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| | Ministry of Higher Education and Scientific Research - Iraq<br>University of Technology<br>Biomedical Engineering Department | |

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
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| **Module Title** | **Biochemistry** | | | **Module Delivery** | |
| **Module Type** | **M.B** | | | ☒**Theory**<br>☒**Lecture**<br>☒**Lab**<br>☐**Tutorial**<br>☐**Practical**<br>☐**Seminar** | |
| **Module Code** | **BIOC112** | | | | |
| **ECTS Credits** | **7** | | | | |
| **SWL (hr/sem)** | **175** | | | | |
| **Module Level** | First year | | **Semester of Delivery** | 1 | |
| **Administering Department** | Type Dept. Code | | **College** | Type College Code | |
| **Module Leader** | Asst. Prof. Dr. Sabah Saad Abdulsahib | | **e-mail** | Sabah.s.abdulsahib@uotechnology.edu.iq | |
| **Module Leader's Acad. Title** | Assistant Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | Name | | **e-mail** | E-mail | |
| **Scientific Committee Approval Date** | 01/06/2023 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
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| **Prerequisite module** | None | **Semester** | |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
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| **Module Aims**<br>أهداف المادة الدراسية | 1. Knowledge and understanding<br>a. Basic principles in chemistry related to the structure and process in living system.<br>b. Theoretical and principles of structure, functions of biomolecules and its role in living process.<br>c. Concepts and theory of chemical reactions in living organisms.<br>d. The role of biochemistry in the understanding of living systems and sciences.<br>2. Ability/intellectual skill<br>a. To do and report research in biochemistry fields.<br>b. To formulate and prove hypothesis in biochemistry field<br>c. To integrate and evaluate the information and data in biochemical process of living organisms from many sources<br>3. Practical skill<br>a. To analyses the results of experiments in biochemistry fields and adjust the validity.<br>b. To use Scientifics references and to make lecture note effectively.<br>c. To make and produce technical services in scientific manner.<br>4. Managerial and transferable skill<br>a. Good and effectively communications either in writing, oral or drawing.<br>b. To apply the principles of mathematics and chemistry in biology.<br>c. To work together in the group.<br>d. To apply and integrate the biochemistry in biology and its branches.<br>e. To manage the time and resources effectively and efficiently.<br>5. Attitude<br>a. Curiosity.<br>b. Respect to the originality ideas, concepts and other findings.<br>c. Attention and respect to other opinions and comments. |

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| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | By the end of the course, students should be able to:<br>1. Describe the structure and properties of carbohydrates, lipids and proteins of biological importance.<br>2. Describe the structure of cell membrane and point out its importance.<br>3. Describe the chemistry of nucleotides and nucleic acids.<br>4. Point out the processes of replication, transcription and translation.<br>5. Describe the primary catabolic and anabolic pathways pertaining to the following molecular classes:<br>a. Carbohydrates<br>b. Fats and lipids<br>c. Amino Acid. |
| **Indicative Contents**<br>المحتويات الإرشادية | This module covers principal of biochemistry as the basic understanding of molecular phenomena of life such as hierarchy of living materials, structures and functions of living molecules: carbohydrates, proteins, lipids, nucleic acids, vitamins and hormones. The teaching and learning course contain of the following topics:<br>1- Cell structure.<br>2- Chemistry of carbohydrate, lipid, protein and Nucleic acid.<br>3- Enzymes.<br>4- Vitamins.<br>5- Hormones.<br>6- Metabolism.<br><br>Students will also carry out experiments. |

| **Course Description** | |
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| **Course Description** | The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of assignments involving some problem solving that are interesting to the students. |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
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| **Strategies** | Lectures and practical work in the classroom. This module will be delivered as underpinning lectures followed by a series of tutorials where extensive use of case studies will be made.<br>Case studies will be provided prior to the tutorial sessions. Tutorials will use indicative lists of questions to guide student learning. It is expected that the case study will be completed before the tutorial. Therefore, the tutorial will engage active discussion on individual and group findings. Case studies will be part of the final year assessment and therefore attendance at tutorials is strongly encouraged. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا | | | |
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| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 91 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 200 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
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| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5, 10 | LO #1, 2, 10 and 11 |
| | **Assignments** | 2 | 10% (10) | 2, 12 | LO # 3, 4, 6 and 7 |
| | **Projects / Lab.** | 1 | 10% (10) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO # 5, 8 and 10 |
| **Summative assessment** | **Midterm Exam** | 2 hr | 10% (10) | 7 | LO # 1-7 |
| | **Final Exam** | 2hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
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| | **Material Covered** |
| **Week 1** | Introduction to biochemistry, Cell, Cell components. |
| **Week 2** | Carbohydrates: Monosaccharide. |
| **Week 3** | Carbohydrates: Disaccharide. |
| **Week 4** | Carbohydrates: Oligosaccharide, Polysaccharide. |
| **Week 5** | Carbohydrates: Carbohydrate metabolism, Biomedical importance of carbohydrates. |
| **Week 6** | Lipids: Lipids classification. |
| **Week 7** | Mid-term Exam 1 |
| **Week 8** | Lipids: Lipid metabolism, Medical and biological importance of lipids. |
| **Week 9** | Proteins: Classification of amino acids, Levels of protein structure. |
| **Week 10** | Proteins: Cellular functions of proteins, Biosynthesis of amino acids, Catabolism of proteins, Medical and biological importance of proteins. |
| **Week 11** | Nucleic acids: DNA. |
| **Week 12** | Nucleic acids: RNA. |
| **Week 13** | Enzyme |
| **Week 14** | Vitamins, Hormones. |
| **Week 15** | Mid-term Exam 2 |
| **Week 16** | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
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| | **Material Covered** |
| **Week 1** | Lab1:Introduction to biochemistry lab. |
| **Week 2** | Lab2: Carbohydrates tests |
| **Week 3** | Lab3: lipids tests |
| **Week 4** | Lab4: amino acids tests |
| **Week 5** | Lab5: proteins tests |
| **Week 6** | Lab6: Enzyme tests |
| **Week 7** | Lab7: Vitamins, Hormones tests |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
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| | **Text** | **Available in the Library?** |
| **Required Texts** | 1- Rodwell, V. W., Bender, D. A., Botham, K. M., Kennelly, P. J., and Weil, P. A. (2018). Harper's illustrated biochemistry (31st edition). New York, McGraw-Hill Education.<br>2- Nelson, D. L., and Cox, M. M. (2017). Lehninger principles of biochemistry (7th edition). New York, W.H. Freeman. | No |
| **Recommended Texts** | 1- Garrett, R. H., and Grisham, C. M. (2016). Biochemistry (6th edition). Belmont, Brooks Cole, Cengage Learning.<br>2- Lodish, H., Berk, A., Kaiser, C. A., Krieger, M., Bretscher, A., Ploegh, H., Amon, A., and Martin K. C. (2016). Molecular Cell Biology (8th edition). New York, W.H. Freeman.<br>3- Mathews, C. k., van Holde, K. E., Appling, D. R., and Anthony-Cahill, S. J. (2012). Biochemistry (4th edition). Pearson Education.<br>4- Berg, J. M., Tymoczko, J. L., and Stryer, L. (2010). Biochemistry (7th edition). New York, W.H. Freeman. | No |
| **Websites** | https://www.coursera.org/search?query=biochemistry& | |

| Grading Scheme<br>مخطط الدرجات | | | | |
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| **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 |
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**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.