جامعة البحرين
University of Bahrain
مركز ضمان الجودة والاعتماد الأكاديمي
Quality Assurance and Accreditation Center

Academic Course Specification Form

استمارة توصيف المقرر الأكاديمي

القسم الخاص بالطالب
Section Concerning the Student

1. Course Code:	MATHS 205	1. رمز المقرر:
2. Course Title	Differential Equations	2. اسم المقرر:
3. College:	College of Science	3. الكلية:
4. Department:	Department of Mathematics	4. القسم:
5. Academic Program:	Bachelor of Science in Mathematics	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:	133	8. عدد الساعات الافتراضية:
9. NQF Credits	13	9. عدد الساعات المعتمدة للمقرر وفقا للإطار الوطني للمؤهلات:
10. Prerequisite:	MATHS 132	10. المتطلب المسبق للمقرر:
11. Lectures Timing & Location:	TBA	11. وقت المحاضرة ومكانها:
12. General Mode of Teaching and Learning	Tranditional تقليدي	12. النمط العام للتعليم والتعلّم:
13. Course Coordinator:	TBA	13. منسق المقرر:
14. Course Instructor:	TBA	14. مدرس المقرر:
15. Office Hours and Location:	TBA	15. الساعات المكتبية ومكانها:
16. Instructor's Email:	TBA	16. البريد الإلكتروني لمدرس المقرر:
17. Academic Year:	Click or tap here to enter text.	17. السنة الأكاديمية:
18. Semester:	First Semester الفصل الأول	18. الفصل الدراسي:

19. Textbook(s):	**19. الكتب الدراسية للمقرر:**
Fundamentals of Differential Equations by Nagle-Saff-Snider, 9th Edition, Pearson.	
20. References:	**20. المراجع:**
Elementary Differential Equations by Boyce-Diprima-Meade.	
21. Other learning resources used (e.g. e-Learning, field visits, periodicals, software, etc.):	**21. مصادر أخرى (مثال : التعلم الالكتروني، زيارات ميدانية، دورات، برامج كمبيوتر، الخ....)**
www.blackboard.uob.edu.bh	
22. Course Description (as published in the College Catalogue):	**22. توصيف المقرر(حسبما ورد في دليل الكلية):**
Differential equations of first order and their solutions. Separable and exact equations. Equations convertible to separable type. Higher order linear ODE's with constant coefficients (homogeneous and nonhomogeneous). Power series method for second order linear equations. Variation of parameters. Laplace transform techniques. Applications of differential equations.	
23. Course Intended Learning Outcomes (3 to 5 CILOs):	**23. مخرجات التعلّم للمقرر (CILOs) (3 إلى 5 مخرجات تعلّمية):**
1. Explain the basic concepts and terminologies of differential equations.	
2. Solve first order separable, exact, homogenous and linear differential equations and initial value problems.	
3. Solve ordinary differential equations of any order using variation of parameters, undetermined coefficients and power series methods	
4. Use Laplace transform techniques to solve differential equations.	
5. Apply differential equations techniques to solve real life problems.	
24. Course Assessment Percentages (As per Regulations of Study and Examination at the University of Bahrain):	**24. أساليب التقويم ونسبها المئوية (بحسب نظام الدراسة والامتحانات في جامعة البحرين):**
OTHERS🕭	20%
TEST#1	20%
TEST#2	20%
EXAM	40%
Total	**100%**
🕭 This assessment includes regular assignments, homework, or quizzes with a minimum of two assessments per semester. These assessments are usually conducted using e-learning tools such as Blackboard, WebAssign, and ALEKS.	

25. Description of Topics Covered: — **25. وصف الموضوعات التي ينبغي تناولها:**

Topic Title ***(e.g. chapter/experiment title)*** **الموضوع**	***Description*** **التفصيل**
Chapter1: Introduction	We introduce ordinary differential equations, initial value problems and partial differential equations. We define linear, nonlinear, homogeneous and nonhomogeneous DE. We treat the existence and unicity theorem for the solutions.
Chapter 2: First order Differential equations	We solve the first order separable, homogeneous, linear and exact DE. We present techniques of variation of parameters, integrating factors, and particular solutions to a nonhomogeneous equation.
Chapter 3: Mathematical Models and Numerical methods	Applications to DE include exponential growth, logistic equation and heating and cooling of buildings.
Chapter 4: Second order linear differential equations	We solve the second order linear DE with constant coefficients via the characteristic equation. We study techniques of variation of parameters, superposition principle and undetermined coefficients.
Chapter 6: Higher order DE	In this chapter, we generalize the techniques discussed in chapters 2 and 4 to linear differential equations of order 3 and higher.
Chapter 7: Laplace transformation	We define and then use Laplace transform and inverse Laplace transform to transform a given differential equation into an algebraic equation and then solve it algebraically.
Chapter 8: Series Solutions of Des.	We use power series expansions to solve ODEs. and IVPs.

26. Weekly Schedule				26. الجدول الأسبوعي:
Week الإسبوع	Date التاريخ	Topics Covered المواضيع المعروضة	CILOs المخرجات التعلُمية للمقرر (CILOs)	Teaching/Assessment Mode and Method منهجية ونمط التدريس/التقييم
01		1.1 Background 1.2 solution of IVP	1, 2 and 5	Traditional Teaching تدريس تقليدي
02		2.2 Separable DEs 2.3 Linear DEs	1, 2 and 5	
03		2.4 Exact DEs 2.5 Special integrating factors	1, 2 and 5	
04		2.6 Substitutions and transformations	1, 2 and 5	
05		3.2 Compartmental analysis 3.3 Heating and cooling of buildings	1, 2 and 5	
06		4.2 Homogeneous linear DEs	1, 3	
07		4.3 Auxiliary equations with complex roots	1, 3	
08		4.4 Undetermined coefficients 4.5 Superposition principle	1, 3	
09		4.6 Variation of parameters 4.7 Variable coefficients DEs	1, 3	
10		6.1 Basic theory 6.2 Homogeneous Linear with constant coefficients	1, 3	
11		6.3 Undetermined coefficients 6.4 Method of variation of parameters	1, 3	
12		7.2 Laplace Transform Definition 7.3 Properties of Laplace	1, 4	
13		7.4 Inverse Laplace Transform 7.5 Solving IVP with Laplace transform	1, 4	
14		8.3 Power series solutions to linear DEs	1, 4	
15		Revision	1, 2, 3, 4, 5	

27. Academic Integrity Statement:	27. 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. 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.	يعتبر الصدق والنزاهة عنصران أساسيان في العملية الأكاديمية. حيث يُتوقع من الطلاب خلال سعيهم لتحقيق أهدافهم الأكاديمية التحلي بالأمانة والأخلاق في جميع الأوقات، وذلك وفقًا للوائح والأنظمة الخاصة بطلبة جامعة البحرين، بالإضافة إلى دليل حقوق الطلبة وواجباتهم، وكما جاء في سياسة الانتحال الخاصة بجامعة البحرين. حيث سيتم التعامل مع أي انتهاك للنزاهة الأكاديمية بحسب ما تنص عليه السياسات والأنظمة السابق ذكرها.
28. Attendance and Absence Regulations:	**28. 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 Article (33), of Regulations of Study and Examination at the University of Bahrain.	يُتوقع من الطلاب الالتزام بالحضور المنتظم للساعات الصفية والعملية بحسب طبيعة المقرر، وفقًا للمادة (33)، من نظام الدراسة والامتحانات في جامعة البحرين.