MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| **Module Information**  **معلومات المادة الدراسية** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Module Title** | **Discrete Mathematics** | | | | **Module Delivery** | | |
| **Module Type** | Basic | | | | * **☒ Theory** * **☐ Lecture** * **☐ Lab** * **☒ Tutorial** * **☐ Practical** * **☐ Seminar** | | |
| **Module Code** | ITC320120 | | | |
| **ECTS Credits** | 3.00 | | | |
| **SWL (hr/sem)** | 75 | | | |
| **Module Level** | | 2 | **Semester of Delivery** | | | | 3 |
| **Administering Department** | | BID | **College** | BMIC | | | |
| **Module Leader** | Dr. Abdulqader Faris | | **e-mail** | [Dr.abdulkadir.faris@uoitc.edu.iq](mailto:Dr.abdulkadir.faris@uoitc.edu.iq) | | | |
| **Module Leader’s Acad. Title** | | Lecturer | **Module Leader’s Qualification** | | | | Ph.D. |
| **Module Tutor** | Asst. lect. Aseel Abbood | | **e-mail** | Aseel.abood-bic@uoitc.edu.iq | | | |
| **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** | | | |
| --- | --- | --- | --- |
| **Prerequisite module** | Mathematics I / BMI111 | **Semester** | 1 |
| **Co-requisites module** | None | **Semester** | None |

| **Module Aims, Learning Outcomes and Indicative Contents**  **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية** | |
| --- | --- |
| **Module Aims**  **أهداف المادة الدراسية** | This course has been designed as an introduction to discrete mathematics. The student enroll in this course should have a background in Set Theory. This course covers basic points in discrete mathematics.   1. Studying Propositional Logic, Conditional Statements, Truth Tables of Compound Propositions, Logical Equivalence. 2. Studying Introduction to Proofs, Methods of Proving Methods: Direct Proofs, Proof by Contraposition, Proofs by Contradiction. 3. Studying terminology – hand shaking theorem – types of graphs – paths –Chromatic number of graph – four color theorem - Euler and Hamilton paths and circuits and Trees. 4. Have the knowledge of the metric spaces –homeomorphisms examples- Compact spaces. 5. Have the knowledge of Boolean Algebras. |
| **Module Learning Outcomes**  **مخرجات التعلم للمادة الدراسية** | The student should to be able to:   1. Explain Propositional Logic, Conditional Statements, Truth Tables of Compound Propositions, Logical Equivalence, Constructing New Logical Equivalence, Rules of Inference 2. Analyze Introduction to Proofs, Methods of Proving. 3. Recognize and prove the Relations and Their Properties, Equivalence Relations 4. Prove hand shaking theorem – types of graphs – paths – Chromatic number of graph – four color theorem - Euler and Hamilton paths and circuits and Trees. 5. Demonstrate knowledge of the concepts of Introduction to Boolean Algebras |
| **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 two main parts, and each part includes a group of sections whose topics are illustrated in weekly syllabus, which includes:  **2. Discussion:** We will use discussion as the main form of interaction in the class. Students’ responses to the weekly readings, their individual assignments, and their thoughtful responses to their classmates' posts show their level of understanding. Their active participation in the discussions is the best way to get the most out of the course!  **3. Oral Presentations:** The purpose of this assignment is to allow students to explore a topic in more detail for each lecture and to share the results with their classmates. Each student is required to submit a short report in slideshow format (10 slides not including title and reference slides) on a topic relevant to one of the course lectures. The proposed topics are presented in the classroom, but the student can choose other related topics (but after the approval of the teacher). Presentations should be based on scientific sources of information (be sure to include an appropriate list of references). And we should delve deeper into an interesting topic for each section. Try to use non-text materials in your presentation (videos or online examples, tables, charts, and graphs) as a way to group and present the main ideas and themes. If some text is necessary, please limit it to very short paragraphs and bulleted lists. Although not a requirement, all presentations will be posted to Google Classroom and a resource for other class participants. The student is expected to answer the questions of his classmates.  **4.** **Project:** This assignment requires the submission of a project by a group of students within a team that employs all the theoretical concepts studied in the theoretical lectures, SQL topics, and advanced experience in dealing with complex SQL expressions to design and implement an EHR system in the real world. |

| **Learning and Teaching Strategies**  **استراتيجيات التعلم والتعليم** | |
| --- | --- |
| **Strategies** | The main strategy that will be adopted in the delivery of this module is to encourage students to participate in discussions, while improving and expanding their critical thinking skills. This will be achieved through discussions during the weekly lectures and after the oral presentations by answering the questions of their colleagues. Enhancing the principle of teamwork by participating in the implementation of the EHR system implementation project. |

| **Student Workload (SWL)**  **الحمل الدراسي للطالب** | | | |
| --- | --- | --- | --- |
| **Structured SWL (h/sem)**  **الحمل الدراسي المنتظم للطالب خلال الفصل** | 33 | **Structured SWL (h/w)**  **الحمل الدراسي المنتظم للطالب أسبوعيا** | 2 |
| **Unstructured SWL (h/sem)**  **الحمل الدراسي غير المنتظم للطالب خلال الفصل** | 42 | **Unstructured SWL (h/w)**  **الحمل الدراسي غير المنتظم للطالب أسبوعيا** | 3 |
| **Total SWL (h/sem)**  **الحمل الدراسي الكلي للطالب خلال الفصل** | 75 | | |

| **Module Evaluation**  **تقييم المادة الدراسية** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **As** | | **Time/**  **Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (20) | 4,10 | LO #1-3 |
| **Project Assignment** | 2 | 10% (10) | 12 | LO # 3,4 and 5 |
| **Attendance and interaction** | 1 | 10%(10) | Continues | All |
| **Seminar** | 1 | 10% (10) | The student chooses the week and the topics | All |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 9 | LO # 1-3 |
| **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) |  |  |

| **Delivery Plan (Weekly Syllabus)**  **المنهاج الاسبوعي النظري** | |
| --- | --- |
| **Week** | **Material Covered** |
| **Week 1** | Mathematical logic, Logical- Logical statements - |
| **Week 2** | The effects of truthfulness and falsehood in the logical statement |
| **Week 3** | Introduction to Proofs - Proof Methods |
| **Week 4** | Direct proof - proof by positive opposite - proof by contradiction - proof by counterexample |
| **Week 5** | Introduction to set theory and the set operation |
| **Week 6** | Types of relations on sets and their properties - |
| **Week 7** | equivalence relationship and equivalence classes |
| **Week 8** | Function on sets, the inverse image of sets, and show the different with respect to relations |
| **Week 9** | **Midterm Exam** |
| **Week 10** | Graphic theory: defining terms |
| **Week 11** | Graphic types - Paths - Cycles - Trees – Paths |
| **Week 12** | Euler and Hamiltonian cycles |
| **Week 13** | Chromatic number for drawing – theory The four colors. |
| **Week 14** | Introduction to groups theory, subgroup, cyclic group, example of group |
| **Week 15** | Introduction to number theory |

| **Learning and Teaching Resources**  **مصادر التعلم والتدريس** | | |
| --- | --- | --- |
|  | **Text** | **Available in the Library?** |
| **Required Texts** | Discrete Mathematics and Its Application, Kenneth H. Rosen, 2007 | Yes |
| **Recommended Websites** | <https://people.cs.pitt.edu/~milos/courses/cs441/>  <https://home.iitk.ac.in/~arlal/book/mth202.pdf> | |

| **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. | | | | |