COURSE SPECIFICATION

(Genetic and Quantitative Analysis of Stem Cell Biology)

Faculty of Medicine– Mansoura University

(A) Administrative information

(1) Programme offering the course:	Postgraduate PhD degree of Regenerative Medicine/ RMD
(2) Department offering the programme:	Inter-departmental Faculty of Medicine
(3) Department responsible for teaching the course:	Clinical Pathology Department
(4) Part of the programme:	Second part (Semester VI)
(5) Date of approval by Faculty council	9/8/2016
(6) Date of last approval of programme specification by Faculty council	9/8/2016
(7) Course title:	Genetic and Quantitative Analysis of Stem Cell Biology
(8) Course code:	RMD630BS5
(9) Total credit hours:	4 Theoretical + 1.5 Laboratory/Practical + 0.5 field work

(B) Professional information

(1) Course Aims:

The broad aims of the course are as follows:

This course provide students with knowledge about genomic technologies and systems biology approaches for studying stem cells.

1- Students will understand:
   - classical genetic approaches to stem cell biology in model organisms
   - gene regulatory mechanisms determining key events such as the switch between proliferation and differentiation
   - functional methods to identify and target genes relevant to stem cell fate
   - strategies to manipulate stem cells on a molecular basis
   - the principles of systems biology approaches versus conventional strategies

2- Students will also be familiar with methods for the analysis of quantitative biological data. The module will introduce methods from computational biology and biostatistics for the analysis of small and large experimental datasets, focussing on methods for the analysis of molecular biology and genetics data. Students will be able to:
   - perform statistical analysis of experimental data
   - analyze large-scale biological datasets (such as genome wide measurements or sequencing data)
   - understand data integration and modeling techniques for the system-level analysis of biological processes.

(2) Intended Learning Outcomes (ILOs):

A- Knowledge and Understanding:

On successful completion of the programme, the candidate will be able to:

A1: Explain the chemistry that underlies molecular reactions in cells and the techniques used to investigate them.

A2: Describe the cell structure, gene structure, replication, expression, inheritance, evolution and relevant experimental methods of analysis;

A3: Illustrate the principles and recent advances in molecular genetics and its applications.

A7: Mention principles of stem cells research and technology.

B- Intellectual skills:

On successful completion of the programme, the candidate will be able to:

B1: Analyze and solve problems related to molecular biology and genetics.

B8: Identify different types of stem cells and their different capacities.

C- Professional/practical skills:

On successful completion of the programme, the candidate will be able to:

C1: Practice appropriate laboratory skills, including safe working practices where relevant.

C3: Isolate, characterize, culture and transdifferentiate stem cells.

D- Communication & Transferable skills:

On successful completion of the programme, the candidate will be able to:

D1: Communicate effectively using a variety of formats.

D2: Use effectively a range of information sources.

D3: Organize and present intellectual argument commensurate with the level of award.

D4: Work effectively both alone (e.g. on assignments or during the project) and as part of a team (e.g. in group work, during group discussions and workshops).

D5: Demonstrate key skills in the retrieval, preparation, analysis and interpretation of information from different sources.

D6: Acquire continued self-managed professional development.

D7: Apply the principle of reflective practice.

(3) Course content:

Subjects	Lectures	Clinical	Laboratory	Field	Total Hours
Genetic and Quantitative Analysis of Stem Cell Biology/ RMD630BS5			**15 weeks**		
1- Tools of Genetic Engineering-1 2- Tools of Genetic Engineering-2 3- Cloning of vectors 4- siRNA and mRNA 5- Methods of Gene transfer-1 6- Methods of Gene transfer-2 7- Screening methods-1 8- Screening methods-2 9- Expression of cloned genes 10- Detection of cloned genes 11- PCR 12- Microarray 13- DNA & Protein engineering 14- Applications of genetic engineering 15- Reprogramming of cells	4		1.5	0.5	6 hours

(4) Teaching methods:

4.1: Lectures

4.2: Practical lab work

(5) Assessment methods:

5.1: Exam Description

The final exam is composed of:

Two written exams (200 marks) 3 hours (Short Essay questions 2 hours 160 marks + MCQ 1 hour 40 marks)

Final Practical exam (OSPE) (100 marks): five stations exam.

Final oral exam (OSCE) (100 marks): five stations exam.

Percentage of each Assessment to the total mark:

Written exam: 50% Practical exam: 25% Oral exam: 25%

Other assessment without marks: seminars and log book activities.

5.2: Marks

Course/ code	Marks					
	Written Exam			Practical Exam	Oral Exam	Total
	Short Essay questions	MCQ	total			
Genetic and Quantitative Analysis of Stem Cell Biology/RMD630BS5	160	40	200	100	100	400

(6) References of the course:

Text books: Stem Cell from bench to bedside

(7) Facilities and resources mandatory for course completion:

Lecture halls and data show and MERC labs

Course coordinator: Dr. Mohamed Salama

Programme Director: Prof.Mohamed Sobh

Date: