

# BMS3005: MEDICAL GENETICS

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## Effective Term

Semester A 2025/26

## Part I Course Overview

### Course Title

Medical Genetics

### Subject Code

BMS - Biomedical Sciences

### Course Number

3005

### Academic Unit

Biomedical Sciences (BMS)

### College/School

College of Biomedicine (BD)

### Course Duration

One Semester

### Credit Units

3

### Level

B1, B2, B3, B4 - Bachelor's Degree

### Medium of Instruction

English

### Medium of Assessment

English

### Prerequisites

Nil

### Precursors

Nil

### Equivalent Courses

Nil

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

This course aimed to provide students with an understanding of advanced genetics and biology at molecular levels. This course focuses on the fundamental principles in human medical genetics; including the genetic and genomic information,

transmission of genetic information and DNA technologies, as well as the significance of genetics in pathological conditions (e.g. genetic diseases). The concepts will be illustrated using relevant examples in different areas, e.g. hereditary disorders will be highlighted. The practical sessions are designed to train students the fundamental laboratory skills for genetic diagnostics.

### Course Intended Learning Outcomes (CILOs)

CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1 Identify the structure of genetic material, chromosomes and the human genome		x		
2 Explain the various mutations and genetic abnormalities which can result in genetic diseases			x	
3 Apply recombinant DNA technology for research and medical use, including Genetic modification or transgenesis that involves creating artificial genetic material for repairing genetic disorders			x	
4 Criticize the literature in Medical Genetics, extract relevant information and integrate new information with current knowledge			x	x
5 Use selected DNA technologies and gene cloning applications, genomic libraries, Southern and Northern blotting, Next Generation Sequencing (NGS), DNA sequencing including high throughput sequencing and DNA restriction mapping for molecular diagnosis			x	x

#### A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

#### A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

#### A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

### Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lectures and tutorials	Teaching and learning based on a combination of lectures and tutorials to explain the fundamental principles in human medical genetics, expression of genetic information, transmission of genetic information and molecular diagnosis of genetic diseases	1, 2, 3, 4	
2	Lab Practical		2, 3, 4, 5	

#### Additional Information for LTAs

Under the latest guidelines on the use of generative artificial intelligence tools in learning and teaching (effective Semester A, 2025/26), GenAI tools are allowed in formative assessment tasks. For this reason, the powerpoint presentation materials for tutorials, including powerpoint slides, can be generated by GenAI tools. In addition, lab reports, in particular the parts including literature search / introduction and discussion, can be generated by GenAI.

#### Assessment Tasks / Activities (ATs)

ATs		CILO No.	Weighting (%)	Remarks ("- " for nil entry)	Allow Use of GenAI?
1	Lab practical sessions and reports	1, 2, 3	20	-	Yes
2	Medical case studies and group presentation	3, 4	20	-	Yes

#### Continuous Assessment (%)

40

#### Examination (%)

60

#### Examination Duration (Hours)

2

#### Minimum Continuous Assessment Passing Requirement (%)

40

#### Minimum Examination Passing Requirement (%)

40

#### Additional Information for ATs

Minimum Passing Requirement : A minimum of 40% in coursework as well as in examination. Please note that attendance in all practical sessions is mandatory for the completion of the course. Practical sessions are an integral part of the curriculum, providing hands-on learning experiences and essential for medical laboratory science training. Failure to attend practical sessions (an unauthorized absence and/or lateness) may result in a deduction of marks or, in extreme cases, may lead to failure in the course.

**Assessment Rubrics (AR)**

**Assessment Task**

1. Lab practical sessions + reports

**Criterion**

To test students' application of material taught in class and evaluate their knowledge and skills based on their performance in lab practical

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

2. Medical case studies and group presentation

**Criterion**

Challenges students to collaborate, communicate and work together to solve problems

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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**Assessment Task**

3. Written Examination

**Criterion**

To test students' application of material taught in class and evaluate their knowledge.

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not even reaching marginal levels

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## Part III Other Information

### Keyword Syllabus

- Chromosome structure
- The genetic code
- Mutagens and mutagenesis
- Mutations
- Gene inheritance
- Genetic disorders
- DNA analysis
- Molecular Diagnosis of gene disorders
- Molecular Diagnosis methods and practical skills
- Cytogenetic
- Clinical genetic
- Treatment of genetic diseases
- Ethical issues

### Reading List

#### Compulsory Readings

Title	
1	Genetics in medicine. By Thompson & Thompson, 8th edition
2	Medical Genetics. By Jorde, Carey & Bamshad. 4th edition.

#### Additional Readings

Title	
1	Nil