3) Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving. (4)- Papers based essays (5) Oral exam consisting of a presentation of one of topics taught
1.2	Understand the nature of the genomes and their comparisons	3. Microscopical demonstration of slides.	
1.3	Understand and apply the classical and largescale techniques in gene expression study	4. Practical training 5. Internet data collection. 6. Seminars 7. Inverted class rooms 8. E-Learning	
2.0	<b>Cognitive Skills</b>		
2.1	Understand the application of functional genomics and proteomics	1. Lectures with the help of data show and power point slide show.	(1). Announced Quizzes (2). Activities will include laboratory reports, homework, and movie quizzes. (3) Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving. (4)- Papers based essays (5) Oral exam consisting of a presentation of one of topics taught
2.2	Recognize the Correlation between mRNA and protein abundance, functional genomic analysis using forward genetics and reverse genetics	2. Discussions and Class activities. 3. Microscopical demonstration of slides. 4. <b>Practical</b> training 5. Internet data collection. 6. Seminars 7. Inverted class rooms 8. E-Learning	
3.0	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Learn the techniques used in the proteome analysis	• Lectures with the help of data show and power point slide show.	Announced Quizzes, Activities will include laboratory reports, homework, and
3.2	apply the classical and largescale techniques in gene expression study		

3.3	the analysis of gene expression – Semi quantitative RT PCR, quantitative PCR (real time PCR), differential display PCR, Northern hybridization	<ul style="list-style-type: none"> <li>• Discussions and Class activities.</li> <li>• collection.</li> <li>• Inverted class rooms</li> <li>• E-Learning</li> </ul>	movie quizzes. Oral exam consisting of a presentation of one of topics taught
4.0	<b>Communication, Information Technology, Numerical</b>		
4.1	Acquire the ability for Comparative genomics of bacteria and horizontal gene transfer	1.Lectures with the help of data show and power point slide show.	(1) Announced Quizzes (2). Activities will include laboratory reports, homework, and movie quizzes. (3) Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving. (4)- Papers based essays (5) Oral exam consisting of a presentation of one of topics taught
4.2	Acquire the ability for Comparative genomics of mitochondrial genomes, plastids and nuclear genomes of eukaryotes	2. Discussions and Class activities. 3. Microscopical demonstration of slides.	
4.3	Have the ability for Genome analysis of gene expression – SAGE, RNA Sequencing using NGS methods	4. Practical training 5. Internet data collection. 6. Seminars	
4.4	Have the ability for Proteomic analysis of post translational modifications, Experimental approaches for protein-protein interaction mapping	7. Inverted class rooms 8. E-Learning	
5.0	<b>Psychomotor</b>		
5.1	Performing comparative genome analysis in prokaryotes,	<ul style="list-style-type: none"> <li>• 1.Lectures with the help of data show and power point slide show.</li> <li>• Discussions and Class activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Announced Quizzes</li> <li>• Activities will include laboratory reports, homework, and movie quizzes.</li> <li>• Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving.</li> <li>• (4)- Papers based essay</li> </ul>
5.2	Acquired ability for applications of proteomics for the analysis of genetically modified plants	<ul style="list-style-type: none"> <li>• Microscopical demonstration of slides.</li> <li>• Practical training</li> <li>• Internet data collection.</li> <li>• Seminars</li> </ul>	
5.3	Acquired ability for 2D gel electrophoresis, MALDI-TOF and ESI analysis with applications in proteomics,	<ul style="list-style-type: none"> <li>• Inverted class rooms</li> <li>• E-Learning</li> <li>• Practical training</li> <li>• Internet data collection.</li> </ul>	

	MASCOT analysis Mass spectroscopy		
5.3	Awareness of laboratory safety issues and experimental ethics	Discussions and labs activities.	Activities will include laboratory reports, homework, and movie quizzes

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Oral presentation	4 Weeks	5%
2	Reports (write paper)	2 Weeks	10%
3	Participation	All Weeks	5%
4	Quizzes	2 Weeks	10%
5	Med Exam	8 <sup>th</sup> Week	10%
6	Online training	13 <sup>th</sup> Week	10%
7	Final Exam	18 <sup>th</sup> Week	50%

#### D. Student Academic Counseling and Support

<p>1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)</p> <p>The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.</p>
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#### E. Learning Resources

1. List Required Textbooks	<b>Textbook 1:</b> Jonathan Pevsner 2015 Bioinformatics and Functional Genomics
3-Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)	<b>Textbook 1:</b> Liebler. D.C., "Introduction to Proteomics" Humana Press, 2002 <b>Textbook 2:</b> Sándor Suhai 2013 Genomics and Proteomics: Functional and Computational Aspects <b>Textbook 3:</b> Michael J. Brownstein and Arkady Khodursky 2003 Functional Genomics: Methods and Protocols (Methods in Molecular Biology, Vol. 224)
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.	<b>Textbook 1:</b> Primrose. S.B., Twayman. R.M., "Principles of Gene Manipulation and Genomics" 7th edition, Blackwell publishing. 2006.
4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.	<b>Website 1:</b> Videos, CDs , Related software's , Related webs ,

### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
2. Technology resources (AV, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

### G Course Evaluation and Improvement Procedures

4. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching <ul style="list-style-type: none"> <li>- <b>Student activities.</b></li> <li>- <b>Student discussions.</b></li> <li>- <b>Student proposals.</b></li> <li>- <b>Student assessment</b></li> </ul>
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department <ul style="list-style-type: none"> <li>- <b>Regular exams and quiz</b></li> <li>- <b>Work questionnaires</b></li> <li>- <b>Student interview</b></li> </ul>
32. Procedures for Teaching Development <ul style="list-style-type: none"> <li>- <b>Continuous updating with the use of all new mechanisms in the field</b></li> <li>- <b>Staff members are required to attend training courses, conferences and workshops to improve their learning skills</b></li> <li>- <b>communication with faculty members in other colleges to share experiences</b></li> </ul>
33. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) <ul style="list-style-type: none"> <li>- <b>Comparison of lectures and tests.</b></li> <li>- <b>Random review of tests</b></li> </ul>
34. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. <ul style="list-style-type: none"> <li>- <b>An advisory committee is formed to improve and develop the program's courses</b></li> <li>- <b>Adding or removing a subject from a course after approval by the department council</b></li> <li>- <b>The university book must be approved by the department council</b></li> </ul>

Name of Course Instructor: **Staff in the campus**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_

**Course Title: CONSERVATION GENETICS****Course Code: 2307617-3 Bio**

<b>Date: 30 – 2 -1440</b>	<b>Institution: Umm Al-Qura University</b>
<b>College: Al-Jumoum University college</b>	<b>Department: Biology</b>

**A. Course Identification and General Information**

1. Course title and code: <b>CONSERVATION GENETICS/ 2307617-3 Bio</b>			
2. Credit hours: 42			
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course: <b>Al-Jumum University college</b>			
5. Level/year at which this course is offered: <b>Elective@ Level-1or2/Year-1</b>			
6. Pre-requisites for this course (if any): N/A			
7. Co-requisites for this course (if any): N/A			
8. Location if not on main campus: Building (B) in Al-Jumum College			
<b>9. Mode of Instruction (mark all that apply):</b>			
a. Traditional classroom	<input checked="" type="checkbox"/>	percentage	<b>60%</b>
b. Blended (traditional and online)	<input checked="" type="checkbox"/>	percentage	<b>10%</b>
c. E-learning	<input checked="" type="checkbox"/>	percentage	<b>20%</b>
d. Correspondence	<input type="checkbox"/>	percentage	<b>%0</b>
f. Other: <b>Inverted Classroom and Integrated education</b>	<input checked="" type="checkbox"/>	percentage	<b>10%</b>
Comments:			

**B. Objectives**

<p><b>1. The main objective of this course</b></p> <p><b>After completing this course, students will learn:</b></p> <ul style="list-style-type: none"> <li>- Acquire a basic understanding of the concepts of conservation genetics and applications in natural resources management.</li> <li>- Understand the theory and methods for characterizing genetic diversity.</li> <li>- Develop a fundamental knowledge of molecular methods for measuring genetic diversity in DNA and proteins.</li> <li>- Understand the relationships between genetic diversity, inbreeding, reproductive fitness and evolutionary potential.</li> <li>- Understand the effects of population size reduction, population bottlenecks and population fragmentation on genetic diversity.</li> <li>- Understand the concept of management units and genetic management approaches for wild populations, captive populations and for reintroduction strategies.</li> <li>- Explore approaches for integrating genetic analysis into natural resource conservation and management.</li> <li>- Acquire a basic knowledge of the applications of molecular tools in resolving taxonomic uncertainties, understanding species biology, forensics, and natural resource management.</li> </ul>
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<p><b>Describe briefly any plans for developing and improving the course</b> that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>- <b>Regular Updating the content of the course according to the new publications and research in the field</b></li> </ul>
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- **Feedback of outcome for this course**  
**Build in more active learning into class**

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

This course will introduce students to the field of conservation genetics, including methods for genetic analysis of populations and applications in conservation biology. Emphasis will be placed on the use of molecular genetic methods to address questions such as "How are taxa related", "What is the genetic structure of the population(s)", and "Are populations inbred". Applications of genetic approaches include identifying populations of concern and defining management units within species. The importance of genetic diversity and evolutionary potential is a central theme of the course. The course will also explore the benefit of integrating genetic analysis into strategies for conservation and sustainable management of natural resources and ecological diversity.

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
<b>Introduction</b> Overview populations & sampling probability	1	3
<b>Genetics of Natural Populations</b> Origins of genetic diversity. Mutation. Migration and gene flow. Natural selection and adaptation. Interactions between genotype and environment.	3	9
<b>Genetic Effects of Small Population Size</b> Genetic diversity and small population size. Population fragmentation. Loss of genetic diversity and reduced fitness. Genetic drift. Inbreeding and inbreeding depression. Effective population size.	2	6
<b>Molecular evolution</b> and DNA barcoding Quantitative genetics and complex traits Heritability and estimating quantitative genetic diversity	2	6
<b>Genetic Approaches for Defining Taxonomic Groups and Management Units –</b> Importance of systematics and taxonomy. Higher order taxonomic groups. Genetic analysis in defining species and sub-species. Genetic distance and differences between populations. Phylogenetic trees.	2	6



<p><b>Genetic Management</b> Endangered species. Wild populations. Fragmented populations. Captive populations and reintroduction. Diagnosing genetic problems. Increasing population size. Introgression. Hybridization. Impacts of harvesting.</p>	3	9
<p><b>Additive reading</b> Invasive species and transgene escape Pesticide and antibiotic resistance</p>	1	3
<b>Number of Weeks /and Units Per Semester</b>	14	42

**2. Course components (total contact and credit hours per semester):**

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	28	2	6	6	-	42
	Actual						
Credit	Planned	28	2	6	6	-	42
	Actual						

<b>2. Individual study/learning hours expected for students per week.</b> - Additionally, Office hours for faculty member	<b>4</b>
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**4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies**

On the table below are the five NQF Learning Domains, numbered in the left column. **First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map			
Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	<b>Understanding facts</b>		

	<p>Understand the theory and methods for characterizing genetic diversity.</p> <p>Develop a fundamental knowledge of molecular methods for measuring genetic diversity in DNA and proteins.</p> <p>Understand the relationships between genetic diversity, inbreeding, reproductive fitness and evolutionary potential.</p>	<p>1. Lecture, support readings, group discussions, writing reports, preparing research papers.</p> <p>2. Conducting individual tasks, practical training, field training, Talks,</p> <p>3. Activities and homework</p>	<p>(1)- written MCQ's exams</p> <p>(2)- Paper oral presentation</p> <p>(3)- Papers based essays</p> <p>(4)- Extended literature review</p>
1.2	<p>Understanding and applying theories and concepts</p> <p>Acquire a basic understanding of the concepts of conservation genetics and applications in natural resources management</p>		
1.3	<p>Understanding procedures</p> <p>Understand the concept of management units and genetic management approaches for wild populations, captive populations and for reintroduction strategies</p>		
2.0	<b>Cognitive Skills</b>		
2.1	<p>Applying skills / procedures of theoretical and concepts learned</p> <p>- The ability to Describe and Measure genetic variation.</p> <p>- The ability to Describe Genetic basis of Conservation Genetics traits</p>	<p>1. Lecture, support readings, group discussions, writing reports, preparing research papers.</p> <p>2. Conducting individual tasks, practical training, field training, Talks,</p> <p>3. Activities and homework</p>	<p>(1)- written MCQ's exams</p> <p>(2)- Paper oral presentation</p> <p>(3)- Papers based essays</p> <p>(4)- Extended literature review</p>
2.2	<p>Critical thinking</p> <p>Critically evaluate Conservation Genetics</p>		
2.3	<p>Creative thinking</p> <p>Interpret genetic data and results, and apply findings in a management context</p>		
2.4	<p>Problem solving</p>		
3.0	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	<p>Responsibility of own learning</p> <p>Describe the major aspects of the fields of Ecological genetics</p>	<p>1. Lecture, support readings, group discussions, writing reports, preparing research papers.</p>	<p>(1)- written MCQ's exams</p> <p>(2)- Paper oral presentation</p> <p>(3)- Papers based essays</p>
3.2	<p>Group participation and leadership</p> <p>- create a spirit of cooperation, understanding, respect and</p>		



	responsibility - work in groups to improve the skills of relationship with others - cooperation in solving the problems of the students in the compilation of scientific material	2. Conducting individual tasks, practical training, field training, Talks, 3. Activities and homework	(4)- Extended literature review
3.3	Act responsibly-personal and professional situation ongoing discussions in the lecture hall - the duties assigned to the students		
3.4	Ethical standards of behavior		
4.0	<b>Communication, Information Technology, Numerical</b>		
4.1	Oral and written communication Oral and written communication: effectively communicate Conservation Genetics information in both written and oral form	1. Lecture, support readings, group discussions, writing reports, preparing research papers. 2. Conducting individual tasks, practical training, field training, Talks, 3. Activities and homework	(1)- written MCQ's exams (2)- Paper oral presentation (3)- Papers based essays (4)- Extended literature review
4.2	Use of IT skill of using a computer to assemble the scientific material - the ability to use modern electronic libraries		
4.3	Basic math and statistics		
5.0	<b>Psychomotor (if any)</b>		
5.1	Carrying out practical experiments in field and laboratory	Attendance and participating in all practical research project and supervising students throughout the lab experiments	(1)- Work on research project leading to write a thesis or a dissertation
5.2	Awareness of laboratory safety issues and experimental ethics	Attendance and participating in all practical research project and supervising students throughout the lab experiments	Work on research project leading to write a thesis or a dissertation

**5. Assessment Task Schedule for Students During the Semester**

	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Exercises & Assignments	All Weeks	5%
2	Project (single\group)	--	3%
3	Participation	All Weeks	2%

4	Quiz (1)	5 <sup>th</sup> Week	10%
5	Written Exam (1)	8 <sup>th</sup> Week	20
6	Quiz (2)	13 <sup>th</sup> Week	10%
7	Final Exam	18 <sup>th</sup> Week	50%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

**The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.**

#### E Learning Resources

1. List Required Textbooks	<p><b>Textbook 1:</b> Conservation of wildlife populations: demography, genetics, and management, 2nd edition by L. Scott Mills   <b>2013</b></p> <p><b>Textbook 2:</b> Introduction to Conservation Genetics 2nd (second) Edition by Frankham, Richard, Ballou, Jonathan D., Briscoe, David A. published by Cambridge University Press (<b>2010</b>)</p> <p><b>Textbook 3:</b> Conservation and the Genetics of Populations by Fred W. Allendorf, Gordon H. Luikart, et al.   <b>2012</b></p>
2-Recommended Books and Reference	<p>Textbook 1: A Primer of Conservation Genetics 1st edition by Frankham, Richard, Ballou, Jonathan D., Briscoe, David A. (<b>2004</b>)</p>
3. Desire2Learn (D2L) Site. (E. LEARNING)	<ul style="list-style-type: none"> <li>• PowerPoint presentations, pdf files of literature discussion and reference articles, and other materials will be available via the class D2L site (<b>Ecological genetics.2307626-3 Bio</b>).</li> <li>• To access, go to the UQU E. LEARNING enter the username and password that you use for UQU e-mail.</li> </ul>
4. List Electronic Materials, Web Sites, Facebook, Twitter, etc.	<p><b>Website 1:</b> <a href="https://onlinelibrary.wiley.com/journal/15231739">https://onlinelibrary.wiley.com/journal/15231739</a></p> <p><b>Website 2:</b> <a href="http://viafet.com/reproductive-genetics-at-viafet/?gclid=Cj0KCQiAwc7jBRD8ARIsAKSUBHLf7USTs0ys3Xt77ZxJsc9qEa_Mhlpmc6m9lcfO4KNnFz-_RFIKKoaAvdaEALw_wcB">http://viafet.com/reproductive-genetics-at-viafet/?gclid=Cj0KCQiAwc7jBRD8ARIsAKSUBHLf7USTs0ys3Xt77ZxJsc9qEa_Mhlpmc6m9lcfO4KNnFz-_RFIKKoaAvdaEALw_wcB</a></p> <p><b>Website 3:</b> <a href="https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1523-1739.1990.tb00103.x">https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1523-1739.1990.tb00103.x</a></p> <p><b>Website 4:</b> <a href="http://science.sciencemag.org/content/229/4711/400">http://science.sciencemag.org/content/229/4711/400</a></p> <p><b>Website 5:</b> <a href="https://www.sciencedirect.com/science/article/pii/S0169534701022820">https://www.sciencedirect.com/science/article/pii/S0169534701022820</a></p> <p><b>Website 6:</b> <a href="https://www.mdpi.com/journal/genes/special_issues/Conservation_Genetics_Genomics">https://www.mdpi.com/journal/genes/special_issues/Conservation_Genetics_Genomics</a></p>

### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
2. Technology resources (AV, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

### G Course Evaluation and Improvement Procedures

5. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching <ul style="list-style-type: none"> <li>- <b>Student activities.</b></li> <li>- <b>Student discussions.</b></li> <li>- <b>Student proposals.</b></li> <li>- <b>Student assessment</b></li> </ul>
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department <ul style="list-style-type: none"> <li>- <b>Regular exams and quiz</b></li> <li>- <b>Work questionnaires</b></li> <li>- <b>Student interview</b></li> </ul>
35. Procedures for Teaching Development <ul style="list-style-type: none"> <li>- <b>Continuous updating with the use of all new mechanisms in the field</b></li> <li>- <b>Staff members are required to attend training courses, conferences and workshops to improve their learning skills</b></li> <li>- <b>communication with faculty members in other colleges to share experiences</b></li> </ul>
36. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) <ul style="list-style-type: none"> <li>- <b>Comparison of lectures and tests.</b></li> <li>- <b>Random review of tests</b></li> </ul>
37. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it. <ul style="list-style-type: none"> <li>- <b>An advisory committee is formed to improve and develop the program's courses</b></li> <li>- <b>Adding or removing a subject from a course after approval by the department council</b></li> <li>- <b>The university book must be approved by the department council</b></li> </ul>

Name of Course Instructor: **Biology Staff in partnership**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_

**Course Title: MICROBIAL GENETICS.**

**Course Code: 2307625-3 Bio**

<b>Date: 30 – 2 -1440</b>	<b>Institution: Umm Al-Qura University</b>
<b>College: Al-Jumum University College</b>	<b>Department: Biology</b>

**A. Course Identification and General Information**

1. Course title and code: <b>Microbial Genetics 2307625-3 Bio</b>			
2. Credit hours: 42			
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course: <b>Al-Jumum University college</b>			
5. Level/year at which this course is offered: <b>Elective @ Level-1or2/Year-1</b>			
6. Pre-requisites for this course (if any): N/A			
7. Co-requisites for this course (if any): N/A			
8. Location if not on main campus: <b>Building (B) in Al-Jumum College</b>			
<b>9. Mode of Instruction (mark all that apply):</b>			
a. Traditional classroom	√	percentage	<b>60%</b>
b. Blended (traditional and online)	√	percentage	<b>15%</b>
c. E-learning	√	percentage	<b>10%</b>
d. Correspondence		percentage	<b>%0</b>
f. Other: <b>Inverted Classroom and Integrated education</b>	√	percentage	<b>15%</b>
Comments:			

**B. Objectives**

<p><b>1. The main objective of this course</b></p> <p><b>After completing this course, students will learn:</b></p> <ul style="list-style-type: none"> <li>- Sound understanding of the core principles, paradigms and unique aspects of microbial genetics</li> <li>- Familiarity with historically important, contemporary, and state-of-the-art research techniques used in microbial genetics</li> <li>- Development of skills in critical thinking, integration/synthesis of concepts and ideas and scientific problem-solving</li> <li>- Understand the gene transfer mechanism, mutation and phage life cycle</li> <li>- Understand regulation of gene expression &amp; responses to changing environments</li> <li>- Gain knowledge about Gene Transfer</li> <li>- Throughout the course, we will discuss research and review articles related to microbial genetics.</li> </ul>
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<p><b>Describe briefly any plans for developing and improving the course</b> that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>- <b>Regular Updating the content of the course according to the new publications and research in the field</b></li> <li>- <b>Feedback of outcome for this course</b></li> <li>- <b>Build in more active learning into class</b></li> </ul>
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**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

The course examines the transmission of heritable traits by microbes and the methods and principles used to study inheritance. The role of genetic variation in driving microbial evolution will be an underlying theme. We will also explore how knowledge of natural genetic processes in bacteria such as conjugation, transformation and transduction have been utilized under controlled conditions to produce desirable/valuable traits. We will learn about state-of-the-art concepts and approaches developed in just the past few years that are revolutionizing our ability to understand core genomes (essential genes necessary for life), comparative genomics, metagenomics and various drivers of genetic and physiological biodiversity.

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
<p><b>Over review on genetic</b></p> <ul style="list-style-type: none"> <li>DNA structure review</li> <li>concepts in microbial genetics</li> <li>complementation</li> <li>recombination</li> <li>mapping.</li> <li>manipulations</li> </ul>	2	6
<p><b>Bacterial Genetics analysis and mutations</b></p> <ul style="list-style-type: none"> <li>Conjugation,</li> <li>sex factors</li> <li>High frequency recombination</li> <li>Transduction (Generalized, Specialized)</li> <li>Bacterial transformation</li> <li>Mutation types,</li> <li>Repair mechanism,</li> <li>Selection of mutants</li> </ul>	2	6
<p><b>Genetics of Bacteriophage</b></p> <ul style="list-style-type: none"> <li>Bacteriophages Classification, types</li> <li>Phage T4 – structure,</li> <li>gene expression and genome organization</li> <li>Lamda phage replication, lytic and lysogenic cycles</li> <li>Mechanisms of repressor synthesis and its control,</li> <li>Importance of bacteriophages</li> </ul>	2	6

<b>Extra-chromosomal and moveable elements</b>	2	6
<ul style="list-style-type: none"> <li>Plasmids</li> <li>gene cloning and in vitro mutagenesis</li> <li>Gene Transfer:</li> <li>Impact on microbial evolution &amp; basis for classical mapping and mutation analysis,</li> <li>Conjugation and conjugative plasmids</li> </ul>		
<b>Gene Transfer</b>	1	3
<ul style="list-style-type: none"> <li>Transformation: physiological and artificial</li> <li>Transduction and bacteriophages</li> </ul>		
<b>Moveable genetic elements</b>	2	6
<ul style="list-style-type: none"> <li>Transposons, 'illegitimate' recombination, &amp; site-specific recombination</li> <li>Plasmids and transposons as tools</li> <li>Microbial introns, retrons, and inteins</li> </ul>		
<b>Regulation of gene expression &amp; responses to changing environments</b>	2	6
<ul style="list-style-type: none"> <li>Operons, repressors, activators, &amp; paradigms of gene regulation</li> <li>Global regulatory mechanisms</li> <li>Regulatory cascades, two component sensors, sensor-kinases &amp; response</li> <li>regulators, enhancers &amp; silencers</li> <li>Regulatory RNAs</li> <li>Global gene expression studies, further discussion of microarrays,</li> <li>proteomics &amp; new technologies</li> </ul>		
<b>Special topics:</b>	1	3
<ul style="list-style-type: none"> <li>Genetic analysis of bacteria, strain construction, gene fusions &amp; genetic reporters.</li> <li>Synthetic genes &amp; genomes, in vitro genetic manipulations, final discussions and revision</li> </ul>		
<b>Number of Weeks /and Units Per Semester</b>	14	42

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	28	6	6	12	-	52
	Actual						
Credit	Planned	28	2	6	6	-	42
	Actual						

3. Individual study/learning hours expected for students per week	4
Office hours for faculty member	

#### 4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies

On the table below are the five NQF Learning Domains, numbered in the left column. **First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

#### Curriculum Map

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Understand the working with different microscopes Gain knowledge about microbial classification and taxonomy	1. Lecture, support readings, group discussions, writing reports, preparing research papers.	(1)- written MCQ's exams (2)- Paper oral presentation (3)- Papers based essays (4)- Extended literature review
1.2	Understand the gene transfer mechanism, mutation and phage life cycle	2. Conducting individual tasks, practical training, field training, Talks,	
1.3	Understand regulation of gene expression & responses to changing environments	3. Activities and homework	
2.0	<b>Cognitive Skills</b>		
2.1	Understanding the Genetics of Bacteriophage and Extra-chromosomal and moveable elements: Plasmids: gene cloning and in vitro mutagenesis. Also, Gene Transfer: Impact on microbial evolution & basis for classical mapping and mutation analysis. Conjugation and conjugative plasmids	1. Lecture, support readings, group discussions, writing reports, preparing research papers. 2. Conducting individual tasks, practical training, field training, Talks, 3. Activities and homework	(1)- written MCQ's exams (2)- Paper oral presentation (3)- Papers based essays (4)- Extended literature review
2.2	Critical thinking Critically evaluate microbial genetics		
2.3	Creative thinking microbial genetics		
2.4	Problem solving in microbial genetics		

3.0	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Responsibility of own learning Describe the major aspects of the fields of microbial genetics	1. Lecture, support readings, group discussions, writing reports, preparing research papers. 2. Conducting individual tasks, practical training, field training, Talks, 3. Activities and homework	(1)- written MCQ's exams (2)- Paper oral presentation (3)- Papers based essays (4)- Extended literature review
3.2	Group participation and leadership create a spirit of cooperation, understanding, respect and responsibility - work in groups to improve the skills of relationship with others - cooperation in solving the problems of the students in the compilation of scientific material		
3.3	Act responsibly-personal and professional situation		
3.4	Ethical standards of behavior		
4.0	<b>Communication, Information Technology, Numerical</b>		
4.1	Oral and written communication: effectively communicate microbial genetics information in both written and oral form	1. Lecture, support readings, group discussions, writing reports, preparing research papers. 2. Conducting individual tasks, practical training, field training, Talks, 3. Activities and homework	(1)- written MCQ's exams (2)- Paper oral presentation (3)- Papers based essays (4)- Extended literature review
4.2	Use of IT skill of using a computer to assemble the scientific material - the ability to use modern electronic libraries		
4.3	Basic math and statistics		
5.0	<b>Psychomotor (if any)</b>		
5.1	Carrying out practical experiments in field and laboratory	Attendance and participating in all practical research project and supervising students throughout the lab experiments	(1)- Work on research project leading to write a thesis or a dissertation
5.2	Awareness of laboratory safety issues and experimental ethics	Attendance and participating in all practical research project and supervising students	Work on research project leading to write a thesis or a dissertation

		throughout the lab experiments	
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5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Exercises & Assignments	All Weeks	5%
2	Journal article reports	2 reports	10%
3	Participation	All Weeks	2%
4	Quizzes	2 Weeks	10%
5	Presentations	1 Week	10%
6	Written Exam (1)	8 <sup>th</sup> Week	20
7	Final Exam	15 <sup>th</sup> Week	50%

#### D. Student Academic Counseling and Support

<p>1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)</p> <p><b>The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.</b></p>
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#### E. Learning Resources

1. List Required Textbooks	<p><b>Textbook 1:</b> Molecular Genetics of Bacteria, 4th Edition: by Larry Snyder, Joseph E. Peters, et al.   Jan 7, <b>2013</b></p> <p><b>Textbook 2:</b> Molecular Genetics of Bacteria, 4<sup>th</sup> by Larry Snyder, Joseph E. Peters, Tina M. Henkin, Wendy Champness</p> <p><b>Textbook 3:</b> Microbial Genetics   August 22, <b>2013</b> by Keya Chaudhari</p>
2-Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)	<p><b>Textbook 4:</b> Microbial Inoculants in Sustainable Agricultural Productivity: by Dhananjaya Pratap Singh, Harikesh Bahadur Singh, et al.   Feb 23, <b>2016</b></p> <p><b>Textbook 4:</b> Principles of Microbial Diversity by James W. Brown   Dec 18, 2014</p>
3. List Electronic Materials, Web Sites, etc.	<p><b>Some genetics and other resources on the internet:</b></p> <p><b>Website1.</b> Class D2L site, described above.</p> <p><b>Website12.</b> American Society for Microbiology (ASM) home page: <a href="http://www.asmtusa.org">http://www.asmtusa.org</a>.</p> <p><b>Website13.</b> BioWeb <a href="http://bioweb.uwlax.edu/index.htm">http://bioweb.uwlax.edu/index.htm</a>. (A collection of data and tools for genetics and biology).</p> <p><b>Website14.</b> DOE Joint Genomics Institute (JGI): <a href="http://www.jgi.doe.gov/JGI_microbial/html/index.html">http://www.jgi.doe.gov/JGI_microbial/html/index.html</a> (Microbial genome databases and a great resource for genome analysis including BLAST searches.)</p>

	<p><b>Website15.</b> ExpPASy Molecular Biology Server: <a href="http://www.expasy.ch/">http://www.expasy.ch/</a>. (A very useful site for molecular biology, genomics, and proteomics included predicted peptide mass fingerprints.)</p> <p><b>Website16.</b> NATIONAL CENTER FOR BIOTECHNOLOGY INFORMATION (NCBI): <a href="http://www.ncbi.nlm.nih.gov/">http://www.ncbi.nlm.nih.gov/</a>. (This site includes the GenBank and other DNA, protein, and genomic databases and extremely useful search programs such as “BLAST.” Includes the PubMed, MEDLINE literature database.) 2</p> <p><b>Website17.</b> Within NCBI, note for example PubMed (<a href="http://www.ncbi.nlm.nih.gov/pubmed/">http://www.ncbi.nlm.nih.gov/pubmed/</a>) for literature database searches and PubChem (<a href="http://pubchem.ncbi.nlm.nih.gov/">http://pubchem.ncbi.nlm.nih.gov/</a>) for structures and information about small molecules including metabolites, antibiotics, and inhibitors.</p>
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#### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
2. Technology resources (AV, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

#### G. Course Evaluation and Improvement Procedures

1. Strategies for Obtaining Student’s Feedback on Effectiveness of Teaching <ul style="list-style-type: none"> <li>- <b>Student activities.</b></li> <li>- <b>Student discussions.</b></li> <li>- <b>Student proposals.</b></li> <li>- <b>Student assessment</b></li> </ul>
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department <ul style="list-style-type: none"> <li>- <b>Regular exams and quiz</b></li> <li>- <b>Work questionnaires</b></li> <li>- <b>Student interview</b></li> </ul>
2. Procedures for Teaching Development <ul style="list-style-type: none"> <li>- <b>Continuous updating with the use of all new mechanisms in the field</b></li> <li>- <b>Staff members are required to attend training courses, conferences and workshops to improve their learning skills</b></li> <li>- <b>communication with faculty members in other colleges to share experiences</b></li> </ul>
3. Procedures for Verifying Standards of Student’s Achievement (e.g. check marking by an independent member teaching staff of a sample of student’s work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution) <ul style="list-style-type: none"> <li>- <b>Comparison of lectures and exam results</b></li> <li>- <b>Random assessment of exam results</b></li> </ul>



4. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.
- **An advisory committee is formed to improve and develop the program's courses**
  - **Adding or removing a subject from a course after approval by the department council**
  - **The university book must be approved by the department council**

Name of Course Instructor: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Sameer Qari**

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_

Course Title: **BIOSAFETY.**

Course Code: 2307626-3 Bio

Date: 30 – 2 -1440	Institution: Umm Al-Qura University
College: Al-Jumum University College	Department: Biology

**A. Course Identification and General Information**

1. Course title and code: <b>Biosafety / 2307626-3 Bio</b>			
2. Credit hours: 42			
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course: <b>Al-Jumum University College</b>			
5. Level/year at which this course is offered: <b>Elective@Level-1or2/Year-1</b>			
6. Pre-requisites for this course (if any): N/A			
7. Co-requisites for this course (if any): N/A			
8. Location if not on main campus: Building (B) in Al-Jumum College			
9. Mode of Instruction (mark all that apply):			
a. Traditional classroom	√	percentage	60%
b. Blended (traditional and online)	√	percentage	20%
c. E-learning	√	percentage	10%
d. Correspondence		percentage	%0
f. <b>Other: Inverted Classroom and Integrated education</b>	√	percentage	10%
Comments:			

**B. Objectives**

**1. 1. The main objective of this course**

**After completing this course, students will be able to:**

- Gain knowledge on lab ethics and honesty in carrying out the experiments
- Acquire knowledge on lab safety to keep the lab safe for everyone
- Know about personal safety to take care of oneself from the hazards of chemicals and equipment's used
- Gain knowledge on environmental safety to safely dispose the toxic chemicals into the environment

**Describe briefly any plans for developing and improving the course** that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- **Regular Updating the content of the course according to the new publications and research in the field**
- **Feedback of outcome for this course**  
**Build in more active learning into class**

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

In this course we will get an overview of General rules - personal precautions.

Generally; Students of Genetics will be spending most of their time working in the laboratories, either for practical or for projects. Some experiments would involve the use of chemicals and equipments that require cautious handling. This course will train the students on how to safely handle the chemicals, equipments and biological materials also on how to dispose them safely into the environment. Also, this course will describe the Safe handling and proper maintenance of instruments like centrifuge, UV transilluminator, Autoclave, Water bath, Hot air oven, General causes of fire, classification of fire, portable fire extinguishers, Safety of people in the event of fire, fire protective clothing. Containment/safe disposal of biohazardous samples and Handling and disposal of recombinant/genetically modified organisms

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
<ul style="list-style-type: none"> <li>General rules - personal precautions</li> <li>Types of gloves</li> </ul>	1	3
<ul style="list-style-type: none"> <li>Hygienic and clean working space</li> <li>minor and major accidents</li> </ul>	1	3
<ul style="list-style-type: none"> <li>defective equipments and lab maintenance.</li> <li>Handling different chemicals-(toxic, flammable, carcinogenic, cryogenics, compressed gases)</li> </ul>	1	3
<ul style="list-style-type: none"> <li>Understanding MSDS - importance of labels (poison, radioactive, corrosive etc)</li> </ul>	1	3
<ul style="list-style-type: none"> <li>health hazards- protection and emergency action (first aid)</li> </ul>	1	3
<ul style="list-style-type: none"> <li>Radioactive chemicals-types of radiation, safe handling and disposal, radiation counter.</li> <li>Biosafety levels (1-4) - types of samples</li> </ul>	1	3
<ul style="list-style-type: none"> <li>Biosafety levels (1-4) - types of samples</li> <li>Standard practices and handling - biosafety cabinets</li> </ul>	1	3
<ul style="list-style-type: none"> <li>Containment/safe disposal of biohazardous samples</li> <li>Handling and disposal of recombinant/genetically modified organisms.</li> </ul>	1	3
<ul style="list-style-type: none"> <li>Safe handling and proper maintenance of instruments like centrifuge, UV transilluminator, Autoclave, Water bath, Hot air oven</li> </ul>	1	3
<ul style="list-style-type: none"> <li>Importance of log book and reporting faulty instruments</li> </ul>	1	3
<ul style="list-style-type: none"> <li>General causes of fire, classification of fire, portable fire extinguishers</li> </ul>	1	3
<ul style="list-style-type: none"> <li>Safety of people in the event of fire, fire protective clothing</li> </ul>		
<ul style="list-style-type: none"> <li>First aid for burns, injuries. First aid kit.</li> </ul>	1	
<b>Number of Weeks /and Units Per Semester</b>	14	42

### 2. Course components (total contact and credit hours per semester):

	Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total

Contact Hours	Planned	28		14	-	-	42
	Actual						
Credit	Planned	28		14	-	-	42
	Actual						

<b>4. Individual study/learning hours expected for students per week.</b>	<b>4</b>
- Additionally, Office hours for faculty member	

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies			
<p><b>On the table below are the five NQF Learning Domains, numbered in the left column. <u>First</u>, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). <u>Second</u>, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. <u>Third</u>, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)</b></p>			
Curriculum Map			
Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge (Description of the knowledge to be acquired):</b>		
1.1	<ul style="list-style-type: none"> <li>Understand personal precautions</li> <li>minor and major accidents</li> </ul>	<ul style="list-style-type: none"> <li>Lecture, support readings, group discussions, writing reports, preparing research papers.</li> <li>Conducting individual tasks, practical training, field training, Talks,</li> <li>Activities and homework</li> </ul>	<ul style="list-style-type: none"> <li>written MCQ's exams</li> <li>Paper oral presentation</li> <li>Papers based essays</li> <li>Extended literature review</li> </ul>
1.2	<ul style="list-style-type: none"> <li>defective equipments and lab maintenance</li> <li>Handling different chemicals</li> </ul>		
1.3	<ul style="list-style-type: none"> <li>health hazards- protection and emergency action</li> </ul>		
2.0	<b>Cognitive Skills (Description of cognitive skills to be developed):</b>		
2.1	- The ability to Describe personal precautions	<ul style="list-style-type: none"> <li>Lecture, support readings, group discussions, writing reports, preparing research papers.</li> </ul>	<ul style="list-style-type: none"> <li>written MCQ's exams</li> <li>Paper oral presentation</li> <li>Papers based essays</li> <li>Extended literature review</li> </ul>
2.2	Critical thinking: Critically evaluate Biosafety levels		
2.3	Creative thinking: Safety of people in the event of fire, fire protective		

2.4	at the end of this course the students will be able to solve Problems related to safety in the different laboratories of genetics	<ul style="list-style-type: none"> <li>• Conducting individual tasks, practical training, field training, Talks,</li> <li>• Activities and homework</li> </ul>	
3.0	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Responsibility of own learning: Describe the major aspects of the fields of biosafety	<ul style="list-style-type: none"> <li>• Lecture, support readings, group discussions, writing reports, preparing research papers.</li> <li>• Conducting individual tasks, practical training, field training, Talks,</li> <li>• Activities and homework</li> </ul>	<ul style="list-style-type: none"> <li>• written MCQ's exams</li> <li>• Paper oral presentation</li> <li>• Papers based essays</li> <li>• Extended literature review</li> </ul>
3.2	Group participation and leadership in description of safe handling and proper maintenance of instruments like centrifuge, UV transilluminator, Autoclave, Water bath, Hot air oven		
3.3	Act responsibly-personal and professional situation		
3.4	Ethical standards of behavior		
4.0	<b>Communication, Information Technology, Numerical</b>		
4.1	Oral and written communication: effectively communicate biosafety information in both written and oral form	<ul style="list-style-type: none"> <li>• Lecture, support readings, group discussions, writing reports, preparing research papers.</li> <li>• Conducting individual tasks, practical training, field training, Talks,</li> <li>• Activities and homework</li> </ul>	<ul style="list-style-type: none"> <li>• written MCQ's exams</li> <li>• Paper oral presentation</li> <li>• Papers based essays</li> <li>• Extended literature review</li> </ul>
4.2	Use of IT: skill of using a computer to assemble the scientific material - the ability to use modern electronic libraries		
4.3	Basic math and statistics		
5.0	<b>Psychomotor</b>		
5.1	Carrying out practical experiments in field and laboratory	Attendance and participating in all practical research project and supervising students throughout the lab experiments	Work on research project leading to write a thesis or a dissertation
5.2	Awareness of laboratory safety issues and experimental ethics	Attendance and participating in all practical research project.	Work on research project leading to write a thesis or a dissertation

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Exercises & Assignments	All Weeks	5%
2	Project (single\group)	--	3%
3	Participation	All Weeks	2%
4	Quiz (1)	5 <sup>th</sup> Week	10%
5	Written Exam (1)	8 <sup>th</sup> Week	20
6	Quiz (2)	13 <sup>th</sup> Week	10%
7	Final Exam	15 <sup>th</sup> Week	50%

#### D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)

**The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.**

#### E. Learning Resources

List Required Textbooks	<p><b>Textbook 1:</b> Safety-Scale Laboratory Experiments for Chemistry for Today (Cengage Laboratory Series for General, Organic, and Biochemistry), by Spencer L. Seager, Michael R. Slabaugh, et al.   Jan 1, <b>2017</b></p> <p><b>Textbook 2:</b> Alcohol, Drugs, Genes and the Clinical Laboratory: An Overview for Healthcare and Safety Professionals, by Amitava Dasgupta PhD DABCC   Nov 4, <b>2016</b></p> <p><b>Textbook 3:</b> Keith Furr, A., Handbook of Laboratory Safety Manual, CRC Press, 5th edition, <b>2000</b>.</p> <p>Guide for the Care and Use of Laboratory Animals: Eighth Edition (Laboratory Safety) 8th ed. Edition, By National Research Council, Division on Earth and Life Studies, et al.   Jan 27, <b>2011</b></p>
Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)	<p><b>Textbook 1:</b> Safety-Scale Laboratory Experiments for Chemistry for Today (Brooks/Cole Laboratory Series for General, Organic, and Biochemistry) by Spencer L. Seager and Michael R. Slabaugh   Jan 1, <b>2013</b></p>
List Electronic Materials, Web Sites, etc.	<p><b>Website:</b> 1:  <a href="https://www.coursehero.com/file/14883025/Genetics-Lab-Manual/">https://www.coursehero.com/file/14883025/Genetics-Lab-Manual/</a>  <a href="http://www.flinders.edu.au/medicine/fms/sites/support_services/documents/lab_safety_manual.pdf">http://www.flinders.edu.au/medicine/fms/sites/support_services/documents/lab_safety_manual.pdf</a>  <a href="https://www.ncbs.res.in/sitefiles/labsafety.pdf">https://www.ncbs.res.in/sitefiles/labsafety.pdf</a></p>



[https://www.ethz.ch/content/dam/ethz/special-interest/biol/mol-biol/inst-molecular-biology-and-biophysics-dam/documents/Safety\\_Guidelines.pdf](https://www.ethz.ch/content/dam/ethz/special-interest/biol/mol-biol/inst-molecular-biology-and-biophysics-dam/documents/Safety_Guidelines.pdf)

## F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)

1. Accommodation

(Classrooms, laboratories, demonstration rooms/labs, etc.)

2. Technology resources (AV, data show, Smart Board, software, etc.)

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

## G. Course Evaluation and Improvement Procedures

6. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

- **Student activities.**
- **Student discussions.**
- **Student proposals.**
- **Student assessment**

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

- **Regular exams and quiz**
- **Work questionnaires**
- **Student interview**

38. Procedures for Teaching Development

- **Continuous updating with the use of all new mechanisms in the field**
- **Staff members are required to attend training courses, conferences and workshops to improve their learning skills**
- **communication with faculty members in other colleges to share experiences**

39. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

- **Comparison of lectures and exam results**
- **Random assessment of exam results**

40. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

- **An advisory committee is formed to improve and develop the program's courses**
- **Adding or removing a subject from a course after approval by the department council**
- **The university book must be approved by the department council**

Name of Course Instructor: **Staff from campus**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_

**Course Title: SPECIAL TOPICS IN GENETICS.**

**Course Code: 2307627-3 Bio**

<b>Date: 20 – 6 -1440</b>	<b>Institution: Umm Al-Qura University</b>
<b>College: Al-Jumoum University college</b>	<b>Department: Biology</b>

**A. Course Identification and General Information**

1. Course title and code: <b>Special Topics in Genetics –code:2307627-3 Bio</b>
2. Credit hours: <b>3</b>
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)
4. Name of faculty member responsible for the course: <b>Al-Jumum University College</b>
5. Level/year at which this course is offered: <b>Elective @ Level-2/Year-1</b>
6. Pre-requisites for this course (if any): <b>N/A</b>
7. Co-requisites for this course (if any): <b>N/A</b>
8. Location if not on main campus: <b>Building (B) in Al-Jumum College</b>
<b>9. Mode of Instruction (mark all that apply):</b>
a. Traditional classroom <input checked="" type="checkbox"/> percentage <b>30%</b>
b. Blended (traditional and online) <input checked="" type="checkbox"/> percentage <b>15%</b>
c. E-learning <input checked="" type="checkbox"/> percentage <b>5%</b>
d. Correspondence <input type="checkbox"/> percentage <b>%0</b>
f. Other: Inverted Classroom and Integrated education <input checked="" type="checkbox"/> percentage <b>50%</b>
Comments:

**B. Objectives**

<p><b>1. The main objective of this course</b>  <b>After completing this course, students will learn:</b></p> <ul style="list-style-type: none"> <li>- Develop an understanding of a particular aspects of genetics.</li> <li>- Develop an understanding of technological advances of a particular aspect of genetics.</li> <li>- Know how to read a scientific paper critically.</li> <li>- Develop critical thinking skills and problem-solving skills to review and analyze information relating to the selected topic.</li> <li>- Develop an appreciation of the societal issues involved with the special topic, when appropriate.</li> </ul>
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<p><b>Describe briefly any plans for developing and improving the course</b> that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)</p> <ul style="list-style-type: none"> <li>- <b>Regular Updating the content of the course according to the new publications and research in the field</b></li> <li>- <b>Feedback of outcome for this course</b></li> <li>- <b>Build in more active learning into class</b></li> </ul>
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**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

<p><b>Course Description:</b>  This course enables students to study an area of Genetics not covered in other courses in this programe. Students should consult with the faculty member (advisor) to arrange the</p>
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topic of study and develop an outline of course content, which must be approved by the Chair of the Biology department. The topics will be selected at the forefront of modern-day research in genetics.

### 1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
<p><b>Special Topics course</b> provide opportunities for graduate students that are unique from a regularly offered course and can be of three formats:</p> <ul style="list-style-type: none"> <li>independent or team study that includes a common research project, which may provide research experience but is not required to be original research;</li> <li>Provide students with an opportunity to attend a series of specialist lectures (not covered in a regular course) at the forefront of modern-day research in genetics areas</li> <li>a course organized by the instructor and (usually) only offered once. In this case the course will appear in the timetable as Special Topics: (name of the course).</li> </ul> <p><b>Regulations</b></p> <ul style="list-style-type: none"> <li>The student(s) should normally be in their 2nd semester of study in MSc of Genetics.</li> <li>The supervisor for a Special Topics course is usually a faculty member at biology department who holds a PhD in a Biological discipline.</li> <li>Material prepared for a Special Topics course cannot be used in an Honors thesis.</li> <li>Material covered or prepared for a Special Topics course cannot be derived from work performed as a routine in previous courses.</li> <li>The content of the course should not overlap significantly with that of a regular course that is offered in the current academic programme.</li> <li>under the guidance of faculty members with pertinent expertise. Each subject will highlight “hot-topics” of selected research areas, focusing on very recent advances in the field of genetics</li> </ul>	Var.	Var.
<b>Number of Weeks /and Units Per Semester</b>	Var.	Var.

### 2. Course components (total contact and credit hours per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	Var.	Var.	Var.	Var.	-	Var.
	Actual						
Credit	Planned	Var.	Var.	Var.	Var.	-	Var.
	Actual						

2. Individual study/learning hours expected for students per week. - Additionally, Office hours for faculty member	4
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**4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies**

On the table below are the five NQF Learning Domains, numbered in the left column. **First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Curriculum Map			
Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	<b>Knowledge</b>		
1.1	Understanding facts	<ul style="list-style-type: none"> <li>Lecture,</li> <li>support readings,</li> <li>group discussions,</li> <li>writing reports,</li> <li>preparing protocols sheets.</li> <li>practical training,</li> <li>Lab training,</li> <li>Attendees</li> <li>homework</li> </ul>	<ul style="list-style-type: none"> <li>Written MCQ's exams</li> <li>oral presentation</li> <li>Papers based essays</li> <li>Extended literature review</li> </ul>
1.2	Understanding and applying theories and concepts		
1.3	Understanding procedures		
2.0	<b>Cognitive Skills</b>		
2.1	Applying skills / procedures of theoretical and concepts learned	<ul style="list-style-type: none"> <li>Consulting</li> <li>Round table discussion</li> <li>Training</li> <li>Inverted classroom</li> <li>preparing reports</li> <li>support readings</li> </ul>	<ul style="list-style-type: none"> <li>Seminars</li> <li>Report</li> <li>Proposal paper</li> <li>Oral presentation</li> <li>Papers based Thinking and ideas</li> <li>Applied work</li> </ul>
2.2	Critical thinking		
2.3	Creative thinking		
2.4	Problem solving		
3.0	<b>Interpersonal Skills &amp; Responsibility</b>		
3.1	Responsibility of own learning	<ul style="list-style-type: none"> <li>Lecture,</li> <li>support readings,</li> </ul>	<ul style="list-style-type: none"> <li>Written MCQ's exams</li> </ul>
3.2	Group participation and leadership		

3.3	Act responsibly-personal and professional situation	<ul style="list-style-type: none"> <li>group discussions,</li> <li>writing reports,</li> <li>preparing protocols sheets.</li> <li>practical training,</li> <li>Lab training,</li> <li>Attendees</li> <li>homework</li> </ul>	<ul style="list-style-type: none"> <li>oral presentation</li> <li>Papers based essays</li> <li>Extended literature review</li> </ul>
3.4	Ethical standards of behavior		
4.0	<b>Communication, Information Technology, Numerical</b>		
4.1	Oral and written communication	<ul style="list-style-type: none"> <li>support readings,</li> <li>writing reports,</li> <li>preparing research papers.</li> <li>practical training,</li> <li>field training,</li> <li>Activities and homework</li> </ul>	<ul style="list-style-type: none"> <li>written reports</li> <li>oral seminar</li> <li>Summarized literature</li> <li>Collecting Data</li> <li>Labs sections</li> </ul>
4.2	Use of IT		
4.3	Basic math and statistics		
5.0	<b>Psychomotor (if any)</b>		
5.2	Awareness of laboratory safety issues and experimental ethics	<ul style="list-style-type: none"> <li>Attendance and participating in all practical research project and supervising students throughout the lab experiments</li> </ul>	<ul style="list-style-type: none"> <li>Work on research project leading to write a thesis or a dissertation</li> </ul>

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Oral presentation	Var.	15%
2	Reports (write paper)	Var.	10%
3	Participation	Var.	5%
4	Quizzes	Var.	10%
5	Med Exam	Var.	10%
6	Online training	Var.	10%
7	Final Exam /Final Report	18 <sup>th</sup> Week	40%

#### D. Student Academic Counseling and Support

<p>1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)</p> <p>The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.</p>
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### E Learning Resources

1. List Required Textbooks	<b>Textbook 1:</b> Textbooks will vary, depending on the course topic and the instructor
3-Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)	<b>Textbook 1:</b> Textbooks will vary, depending on the course topic and the instructor
3. List Electronic Materials, Web Sites, Facebook, Twitter, etc.	<b>Website 1:</b> <a href="http://www.esp.org/foundations/genetics/classical/">http://www.esp.org/foundations/genetics/classical/</a> <b>Website 2:</b> <a href="http://www.dnai.org/index.htm">http://www.dnai.org/index.htm</a>
4. Other learning material such as computer-based programs/CD,	<b>Website 1:</b> <a href="https://www.3bscientific.com/heredity-and-genetics-of-man-part-i-interactive-cd-rom-1004283-w13514-joh-lieder-gmbh-co-cd126-en,p_998_15512.html">https://www.3bscientific.com/heredity-and-genetics-of-man-part-i-interactive-cd-rom-1004283-w13514-joh-lieder-gmbh-co-cd126-en,p_998_15512.html</a>

### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
2. Technology resources (AV, data show, Smart Board, software, etc.)
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

### G Course Evaluation and Improvement Procedures

7. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching
- <b>Student activities.</b>
- <b>Student discussions.</b>
- <b>Student proposals.</b>
- <b>Student assessment</b>
2. Other Strategies for Evaluation of Teaching by the Instructor or the Department
- <b>Regular exams and quiz</b>
- <b>Work questionnaires</b>
- <b>Student interview</b>
41. Procedures for Teaching Development
- <b>Continuous updating with the use of all new mechanisms in the field</b>
- <b>Staff members are required to attend training courses, conferences and workshops to improve their learning skills</b>
- <b>communication with faculty members in other colleges to share experiences</b>
42. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)
- <b>Comparison of lectures and exam results</b>
- <b>Random assessment of exam results</b>
43. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.
- <b>An advisory committee is formed to improve and develop the program's courses</b>



Kingdom of Saudi Arabia

Ministry of Education

Umm Al-Qura University

Deanship of Graduate Studies



المملكة العربية السعودية

وزارة التعليم

جامعة أم القرى

عمادة الدراسات العليا

- Adding or removing a subject from a course after approval by the department council
- The university book must be approved by the department council

Name of Course Instructor: **Biology Staff**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_

Course Title: **THESIS**.Course Code: **2307688-10 Bio**

Date: <b>20 – 6 -1440</b>	Institution: <b>Umm Al-Qura University</b>
College: <b>Al-Jumoum University college</b>	Department: <b>Biology</b>

**A. Course Identification and General Information**

1. Course title and code: <b>THESIS –code: 2307688-10 Bio</b>				
2. Credit hours: <b>10</b>				
3. Program(s) in which the course is offered: <b>MSc. Genetics</b> (If general elective available in many programs indicate this rather than list programs)				
4. Name of faculty member responsible for the course: <b>Al-Jumoum University College</b>				
5. Level/year at which this course is offered: <b>Level-4/Year-2</b>				
6. Pre-requisites for this course (if any): <b>N/A</b>				
7. Co-requisites for this course (if any): <b>N/A</b>				
8. Location if not on main campus: <b>Building (B) in Al-Jumoum College</b>				
<b>9. Mode of Instruction (mark all that apply):</b>				
a. Traditional classroom		percentage	<b>N/A</b>	
b. Blended (traditional and online)		percentage	<b>N/A</b>	
c. E-learning		percentage	<b>N/A</b>	
d. Lab Supervision	√	percentage	<b>25%</b>	
f. Other: Inverted Classroom and Integrated education	√	percentage	<b>75%</b>	
Comments:				

**B. Objectives**

<p><b>1. The main objective of this course</b></p> <p><b>After completing this course, students will learn:</b></p> <ul style="list-style-type: none"> <li>- 1. provide an in-depth exploration of a topic of special interest.</li> <li>- 2. explain and apply relevant theories and laws in the chosen area.</li> <li>- 3. interpret theories and doctrines and give recommendations where appropriate.</li> <li>- 4. acquire knowledge on the chosen topic and apply the knowledge, experience, and skills learned in genetics programme to the chosen topic.</li> <li>- 5. show the ability to analyses various aspects of a topic, review, and synthesize knowledge.</li> <li>- 6. apply various research techniques, find suitable sources of information, and acknowledge them in the research project.</li> <li>- 7. acquire and apply academic scientific reading skills and general academic reading skills.</li> <li>- 8. Develop effective communicative skills to present research on genetics.</li> <li>- <b>A published or accepted paper should be performed before thesis discussion</b></li> </ul>
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**Describe briefly any plans for developing and improving the course** that are being implemented. (e.g. increased use of the IT or online reference material, changes in content as a result of new research in the field)

- **Regular Updating the content of the course according to the new publications and research in the field**
- **Feedback of outcome for this course**
- **Build in more active learning into class**

**C. Course Description** (Note: General description in the form used in the program's bulletin or handbook)

**Course Description:**

This course gives student an opportunity to produce and defend a thesis under faculty supervision in the field of genetics. This is a process-oriented writing course that integrates reading, research, writing, and oral presentations. The student will carry out a research project on a genetic topic of the student interest. Apart from the thesis, the student must compile a portfolio with all the drafts, notes about the texts read, supervisors' feedback, research proposal, literature review, class activities, and any written work done for the project such as outlines, book reviews, etc. Student will also present the results of each stage of his work to supervisor and the other students in the course. Other members of the University community may be invited to the presentations. The thesis is expected to conform to appropriate standards of scholarship. It will be encouraged student to send his thesis (a parts) for publication. Additionally, students will engage in a series of class activities aimed at helping them to develop reading, research, writing, and presentation skills.

**1. Topics to be Covered**

List of Topics	No. of Weeks	Contact hours
<p><b>The main topics of the thesis is depending on the student research plan.</b></p> <ul style="list-style-type: none"> <li>- student need to state and define research problem, objectives, the importance of problem, how it will be research, what the literature has said about this problem, and anticipated results.</li> <li>- Passing requirements and scale of evaluation: a positive response must be given to the following</li> <li>- questions in order to approve the essay. All these criteria have the same value. <ul style="list-style-type: none"> <li>• Does the research adequately identify a problem?</li> <li>• Does the research clearly explain the significance of the problem?</li> <li>• Does the research show an awareness of the literature on the problem?</li> <li>• Does the research adequately explain the methodology, theoretical framework, and research plan?</li> <li>• Does the research clearly state the thesis and the interpterion results?</li> <li>• Does the research integrate readings discussed throughout the course?</li> <li>• Does the research follow the style, language, citation method, and organization as scientific methods</li> </ul> </li> </ul>	Var.	Var.
<b>Number of Weeks /and Units Per Semester</b>	Var.	Var.

2. Course components (total contact and credit hours per semester):							
		Lecture	Tutorial	Laboratory/ Studio	Practical	Other	Total
Contact Hours	Planned	Var.	Var.	Var.	Var.	-	Var.
	Actual						
Credit	Planned	Var.	Var.	Var.	Var.	-	Var.
	Actual						

3. Individual study/learning hours expected for students per week. - Additionally, Office hours for faculty member	4
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4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategies	
<p>On the table below are the five NQF Learning Domains, numbered in the left column. <b>First</b>, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). <b>Second</b>, insert supporting teaching strategies that fit and align with the assessment methods and targeted learning outcomes. <b>Third</b>, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy should fit in together with the rest to form an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)</p>	
Curriculum Map	
Code	NQF Learning Domains and Course Learning Outcomes
1.0	<p><b>LEARNING OUTCOMES:</b>            Conduct independent research on Law and Justice topics.            Produce a thesis of publishable quality.            Effectively present and defend your research orally</p>
2.0	<p><b>WRITING PROCESS MODEL</b>            The writing process model underlying this course is the composing process of expert academic writers, a problem-driven process which recognizes that the actual act of writing is a process of thinking, discovering, and developing ideas. This description of the writing process emphasizes the fact that expert academic writers are driven by their engagement with questions or problems and by their need to see their writing as a contribution to an ongoing conversation. Expert academic writing is a lengthy and indivisible process of multiple drafting and revisions.</p>
3.0	<p><b>METHODOLOGY</b>            Student will have to engage in reading, research, and writing. Additionally, he will have to give and receive feedback throughout the course and to make oral presentations about his work. Supervisor role is to guide student in his progression, to encourage him to construct a sound</p>

	analysis, and to design a structured written report. also, It is his responsibility to get the most out of meetings and related activities.
	<p><b>RESPONSIBILITIES</b></p> <ul style="list-style-type: none"> <li>• Student responsibilities are as follows.</li> <li>• To proactively and regularly seek help from supervisor.</li> <li>• To be familiar with requirements and regulations regarding the course.</li> <li>• To meet regularly with supervisor</li> <li>• To actively participate in the class activities.</li> <li>• To bring questions and issues to that meetings.</li> <li>• To pass in the drafts in both printed and electronic copies on the agreed dates.</li> <li>• To read and analyze the texts dealing with writing, research, and selected topic.</li> <li>• To carry out extensive independent research.</li> <li>• To produce a portfolio with the drafts, reading notes, and feedback.</li> <li>• To present orally research proposal and thesis.</li> <li>• To present and discuss on topics related to writing and research.</li> <li>• To give and to receive feedback.</li> <li>• To consider submitting thesis for publication.</li> </ul>

5. Assessment Task Schedule for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Evaluation of the scientific thesis shall be based on the reports of the external and internal arbitrators	18 <sup>th</sup> Week	100%

#### D. Student Academic Counseling and Support

<p>1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic counseling. (include the time teaching staff are expected to be available per week)</p> <p>The Head of the Department arrange the student consultations and academic counseling by distributing the students on the teaching staff to guide them in the Office hours.</p>
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#### E Learning Resources

1. List Required Reading	This is a reading intensive course. There is a list of required journal articles present by supervisor. Additionally, each student will have to compile a list of readings for the selected topic and read these texts deeply.
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#### F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)

2. Technology resources (AV, data show, Smart Board, software, etc.)

3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)

### G Course Evaluation and Improvement Procedures

8. Strategies for Obtaining Student's Feedback on Effectiveness of Teaching

- **Student activities.**
- **Student discussions.**
- **Student proposals.**
- **Student assessment**

2. Other Strategies for Evaluation of Teaching by the Instructor or the Department

- **Regular exams and quiz**
- **Work questionnaires**
- **Student interview**

44. Procedures for Teaching Development

- **Continuous updating with the use of all new mechanisms in the field**
- **Staff members are required to attend training courses, conferences and workshops to improve their learning skills**
- **communication with faculty members in other colleges to share experiences**

45. Procedures for Verifying Standards of Student's Achievement (e.g. check marking by an independent member teaching staff of a sample of student's work, periodic exchange and remarking of tests or a sample of assignments with staff members at another institution)

- **Comparison of lectures and exam results**
- **Random assessment of exam results**

46. Describe the planning arrangements for periodically reviewing course effectiveness and planning for developing it.

- **An advisory committee is formed to improve and develop the program's courses**
- **Adding or removing a subject from a course after approval by the department council**
- **The university book must be approved by the department council**

Name of Course Instructor: **Advisor and Co-advisor**

Signature: \_\_\_\_\_ Date Completed: \_\_\_\_\_

Program Coordinator: **Dr. Sameer Qari**

Signature: \_\_\_\_\_ Date Received: \_\_\_\_\_