King Saud University

College Of Science

Department of Biochemistry

**BCH 550** **– Molecular Biology of the Gene**

2nd Semester 1445 – 2024

* **Course Description**

The course provides a comprehensive coverage of the major topics in molecular biology including, review of genes and their structure, transcription, replication and translation in prokaryotic cell, eukaryotic cell and viruses. Cell differentiation and cell control of cell proliferation at the molecular level.

* **Objectives**

1. To provide a comprehensive understanding of eukaryotic genome, its structure, variations, functions, abnormalities and control of gene expression
2. To have an inclusive knowledge about the mechanisms damaging the genome, and the mechanisms that correct these defects in vivo and how these defects may lead to complex diseases such as cancer.
3. To acquire knowledge in epigenetic modification strategies.

* **Assessment**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Task** | **lecturer** | **Weight** | **Due date** | **Task** |
| Continuous assessment (60%) | Dr. Salman | 20 | Throughout the semester | Class discussion, paper review, short exam, homework or Assignment |
| Dr. Mohammed | 20 |
| Dr. Farid | 20 |
| Final exam (40%) | Dr. Salman | 13 | At the end of the section **or** Final examination period | Study material will be given for exam preparation |
| Dr. Mohammed | 13 |
| Dr. Farid | 13 |
| **Total** | | **100** | | |

* **Course Schedule**

1. The course is divided into 6 modules

|  |  |  |  |
| --- | --- | --- | --- |
| **Module** | **Topics** | **Instructor** | **week allocated** |
|  | Elements of DNA: genes, pseudo-genes transposable elements, repetitive DNA, etc. Eukaryotic and prokaryotic genome; Fundamental features of eukaryotic and prokaryotic genes | Dr. Farid | 2 weeks |
|  | The hallmarks of cancer- DNA damage sources.  Mutations- DNA repair mechanisms | Dr. Mohammad | 2 weeks |
|  | DNA repair defects in cancer developments  DNA repair pathways in cancer therapy and resistance | Dr. Mohammd | 3 weeks |
|  | Transcription: machinery and regulation (activators and repressors, histone modification, methylation). Epigenetic modification of the genome. Control of gene expression. RNA interference as a mechanism for control of gene expression, splicing and connections with human diseases. | Dr. Farid | 3 weeks |
|  | Translation: mechanisms, regulation, post-translational modifications | Dr. Salman | 2 weeks |
|  | Bioinformatics. | Dr. Salman | 2 weeks |

1. Two modules will be allocated to each instructor.
2. continuous assessments are left to the instructor
3. Course books are: left to instructors
4. The timetable divided into lectures given by lecturer.

**Lecture timetable**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Date** | **lecturer** | **Module** |
| **1** | **02/07/1445** | No lecture | **No lecture** |
| **2** | **09/07/1445** | Dr. Farid | **1** |
| **3** | **16/07/1445** | Dr. Farid | **1** |
| **4** | **23/07/1445** | Dr. Mohammed | **2** |
| **5** | **01/08/1445** | Dr. Mohammed | **2** |
| **6** | **08/08/1445** | Dr. Mohammed | **3** |
| **7** | **15/08/1445** | **اجازة منتصف الفصل** | |
| **8** | **22/08/1445** | Dr. Mohammed | **3** |
| **9** | **29/08/1445** | Dr. Mohammed | **3** |
| **10** | **07/09/1445** | Dr. Farid | **4** |
| **11** | **14/09/1445** | Dr. Farid | **4** |
|  | **اجازة رمضان** | | |
| **12** | **05/10/1445** | Dr. Farid | **4** |
| **13** | **12/10/1445** | Dr. Salman | **5** |
| **14** | **19/10/1445** | Dr. Salman | **5** |
| **15** | **26/10/1445** | Dr. Salman | **5** |
| **16** | **04/11/1445** | Dr. Salman | **5** |
| **17** | **11/11/1445** | No lecture | **No lecture** |
| **18** | **22-11-1445** | **Final Exam** | **Final Exam** |