MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| **Module Information**  **معلومات المادة الدراسية** | | | | | | | |
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| **Module Title** | Fundamentals of Organic Chemistry | | | | **Module Delivery** | | |
| **Module Type** | Core | | | | * **☒ Theory** * **☐ Lecture** * **☒ Lab** * **☐ Tutorial** * **☐ Practical** * **☐ Seminar** | | |
| **Module Code** | ITC320100 | | | |
| **ECTS Credits** | 4.00 | | | |
| **SWL (hr/sem)** | 100 | | | |
| **Module Level** | | 2 | **Semester of Delivery** | | | | 3 |
| **Administering Department** | | BID | **College** | BMIC | | | |
| **Module Leader** | M.Sc. Omar A. & M.Sc. Ali Hikmat | | **e-mail** | omara.m@u uoitc.edu.iq , ali.hikmat-bic@uoitc.edu.iq | | | |
| **Module Leader’s Acad. Title** | | Assistant Lecturer | **Module Leader’s Qualification** | | | | MS.c. |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | | | |
| **Peer Reviewer Name** | | jwan k alwan | **e-mail** | jwanism@uoitc.edu.iq | | | |
| **Scientific Committee Approval Date** | | 18/06/2023 | **Version Number** | | | 1.0 | |

| **Relation with other Modules**  **العلاقة مع المواد الدراسية الأخرى** | | | |
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| **Prerequisite module** | General Chemistry / BID112 | **Semester** | 1 |
| **Co-requisites module** | Mathematics II / BID121 | **Semester** | 2 |

| **Module Aims, Learning Outcomes and Indicative Contents**  **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية** | |
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| **Module Aims**  **أهداف المادة الدراسية** | 1. To provide students with a basic understanding of organic chemistry. 2. To provide a fundamental vision at organic chemical bonding, structure, reactivity, mechanism and synthesis of simple functional groups. 3. Students will study nomenclature of organic compounds 4. Understand the structure and the properties of organic compounds 5. The structure, properties and reactivity of molecules of biological importance and of organic macromolecules including synthetic polymers. |
| **Module Learning Outcomes**  **مخرجات التعلم للمادة الدراسية** | 1. Understanding and awareness of different reactions in organic chemistry and why and how they take place. 2. Understanding the structure, shape, properties and reactivity of organic molecules including their acidity, mechanisms and reactions. 3. Drawing of organic structures. Orbitals, sigma and pi bonding, shape, hybridization, stereochemistry, isomerism, conformation. 4. Have a basic understanding of mechanisms and their stereochemical consequences of nucleophilic substitution, elimination, electrophilic additions/substitutions, oxidations and reduction. 5. Mechanism and curly arrows, electrophiles, nucleophiles, radicals 6. Substitution mechanisms, SN1, SN2 7. Addition reactions 8. Elimination reactions and chemistry of alkenes and alkynes 9. Chemistry of alcohols, ethers, amines, oxidation and reduction 10. Hydrolysis reactions 11. Organic compounds are all around us. Many modern materials are at least partially composed of organic compounds They’re foundational to the fields of biochemistry, biotechnology, and medicine. |
| **Indicative Contents**  **المحتويات الإرشادية** | 1. How To Draw a Lewis Structure 2. How To Determine the Relative Acidity of Protons 3. How To Name an organic compounds Using the IUPAC System 4. Mechanisms are the key to understanding the reactions of organic chemistry. For this reason, great care has been given to present mechanisms in a detailed, step-by-step fashion. 5. Applications make any subject seem more relevant and interesting—for nonmajors and majors alike. The most important biological, medicinal, and environmental applications that have been integrated throughout Organic Chemistry. |

| **Learning and Teaching Strategies**  **استراتيجيات التعلم والتعليم** | |
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| **Strategies** | The main strategy: 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 simple experiments involving some sampling activities that are interesting to the students. |

| **Student Workload (SWL)**  **الحمل الدراسي للطالب** | | | |
| --- | --- | --- | --- |
| **Structured SWL (h/sem)**  **الحمل الدراسي المنتظم للطالب خلال الفصل** | 63 | **Structured SWL (h/w)**  **الحمل الدراسي المنتظم للطالب أسبوعيا** | 4 |
| **Unstructured SWL (h/sem)**  **الحمل الدراسي غير المنتظم للطالب خلال الفصل** | 37 | **Unstructured SWL (h/w)**  **الحمل الدراسي غير المنتظم للطالب أسبوعيا** | 2 |
| **Total SWL (h/sem)**  **الحمل الدراسي الكلي للطالب خلال الفصل** | 100 | | |

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

| **Delivery Plan (Weekly Syllabus)**  **المنهاج الاسبوعي النظري** | |
| --- | --- |
| **Week** | **Material Covered** |
| **Week 1** | What is Organic Chemistry, drawing of organic structures. Orbitals, sigma and pi bonding, shape |
| **Week 2** | hybridization, stereochemistry, isomerism, conformation. |
| **Week 3** | Cation/anion stability, resonance, delocalization, acidity, basicity, pKa |
| **Week 4** | Brønsted–Lowry acids and bases, reactions of Brønsted– Lowry acids and bases-Acid strength and pKa, Predicting the outcome of acid–base reactions, Factors that determine acid strength, Common acids and bases, Lewis acids and bases |
| **Week 5** | Functional groups  -An overview of functional groups  -Intermolecular forces  -Physical properties  -Application: Application: The cell membrane  -Vitamins |
| **Week 6** | * Nomenclature of alkanes * Alkyl halides. * Petroleum. |
| **Week 7** | * mid exam1 |
| **Week 8** | * Unsaturated Hydrocarbons Alkenes * Nomenclature of alkenes * Physical properties of alkenes. * Addition reactions: Halogenation, Hydrogenation * Markonikov’s rule * Aromatic compounds |
| **Week 9** | * Elimination reactions and chemistry of alkenes and alkynes |
| **Week 10** | * Chemistry of alcohols, ethers, amines, oxidation and reduction |
| **Week 11** | * Carbonyl chemistry, addition, substitution |
| **Week 12** | * Hydrolysis reactionsAldehydes and Ketones * Nomenclature of aldehydes & ketones * Physical properties of aldehydes and ketones. * Common aldehydes and ketones. * Oxidation of aldehydes and ketones. |
| **Week 13** | * carboxylic Acids and Esters * Nomenclature of carboxylic acids. * Physical properties of carboxylic acids. * Important carboxylic acids * Esters. Nomenclature of esters. * Important esters * Hydrolysis and saponification of esters |
| **Week 14** | * Amines and Amides * Classification and nomenclature of amines. * Physical properties of amines. * Formation of amides. |
| **Week 15** | * **Reveiw** |

| **Delivery Plan (Weekly Lab. Syllabus)**  **المنهاج الاسبوعي للمختبر** | |
| --- | --- |
| **Week** | **Material Covered** |
| **Week 1** | Lab 1: separation technique of organic chemistry : 1- filtrations |
| **Week 2 to 5** | Lab 2, 3, 4, 5: separation technique of organic chemistry : 2- sublimation |
| **Week 5 to 7** | Lab 5, 6, 7: separation technique of organic chemistry : 3- distillation |
| **Week 8-9** | Lab 8, 9: boiling point |
| **Week 10-11** | Lab 10, 11: melting point |
| **Week 12-13** | Lab 12, 13: Identification of alcohols and phenols |
| **Week 14** | Lab 14: Identification of aldehydes and ketones |
| **Week 15** | Presentations and Discussions |

| **Learning and Teaching Resources**  **مصادر التعلم والتدريس** | | |
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|  | **Text** | **Available in the Library?** |
| **Required Texts** | 1. Organic Chemistry Third Edition Janice Gorzynski Smith University of Hawai’i at Ma-noa 2. S. L. Seager & M. R. Slabaugh, Organic and Biochemistry for Today, 8th ed (2014) | No |
| **Recommended Texts** | 1. morrison & boyd - organic chemistry sixth edition 2002 2. Introduction to Stereochemistry, RSC Chemistry Student Guides, Clark, Kitson, Mistry, Taylor, Taylor, Akamune, Lloyd 3. For Maths skills component 4. Maths for Chemists, 2nd Ed., M. Cockett and G. Doggett, RSC Publishing. 5. Foundation Maths, 4th Ed., A. Croft and R. Davison, Pearson Prentice Hall. 6. Calculus with Analytical Geometry, 2nd Ed., G. F. Simmons, McGraw Hill. | No |
| **Websites** |  | |

| **Grading Scheme**  **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. | | | | |