

**ATTACHMENT 2 (e)**

**Course Specifications**

**Kingdom of Saudi Arabia**

**The National Commission for Academic Accreditation & Assessment**

**Course Specifications  
(CS)**

## Course Specifications

Institution: <b>Al Farabi Private College</b> Date of Report: <b>24-08-2015</b>
College/Department: <b>Basic Medical Sciences</b>

### A. Course Identification and General Information

1. Course title and code: <b>Molecular Biology and Human Genetics (MBG 231)</b>			
2. Credit hours: <b>3 Hours</b>			
3. Program(s) in which the course is offered. <b>MEDICINE</b> (If general elective available in many programs indicate this rather than list programs)			
4. Name of faculty member responsible for the course: <b>Dr. Rim Mohamed Bougatfa</b>			
5. Level/year at which this course is offered: <b>Level 3</b>			
6. Pre-requisites for this course (if any): <b>BIOLOGY Level 2</b>			
7. Co-requisites for this course (if any): <b>NONE</b>			
8. Location if not on main campus <b>N/ A</b>			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	<input checked="" type="checkbox"/>	What percentage?	<input type="text" value="100%"/>
b. Blended (traditional and online)	<input type="checkbox"/>	What percentage?	<input type="text"/>
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/>	What percentage?	<input type="text"/>
f. Other	<input type="checkbox"/>	What percentage?	<input type="text"/>
Comments:			

## B Objectives

1. What is the main purpose for this course?

**At the end of this course , the students will be able to:**

- To summarize the structure of DNA and ARN and differentiate between them.
- To explain the mechanisms of protein synthesis.
- To describe the structure & classification, the labeling of chromosomes.
- To explain the karyotype.
- To explain the common chromosomal abnormalities.
- To describe the cell cycle.
- To differentiate between Mitosis / Meiosis.
- To explain the concept of X inactivation.
- To describe the gene structure, the gene expression, the regulation of the gene expression.
- To define Single gene disorders and multifactorial disorders
- To list the molecular basis and types of gene mutation
- To describe the hemoglobin disorders
- To explain the genetic concept of blood types
- To define the principles and patterns of Mendelian inheritance, and explain the concepts of genetic pedigree
- To discuss the molecular basis of inborn errors of metabolism
- To describe the Proto-oncogenes and tumor suppressor genes
- To explain the relation of the cell cycle, Cell death and apoptosis to cancer
- To discuss the chromosomal abnormalities as a cause of cancer (e.g., Philadelphia chromosome)
- To discuss the molecular basis of tumor angiogenesis and metastasis
- To explain the concepts of Genetic engineering and gene therapy
- To describe the principles of the common molecular techniques

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

- Increased use of IT or web-based reference material
- Using of various teaching ways that attract students.
- Usually, to refer to the new scientific references in order to encourage students for scientific and advanced research and to strengthen areas of critical thinking.

**C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)**

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
Registration	1 <sup>st</sup>	
Introduction to genetics	2 <sup>nd</sup>	1
Composition and structure of DNA , RNA , Types of RNA	2 <sup>nd</sup>	1
DNA replication	3 <sup>rd</sup>	2
From Genes to proteins (Transcription, Gene splicing, the genetic code, Translation, Post-transcriptional and post-translational modifications)	3 <sup>rd</sup>	1
Gene structure	4 <sup>th</sup>	1
Regulation of gene expression	4 <sup>th</sup>	1
Chromosomes ( Structure, types)	5 <sup>th</sup>	1
Chromosomes classification	5 <sup>th</sup>	1
The cell cycle / Mitosis	6 <sup>th</sup>	1
Meiosis	6 <sup>th</sup>	1
Gametogenesis	6 <sup>th</sup>	1
Chromosomes labeling / Karyotyping	7 <sup>th</sup>	1
Banding techniques, FISH hybridization	7 <sup>th</sup>	1
Sex chromosomes, Barr body and Lyon hypothesis	7 <sup>th</sup>	1
Chromosomal anomalies ( numerical and structural)	8 <sup>th</sup>	2
Clinical correlations	8 <sup>th</sup>	1
Mendelian laws (Basic Concepts of Genetics)	11 <sup>th</sup>	1
Basic Concepts of Probability	11 <sup>th</sup>	1
Mode of inheritance	11 <sup>th</sup>	1
Genetic Variation And Mutations Hemoglobin structure and disorders Blood Groups	12 <sup>th</sup>	3
Inborn error of metabolism & Clinical screening of inborn error	13 <sup>th</sup>	2
Introduction to Cancer biology, proto-oncogenes	14 <sup>th</sup>	1
Apoptosis and control of cell growth	14 <sup>th</sup>	1
Molecular basis of cancer	15 <sup>th</sup>	1
Recombinant DNA technology , PCR	15 <sup>th</sup>	1
Genetic engineering	16 <sup>th</sup>	1
Gene Therapy	16 <sup>th</sup>	1
Revision		2

	Lecture	Seminar	Total
Contact Hours	34 hours	14 hours	48 hours
Credit Hours	2 hours	1 hour	3 hours

3. Additional private study/learning hours expected for students per week.

2 Hours

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

Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

The *National Qualification Framework* provides five learning domains. Course learning outcomes are required. Normally a course has should not exceed eight learning outcomes which align with one or more of the five learning domains. Some courses have one or more program learning outcomes integrated into the course learning outcomes to demonstrate program learning outcome alignment. The program learning outcome matrix map identifies which program learning outcomes are incorporated into specific courses.

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 intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. **Fourth**, if any program learning outcomes are included in the course learning outcomes, place the @ symbol next to it.

Every course is not required to include learning outcomes from each domain.

	<b>NQF Learning Domains And Course Learning Outcomes</b>	<b>Course Teaching Strategies</b>	<b>Course Assessment Methods</b>
	<b>Knowledge</b>		
	<b>By the end of this course the students will be able to:</b>		
	<ul style="list-style-type: none"> <li>To describe the structure &amp; classification, the labeling of chromosomes.</li> <li>To describe the cell cycle.</li> <li>To describe the gene structure, the gene expression, the regulation of the gene expression.</li> <li>To define Single gene disorders and multifactorial disorders</li> <li>To list the molecular basis and types of gene mutation</li> <li>To describe the hemoglobin disorders</li> <li>To explain the genetic concept of blood types</li> <li>To define the principles and patterns of Mendelian inheritance, and explain the concepts of genetic pedigree</li> <li>To discuss the molecular basis of inborn errors of metabolism</li> <li>To describe the Proto-oncogenes and tumor suppressor genes</li> <li>To discuss the chromosomal abnormalities as a cause of cancer (e.g., Philadelphia chromosome)</li> <li>To discuss the molecular basis of tumor angiogenesis and metastasis</li> <li>To describe the principles of the common molecular techniques</li> </ul>	Interactive lectures Tutorial Assignments Seminar	Written examinations Students' assignments
	<b>Cognitive Skills</b>		
	<ul style="list-style-type: none"> <li>To summarize the structure of DNA and ARN and differentiate between them.</li> <li>To explain the mechanisms of protein synthesis.</li> <li>To differentiate between Mitosis / Meiosis.</li> <li>To explain the concept of X inactivation.</li> <li>To explain the relation of the cell cycle, Cell</li> </ul>	Interactive lectures Tutorial Assignments Seminar	Written examinations Students' assignments Seminar evaluation

	<p>death and apoptosis to cancer</p> <ul style="list-style-type: none"> <li>To explain the relation of the cell cycle, Cell death and apoptosis to cancer</li> <li>To explain the concepts of Genetic engineering and gene therapy</li> </ul>		
<b>Interpersonal Skills &amp; Responsibility</b>			
	<p><b>Communication, Information Technology, Numerical Skills</b></p> <ul style="list-style-type: none"> <li>To research about Single strand Conformation polymorphism (SSCP)</li> <li>To research about denaturing gradient gel electrophoresis (DGGE)</li> <li>To research about Sickle cell anemia &amp; Thalassemia</li> <li>To evaluate the Prevalence of genetic disorders in KSA</li> </ul>	Seminar	Seminar Evaluation
<b>Psychomotor</b>			

**Suggested Guidelines for Learning Outcome Verb, Assessment, and Teaching**

<b>NQF Learning Domains</b>	<b>Suggested Verbs</b>
<b>Knowledge</b>	list, name, record, define, label, outline, state, describe, recall, memorize, reproduce, recognize, record, tell, write
<b>Cognitive Skills</b>	estimate, explain, summarize, write, compare, contrast, diagram, subdivide, differentiate, criticize, calculate, analyze, compose, develop, create, prepare, reconstruct, reorganize, summarize, explain, predict, justify, rate, evaluate, plan, design, measure, judge, justify, interpret, appraise
<b>Interpersonal Skills &amp; Responsibility</b>	demonstrate, judge, choose, illustrate, modify, show, use, appraise, evaluate, justify, analyze, question, and write
<b>Communication, Information Technology, Numerical</b>	demonstrate, calculate, illustrate, interpret, research, question, operate, appraise, evaluate, assess, and criticize
<b>Psychomotor</b>	demonstrate, show, illustrate, perform, dramatize, employ, manipulate, operate, prepare, produce, draw, diagram, examine, construct, assemble,

experiment, and reconstruct

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

\- Office hour ( 2 hours/ week)

Suggested **verbs not to use** when writing measurable and assessable learning outcomes are as follows:

Consider	Maximize	Continue	Review	Ensure	Enlarge	Understand
Maintain	Reflect	Examine	Strengthen	Explore	Encourage	Deepen

Some of these verbs can be used if tied to specific actions or quantification.

**Suggested assessment methods and teaching strategies are:**

According to research and best practices, multiple and continuous assessment methods are required to verify student learning. Current trends incorporate a wide range of rubric assessment tools; including web-based student performance systems that apply rubrics, benchmarks, KPIs, and analysis. Rubrics are especially helpful for qualitative evaluation. Differentiated assessment strategies include: exams, portfolios, long and short essays, log books, analytical reports, individual and group presentations, posters, journals, case studies, lab manuals, video analysis, group reports, lab reports, debates, speeches, learning logs, peer evaluations, self-evaluations, videos, graphs, dramatic performances, tables, demonstrations, graphic organizers, discussion forums, interviews, learning contracts, antidotal notes, artwork, KWL charts, and concept mapping.

Differentiated teaching strategies should be selected to align with the curriculum taught, the needs of students, and the intended learning outcomes. Teaching methods include: lecture, debate, small group work, whole group and

small group discussion, research activities, lab demonstrations, projects, debates, role playing, case studies, guest speakers, memorization, humor, individual presentation, brainstorming, and a wide variety of hands-on student learning activities.



5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Midterm Exam	9/10	30
2	Quizzes / Attendance / Assignments	3 / 7 / 15	20
3	Seminars	Each 2 weeks	10
4	Final Written Exam	18	40

### E. Learning Resources

1. List Required Textbooks	<ul style="list-style-type: none"> <li>• Jorde, Carey, Bamshad and White. Medical Genetics, 3<sup>rd</sup> edition .....</li> <li>• Peter Turnpenny, Sian Ellard. Emery's Elements of medical Genetics, 14<sup>th</sup> edition 2010</li> <li>• Meisenberg &amp; Simmons. Principles of Medical Biochemistry with STUDENT CONSULT Online Access, 3<sup>rd</sup> Edition 2012</li> <li>• Principles of Medical Genetics, 2nd Edition by Thomas D. Gelernter,</li> <li>• Francis S. Collins and David Ginsburg.</li> <li>• Genetics, 3rd Edition by Daniel L. Hartl, Jones and Bartlett Publishers, Boston. Genetics, 3rd Edition by Peter J. Russell, Harper Collins Publishers, New York, or a similar recent text before attempting the study of human genetics</li> </ul>
2. List Essential References Materials (Journals, Reports, etc.)	
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)	None
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)	<ul style="list-style-type: none"> <li>• <a href="http://www.genome.gov/glossary.cfm">http://www.genome.gov/glossary.cfm</a></li> <li>• <a href="http://www.ncbi.nlm.nih.gov/genome/">http://www.ncbi.nlm.nih.gov/genome/</a></li> <li>• <a href="http://www.ncbi.nlm.nih.gov/omim/">http://www.ncbi.nlm.nih.gov/omim/</a></li> </ul>
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.	None

## 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.)
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)
<ul style="list-style-type: none"> <li>Lecture room equipped with data show and computer.</li> </ul>

2. Computing resources (AV, data show, Smart Board, software, etc.)
One computer attached to data show
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)
<ul style="list-style-type: none"> <li></li> </ul>

## G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
<ul style="list-style-type: none"> <li>Asking students before, during and after lectures.</li> <li>Student evaluation survey.</li> <li>From the course report.</li> </ul>
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor
<ul style="list-style-type: none"> <li>Peer observing teaching</li> <li>Questionnaire</li> <li>Reciprocal classroom visit</li> </ul>
3 Processes for Improvement of Teaching
<ul style="list-style-type: none"> <li>Attending training sessions</li> <li>Attending workshops to facilitate the exchange of experiences amongst faculty members</li> <li>Scheduling regular meetings with other colleagues where problems are discussed and solutions are given</li> <li>Discussing the challenges in the classroom with colleagues and members of the Department Counsel</li> <li>Encouraging faculty members to attend conferences on professional development</li> <li>Keeping up to date with pedagogical theory and practice</li> <li>Setting goals for achieving excellence in teaching at the beginning of each new semester after reviewing previous semester's teaching strategies and results and after considering students' feedback</li> <li>Keeping up to date with refereed articles and books related to the topics of the course</li> <li>Collaborative course development</li> </ul>

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

- Annual course review- report prepared by course director
- Compare results of student exam, participation and assignments with results of the same students but with other different courses.
- Periodic review and evaluation- external personal involved
- Peer teaching observation
- Visiting examiner report
- Accreditation report.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Studying of the questioners and staff remarks and student marks to obtain improvement plan.
- Regular department committee reviewer.
- Regular program committee reviewer.
- Develop special software for training students in practices sessions to avoid over exposure of students during practical.
- Compare syllabi and course description to those found in other universities (including those on the Internet)
- Try to contact other professors in different universities who are teaching similar courses (including well-known institutions) to exchange views regarding the optimal ways to improve the course

**Faculty or Teaching Staff: Dr. Rim Mohamed Bougatfa**

**Signature:**

**Date Report Completed:**

**Received by: Dr.**

**Dean/Department Head**

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

**Date:** \_\_\_\_\_