Academic Course Specification Form

استمارة توصيف المقرر الأكاديمي

القسم الخاص بالطالب
Section Concerning the Student

1. Course Code:	ITCS254-258	**1. رمز المقرر:**
2. Course Title	Discrete Structures	**2. اسم المقرر:**
3. College:	Information Technology	**3. الكلية:**
4. Department:	Computer Science	**4. القسم:**
5. Academic Program:	B.Sc. in Computer Science B.Sc. in Software Engineering	**5. البرنامج الأكاديمي:**
6. Course Credits:	3-0-3	**6. عدد الساعات المعتمدة:**
7. Course NQF Level:	6	**7. مستوى المقرر وفقا للإطار الوطني للمؤهلات:**
8. Notional Hours:		**8. عدد الساعات الافتراضية:**
9. NQF Credits:	12	**9. عدد الساعات المعتمدة للمقرر وفقا للإطار الوطني للمؤهلات:**
10. Prerequisite:	ITCS106 & MATHS 101	**10. المتطلب السابق للمقرر:**
11. Lectures Timing & Location:		**11. وقت المحاضرة ومكانها:**
12. General Mode of Teaching and Learning	Traditional تقليدي	**12. النمط العام للتعليم والتعلّم:**

13. Course Coordinator:	Dr. Amine Mahjoub	**13. منسّق المقرر:**
14. Course Instructor:	Dr. Amine Mahjoub	**14. مدرّس المقرر:**
15. Office Hours and Location:	UT: 12h, M: 12h S40-2055	**15. الساعات المكتبية ومكانها:**
16. Instructor's Email:	amahjoub@uob.edu.bh	**16. البريد الإلكتروني لمدرّس المقرر:**
17. Academic Year:	2025-2026	**17. السنة الأكاديمية:**
18. Semester:	Second Semester الفصل الثاني	**18. الفصل الدراسي:**

19. Changes introduced to the course based on the results of the Course Evaluation Surveys (where applicable):	**19. التغييرات التي أُدخلت على المقرر استنادًا إلى نتائج استبانات تقييم المقررات الدراسية (إن وُجدت):**
More exercises and applications	
20. Textbook(s):	**20. الكتب الدراسية للمقرر:**
Rosen, Kenneth H., Discrete Mathematics and Its Applications, 8th Edition, McGraw-Hill, 2019	
21. References:	**21. المراجع:**
Susanna S. Epp, Discrete Mathematics with Applications, 5th edition, Cengage, 2020 Richard Johnonbaugh, Discrete mathematics, 8th edition, Prentice Hall, 2018	
22. This course covers basic discrete structures that are the backbones of computer science. Topics include logic, predicate calculus, proofs, sets, relations, recurrence relations, graphs, and trees.	**22. مصادر التعلّم الأخرى (مثال: التعلّم الإلكتروني، زيارات ميدانية، دوريات، برمجيات، إلخ....)**
LaTeX Typestting Blackboard (e-Learning) MS Teams (Communication)	
23. Course Description (as published in the College Catalogue):	**23. توصيف المقرر (حسب ما ورد في دليل الكلية):**
This course covers basic discrete structures that are the backbones of computer science. Topics include logic, predicate calculus, proofs, sets, relations, recurrence relations, graphs, and trees.	
24. Course Intended Learning Outcomes (3 to 5 CILOs):	**24. مخرجات التعلّم للمقرر (CILOs) (3 إلى 5 مخرجات تعلّمية):**
1. Apply logic and predicates to relate knowledge.	
2. Apply proof techniques to solve mathematical problems.	
3. Explain properties of relations and relate equivalence relations.	
4. Solve problems involving recurrence relations.	
5. Explain the basic properties and concepts of graphs and trees.	

25. Course Assessment Percentages (as per Regulations of Study and Examination at the University of Bahrain):		25. أساليب التقييم ونسبها المئوية (بحسب نظام الدراسة والامتحانات في جامعة البحرين):	
Assessment **التقييم**	**Type** **النوع**	**Percentage** **النسبة**	**Assessment Date** **تاريخ التقييم**
Tests (2)	Individual فردي	*40%*	*TBA*
Quizzes (4)	Individual فردي	*10%*	*TBA*
Home Assignments (2)	Pair ثنائي	*10%*	*TBA*
Final Exam	Individual فردي	*40%*	TBA
Total	**100%**		

26. Description of Topics Covered	26. وصف الموضوعات التي ينبغي تناولها:
Topic Title ***(e.g. chapter/experiment title)*** **الموضوع**	***Description*** **التفصيل**
Propositional Logic and Logic of Predicates. Chapter 1 (Sections 1.1, 1.3, 1.4 and 1.5).	In the first, the propositional logic and its properties and applications are studied. Then the predicate calculus is introduced with many applications.
Arguments, proofs, and inductions proofs. Chapter 1 (Sections 1.6, 1.7 and 1.8).	Introduce the rules of inferences and its application to prove the correctness of the arguments. Then study proofs techniques such as direct, contraposition, contradiction proofs and proofs by induction.
Sets and their properties. Chapter 2 (Sections 2.1 and 2.2).	The fundamental discrete structure on which all other discrete structures are built, namely, the set is introduced. Then the different application of the sets is presented.
Recurrence Relations. Chapter 8 (Section 8.2).	Finding solutions to recurrence relations using varieties of methods and techniques.
Relations. Chapter 9 (Sections 9.1 and 9.3)	Determine properties of relations and inspect various types of relations such as equivalence and partial order relations
Graphs and Trees. Chapter 10 (Sections 10.2 and 10.3) and Chapter 11 (Section 11.1).	Introduction to graph theory. Study graphs, graph terminology, representing graphs and graph Isomorphism. Then, study trees, rooted trees and properties of trees.

27. Weekly Schedule			27. الجدول الأسبوعي	
Week **الأسبوع**	**Date** **التاريخ**	**Topics Covered** **الموضوعات المتناولة**	**CILOs** **مخرجات التعلُّم للمقرر (CILOs)**	**Teaching/Assessment Mode and Method** **منهجية ونمط التدريس/التقييم**

1	2/8/2026	Chapter 1 Logic and Proofs 1.1: Propositional Logic	1	Tranditional تقليدي
2	2/15/2026	Chapter 1 Logic and Proofs 1.1: inverse, converse, contrapositive.	1	Tranditional تقليدي
3	2/22/2026	Chapter 1 Logic and Proofs 1.3: Propositional equivalences: truth table and identities.	1	Tranditional تقليدي
4	3/1/2026	Chapter 1 Logic and Proofs 1.4: Predicates and Quantifiers.	1	Tranditional تقليدي
5	3/8/2026	Chapter 1 Logic and Proofs 1.5: Nested Quantifiers.	1	Tranditional تقليدي
6	3/15/2026	Chapter 1 Logic and Proofs 1.6: Rules of Inference, Argument's validation: truth table, Inference Rules.	1	Tranditional تقليدي
7	3/22/2026	Chapter 1 Logic and Proofs 1.7: Proofs Direct, contrapositive, counter example.	2	Tranditional تقليدي
8	3/29/2026	Chapter 1 Logic and Proofs 1.7, 1.8: contradiction, proof by cases.	2	Tranditional تقليدي
9	4/5/2026	Chapter 2 Basic Structures: Sets 2.1, 2.2: Set Notation, set operations, and cardinality. Prove set equivalence and subset.	3	Tranditional تقليدي
10	4/12/2026	Chapter 5 Mathematical Induction: 5.1: Mathematical Review (proofs on recurrence relations, properties of summations, properties of divisibility).	2	Tranditional تقليدي
11	4/19/2026	Chapter 8 Solving Recurrence Relations: 8.2: Solving Homogeneous and Nonhomogeneous	4	Tranditional تقليدي

		Recurrence Relations with Constant Coefficients.		
12	4/26/2026	Chapter 9 Relations: 9.1: Relations properties. 9.3 Equivalence Relations.	3	Tranditional تقليدي
13	5/3/2026	Chapter 10 Graphs: Sec 10.2: Graph Terminology and Special Types of Graphs; 10.3: Representing Graphs and Graph Isomorphism.	5	Tranditional تقليدي
14	5/10/2026	Chapter 11 Trees: 11.1: Introduction to Trees – Rooted Trees and Properties of Trees.	5	Tranditional تقليدي
15	5/17/2026	Revision	1,2,3,4,5	Tranditional تقليدي
16	5/21/2026	Revision	1,2,3,4,5	Tranditional تقليدي

28. Academic Integrity Statement	**28. بيان النزاهة الأكاديمية**
Students are to observe the highest level of honesty and academic ethics in pursuit of their academic goals as per UOB Regulations of Student Conduct and Academic Integrity, Anti-plagiarism Policies, and Students' Rights and Responsibilities Handbook (available on the Bylaws, Regulations and Policies webpage). The consequences for cheating, plagiarism, unauthorized collaboration, and other forms of academic dishonesty can be very serious and will be dealt with as per the aforementioned policies and regulations.	يتعيّن على الطلبة الالتزام بأعلى مستويات الصدق والأمانة والأخلاق الأكاديمية في سعيهم لتحقيق أهدافهم الأكاديمية وفقًا للوائح سلوك الطلاب والنزاهة الأكاديمية، وسياسات مكافحة الانتحال، ودليل حقوق الطلبة وواجباتهم، المعمول بها في جامعة البحرين (والمتاحة على صفحة اللوائح والأنظمة والسياسات). يمكن لعواقب الغش والسرقة الأدبية والتعاون غير المصرّح به وغيرها من أشكال عدم الأمانة الأكاديمية أن تكون خطيرة للغاية، وسيتم التعامل معها وفقًا للسياسات واللوائح المذكورة آنفًا.
29. Attendance and Absence Regulations	**29. نظام الحضور والغياب**
Students are required to adhere to regular attendance for class lectures and practical sessions, as determined by the nature of the course, as per the Regulations of Study and Examination at the University of Bahrain, (available on the Bylaws, Regulations and Policies webpage).	يجب على الطلبة الالتزام بالحضور المنتظم للمحاضرات الصفية والعملية، حسبما تحدده طبيعة المقرر الدراسي، وذلك وفقًا لنظام الدراسة والامتحانات في جامعة البحرين، والمتاح على صفحة اللوائح والأنظمة والسياسات.