MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| **Module Information**  **معلومات المادة الدراسية** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Module Title** | Molecular Biology and genomics | | | | **Module Delivery** | | |
| **Module Type** | Core | | | | * **☒ Theory** * **☐Lecture** * **☒ Lab** * **☐ Tutorial** * **☐ Practical** * **☐ Seminar** | | |
| **Module Code** | BID322 | | | |
| **ECTS Credits** | 5.00 | | | |
| **SWL (hr/sem)** | 125 | | | |
| **Module Level** | | 3 | **Semester of Delivery** | | | | 6 |
| **Administering Department** | | BID | **College** | BMIC | | | |
| **Module Leader** | Shaimaa Khalid Moufak | | **e-mail** | Shaimaa.khalid-bic@uoitc.edu.iq | | | |
| **Module Leader’s Acad. Title** | | Assistant Lecturer | **Module Leader’s Qualification** | | | | MSc |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | | | |
| **Peer Reviewer Name** | | omara.m | **e-mail** | omara.m@uoitc.edu.iq | | | |
| **Scientific Committee Approval Date** | | 18/06/2023 | **Version Number** | | | 1.0 | |

| **Relation with other Modules**  **العلاقة مع المواد الدراسية الأخرى** | | | |
| --- | --- | --- | --- |
| **Prerequisite module** | Genetics / BID313 | **Semester** | 5 |
| **Co-requisites module** |  | **Semester** |  |

| **Module Aims, Learning Outcomes and Indicative Contents**  **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية** | |
| --- | --- |
| **Module Objectivesc**  **أهداف المادة الدراسية** | 1. To introduce the molecules of life and how these molecules produce the building blocks of living systems; cells. 2. To identify techniques in molecular biology. 3. To identify the workflow of molecular biology. 4. To predict the DNA sequences based on base-pairing rules. 5. To differentiate the characteristics of DNA and RNA. 6. To identify the process of DNA replication and RNA transcription. 7. To emphasize the molecular mechanisms of DNA replication, repair, protein synthesis …. etc. |
| **Module Learning Outcomes**  **مخرجات التعلم للمادة الدراسية** | 1. Describe the basic structure and biochemistry of nucleic acids and proteins and discriminate between them. 2. Identify the principles of DNA replication, transcription and translation and explain how they relate to each other. 3. Describe the main principles of methods for preparation of DNA, such as DNA extraction, cloning, transformation and PCR, and analyses their applications. 4. Describe the main principles of methods for analysis of DNA, such as hybridization, restriction analysis and DNA sequencing and analyses their applications. 5. Build and interpret phylogenetic trees representing evolutionary relationships among organisms. 6. Describe and discuss applications of molecular biology, including the use of bioinformatics and genomics. |
| **Indicative Contents**  **المحتويات الإرشادية** | The module includes four main requirements that the student must complete in order to successfully pass the course.  1. Readings: Students must weekly read each lecture before presenting it in the classroom in order to be able to interact and discuss. The content of the course includes four main parts, and each part includes topics that are illustrated in weekly syllabus, which includes:  Part 1 – Introduction – What is Molecular Biology?  Part 2 – DNA, RNA and Protein  Part 3 – Genes, Genomes and DNA  Part 4 – DNA Replication  Part 5 – Transcription of Genes  Part 6 - Protein Structure, Function and synthesis … etc.  2. Discussion: We will use discussion as the main form of interaction in the class. Students’ responses to the weekly readings  3. Quiz: every lecture we will do a simple quiz (oral or writing) to enhance the students for more reading and follow up them.  4. Oral Presentations: this is very important to allow the students to learn how to do the slide and how to discuss many topics (theoretical or practical). |

| **Learning and Teaching Strategies**  **استراتيجيات التعلم والتعليم** | |
| --- | --- |
| **Strategies** | * Classes * Discussion * Brainstorming * Practical presentations * (Lab works) Practical |

| **Student Workload (SWL)**  **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا** | | | |
| --- | --- | --- | --- |
| **Structured SWL (h/sem)**  **الحمل الدراسي المنتظم للطالب خلال الفصل** | 64 | **Structured SWL (h/w)**  **الحمل الدراسي المنتظم للطالب أسبوعيا** | 4 |
| **Unstructured SWL (h/sem)**  **الحمل الدراسي غير المنتظم للطالب خلال الفصل** | 61 | **Unstructured SWL (h/w)**  **الحمل الدراسي غير المنتظم للطالب أسبوعيا** | 4 |
| **Total SWL (h/sem)**  **الحمل الدراسي الكلي للطالب خلال الفصل** | **125** | | |

| **Module Evaluation**  **تقييم المادة الدراسية** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **As** | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5 and 10 | LO #1, #2 and #6 |
| **Assignments** | 2 | 10% (10) | 2 and 12 | LO #3, #4 and #6 |
| **Projects / Lab.** | 1 | 10% (10) | Continuous | All |
| **Report** | 1 | 10% (10) | 13 | LO #2, #4 and #6 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #6 |
| **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) |  |  |

| **Delivery Plan (Weekly Syllabus)**  **المنهاج الاسبوعي النظري** | |
| --- | --- |
| **Week** | **Material Covered** |
| **Week 1** | Introduction – What is Molecular Biology? |
| **Week 2** | DNA, RNA and Protein |
| **Week 3** | Genes, Genomes and DNA |
| **Week 4** | DNA Replication |
| **Week 5** | Transcription of Genes |
| **Week 6** | Protein Structure, Function and synthesis |
| **Week 7** | DNA replication steps in prokaryote and eukaryote organisms |
| **Week 8** | Mid-term Exam |
| **Week 9** | Nucleic Acids: Isolation, Purification, Detection, and Hybridization |
| **Week 10** | The Polymerase Chain Reaction |
| **Week 11** | Genomics and DNA Sequencing |
| **Week 12** | The differences between genetics and genomics |
| **Week 13** | Proteomics: The Global Analysis of Proteins |
| **Week 14** | The differences between genomics and proteomics |
| **Week 15** | Discussion |

| **Delivery Plan (Weekly Lab. Syllabus)**  **المنهاج الاسبوعي للمختبر** | |
| --- | --- |
| **Week** | **Material Covered** |
| **Week 1** | Introduction Molecular Biology |
| **Week 2** | Introduction Molecular Biology (quiz and discussion) |
| **Week 3** | Explain DNA extraction; Organic, Magnetic beads, silica based column. |
| **Week 4** | DNA extraction; Organic, Magnetic beads, silica based column (practical) |
| **Week 5** | Explain of RNA extraction methods |
| **Week 6** | RNA extraction methods (practical) |
| **Week 7** | Mid practical exam |
| **Week 8** | Explain of Agarose Gel Electrophoresis |
| **Week 9** | Agarose Gel Electrophoresis (practical) |
| **Week 10** | What is PCR? What is needed in PCR? |
| **Week 11** | What is PCR? What is needed in PCR? (practical) |
| **Week 12** | What is RT-PCR? The importance of detector |
| **Week 13-14** | RT-PCR? The importance of detector (practical) |
| **Week 15** | Review |

| **Learning and Teaching Resources**  **مصادر التعلم والتدريس** | | |
| --- | --- | --- |
|  | **Text** | **Available in the Library?** |
| **Required Texts** | 1. MOLECULAR BIOLOGY, David Clark, 2005. 2. Principles of gene manipulation and genomics, seventh edition, S.B. Primrose and R.M. Twyman, 2006.   3. Genetic Techniques for biological research  A CASE STUDY APPROACH, Corinne A. Michels   1. Introduction to genetics   A MOLECULAR APPROACH, Terry Brown GS Garl and Science.   1. Molecular Biology, David P. Clark Nanette J. Pazdernik. | No |
| **Required Texts** | GENOMES 3, T. A. Brown, Third Edition, 2007. |  |
| **Recommended Texts** | Introduction to medical and molecular biology, Asklepios  Bratislava , 2010 | No |
| **Websites** | <https://www.coursera.org/search?query=molecular%20biology&=null&index=prod_all_launched_products_term_optimization> | |

| **Grading Scheme**  **مخطط الدرجات** | | | | |
| --- | --- | --- | --- | --- |
| **Group** | **Grade** | **التقدير** | **Marks %** | **Definition** |
| **Success Group**  **(50 - 100)** | **A -** Excellent | **امتياز** | 90 - 100 | Outstanding Performance |
| **B -** Very Good | **جيد جدا** | 80 - 89 | Above average with some errors |
| **C -** Good | **جيد** | 70 - 79 | Sound work with notable errors |
| **D -** Satisfactory | **متوسط** | 60 - 69 | Fair but with major shortcomings |
| **E -** Sufficient | **مقبول** | 50 - 59 | Work meets minimum criteria |
| **Fail Group**  **(0 – 49)** | **FX –** Fail | **راسب (قيد المعالجة)** | (45-49) | More work required but credit awarded |
| **F –** Fail | **راسب** | (0-44) | Considerable amount of work required |
|  |  |  |  |  |
| **Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. | | | | |