



# Course Specifications

<b>Course Title:</b>	<b>Medical Genetics</b>
<b>Course Code:</b>	<b>373216-3</b>
<b>Program:</b>	<b>Bachelor's in Clinical Laboratory Sciences (Level-7)</b>
<b>Department:</b>	<b>Clinical Laboratory Sciences</b>
<b>College:</b>	<b>Applied Medical Sciences</b>
<b>Institution:</b>	<b>Taif University</b>



## Table of Contents

<b>A. Course Identification</b> .....	<b>3</b>
6. Mode of Instruction (mark all that apply) .....	3
<b>B. Course Objectives and Learning Outcomes</b> .....	<b>4</b>
1. Course Description .....	4
2. Course Main Objective .....	4
3. Course Learning Outcomes .....	4
<b>C. Course Content</b> .....	<b>4</b>
<b>D. Teaching and Assessment</b> .....	<b>6</b>
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods.....	6
2. Assessment Tasks for Students .....	6
<b>E. Student Academic Counseling and Support</b> .....	<b>7</b>
<b>F. Learning Resources and Facilities</b> .....	<b>7</b>
1. Learning Resources .....	7
2. Facilities Required .....	7
<b>G. Course Quality Evaluation</b> .....	<b>8</b>
<b>H. Specification Approval Data</b> .....	<b>7</b>

## A. Course Identification

<b>1. Credit hours:</b> <b>3 hours</b>
<b>2. Course type:</b>
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> <b>3<sup>rd</sup>Level /2nd Year</b>
<b>4. Pre-requisites for this course (if any):</b> <b>None</b>
<b>5. Co-requisites for this course (if any):</b> <b>None</b>

### 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3 hours /week= 45 hours/semester	100 %
2	Blended	None	0%
3	E-learning	None	0%
4	Correspondence	None	0%
5	Other	None	0%

### 7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
<b>Contact Hours</b>		
1	Lecture	45
2	Laboratory/Studio	None
3	Tutorial	None
4	Others (specify)	None
	<b>Total</b>	45
<b>Other Learning Hours*</b>		
1	Study	28
2	Assignments	15
3	Library	None
4	Projects/Research Essays/Theses	None
5	Others(specify)	4
	<b>Total</b>	47

\*The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

## B. Course Objectives and Learning Outcomes

### 1. Course Description

**On completion of this course, the students will be able to:**

Recognize fundamentals of human genetics and genomics as applied to health and disease, understand the basic principles of genetics that underlie modern principles of diagnostic molecular biology and biotechnology identify the diverse applications of genetics and recognize the basis of laboratory tests used in screening and diagnosis of genetic disorders as well as premarital evaluation.

### 2. Course Main Objective

The purpose of this course is to allow students to develop an understanding of the structure and function of chromosomes, DNA, genes and their role in inheritance and disease states.

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
1	<b>Knowledge:</b>	
1.1	Describe DNA, genes and chromosomes; and role of mutations in disease process.	K1
1.2	Recognize the role of modern techniques of molecular genetics and their potential in clinical diagnosis.	K2
2	<b>Skills:</b>	
2.1	Apply subject-specific concepts and principles of genetics to inherited conditions.	S2
2.2	Analyze the information in a pedigree chart by applying the laws of inheritance.	S2
3	<b>Competence:</b>	
3.1	Communicate concepts, principles and information effectively by oral, written and visual means with clarity and confidence.	C3

## C. Course Content

No	List of Topics	Contact Hours
1	DNA and RNA structure - Overview of cell division Transcription and translation	3
2	<b>Chromosomes structure I</b> - Chemical composition of chromosomes • Chromatin Histones and other protein	3
3	<b>Chromosomes structure II</b> - Centromeres and telomeres • <i>In Situ</i> Hybridization	3

	The chromosome map	
4	<b>DNA Mutation and its clinical correlation</b> <ul style="list-style-type: none"> <li>- Point mutation</li> <li>- Frameshift mutation</li> <li>Trinucleotide repeat expansion</li> </ul>	3
5	<b>Pattern of inheritance (Mendelian) I</b> <ul style="list-style-type: none"> <li>- Mendel's study of heredity</li> <li>- Mendelian principles in human genetics</li> <li>- Alleles, gene, and trait</li> <li>Mendelian segregations</li> </ul>	3
6	<b>Pattern of inheritance (Mendelian) II</b> <ul style="list-style-type: none"> <li>- Autosomal dominant</li> <li>- Autosomal recessive</li> <li>X-linked</li> </ul>	3
7	<ul style="list-style-type: none"> <li>- Pedigree Analysis</li> </ul> Genetic Counselling	3
8	<b>Variation in Chromosome number and structure I</b> <ul style="list-style-type: none"> <li>- Cytological techniques <ul style="list-style-type: none"> <li>• Analysis of mitotic chromosomes</li> </ul> </li> <li>The human karyotypes</li> </ul>	3
9	<b>Variation in Chromosome number and structure II</b> <ul style="list-style-type: none"> <li>- Polyploidy</li> <li>- Aneuploidy</li> </ul> Amniocentesis and chorionic biopsy	3
10	<b>Variation in Chromosome number and structure III</b> <ul style="list-style-type: none"> <li>- Rearrangements of chromosome structure <ul style="list-style-type: none"> <li>• Deletion and duplications of chromosome segments</li> <li>• Inversions</li> </ul> </li> <li>Translocations</li> </ul>	3
11	<b>Genetic (inherited) abnormalities I</b> <ul style="list-style-type: none"> <li>- Chromosome abnormalities <ul style="list-style-type: none"> <li>• Down syndrome</li> <li>• Turner syndrome</li> </ul> </li> <li>- Autosomal dominant disorders <ul style="list-style-type: none"> <li>• Familial hypercholesterolemia</li> <li>• Porphyrias</li> </ul> </li> <li>Von Willebrand disease</li> </ul>	6
12	<b>Genetic (inherited) abnormalities II</b> <ul style="list-style-type: none"> <li>- Autosomal recessive disorders <ul style="list-style-type: none"> <li>• Adenosine deaminase deficiency</li> <li>• Alpha 1-antitrypsin deficiency</li> </ul> </li> </ul> <p style="text-align: right;">Cystic fibrosis</p>	6
13	<b>Genetic (inherited) abnormalities III</b> <ul style="list-style-type: none"> <li>• Phenylketonuria</li> </ul>	3

	- X-linked disorders Hemophilia	
<b>Total</b>		

## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Describe DNA, genes and chromosomes; and role of mutations in disease process.	Lectures	- Written Exams
1.2	Recognize the role of modern techniques of molecular genetics and their potential in clinical diagnosis.	Lectures	- Written Exams
<b>2.0</b>	<b>Skills</b>		
2.1	Apply subject-specific concepts and principles of genetics to inherited conditions.	- Lectures - Problem based learning.	- Written Exams
2.2	Analyze the information in a pedigree chart by applying the laws of inheritance.	- Lectures - Problem based learning.	- Written Exams
<b>3.0</b>	<b>Competence</b>		
3.1	Communicate concepts, principles and information effectively by oral, written and visual means with clarity and confidence.	- Group discussion - Lectures	- Written Exams - Presentation

### 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Mid-Term Exam	8 <sup>th</sup> Week	30%
2	Activity	Throughout the semester	10%
3	Final Exam	17 <sup>th</sup> /18 <sup>th</sup> Week	60%
4	Total		100%

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- Course instructors are available for individual consultation in their free time. They are usually full-time permanent members present on-campus from 8:00 am to 2:30 pm on all working days. Appointments can be made in person with the instructor through email etc. Days and time availability of each instructor are posted on their doors. Course instructors provide a range of academic and course management advice including course planning and its progression.
- Each student at the department of Clinical Laboratory Sciences has an academic adviser who is available for individual consultation and guidance. Appointments can be made in person with the instructor through email etc. Days and time availability of each adviser are posted on their doors. The academic adviser can provide support with time management, exam preparation, clarification of subject requirements, feedback on performance and dealing with personal issues as well.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	Terry A. Brown, Genomes 3. (2006). 3rd edition. Garland Science: New York. 711p
<b>Essential References Materials</b>	US National Library of Medicine /Genetics home reference <a href="https://ghr.nlm.nih.gov/">https://ghr.nlm.nih.gov/</a>
<b>Electronic Materials</b>	- <a href="https://ghr.nlm.nih.gov/chromosome">https://ghr.nlm.nih.gov/chromosome</a> - <a href="https://www.genome.gov/10000464/online-genetics-education-resources">https://www.genome.gov/10000464/online-genetics-education-resources</a>
<b>Other Learning Materials</b>	None

### 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Data show, Blackboard and A/V
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student's feedback on effectiveness of teaching and quality of courses.	Students	Indirect: Questionnaire Survey at the end of each semester.
Alignment map of course ILOs with that of program ILOs.	Development and accreditation committee	Direct: Student's Performance
Availability of learning resources, facilities and equipments related to each course.	Students and faculty	Indirect: Questionnaire Survey at the end of each semester.
Evaluation of teaching	Peer evaluators	Direct: Peer evaluation
Standard of student achievement	Examination Committee	Direct: Students grades
Periodical review of course effectiveness and planning for its improvement.	Teaching staff/ Development and accreditation committee	Indirect: Review by Department Committee

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

Council / Committee	Department Meeting
Reference No.	Meeting No.10
Date	10-9-1440

