Kingdom Saudi arbia
Ministry of Education
Jazan University
Faculty of Science
Mathematics Department

المملكة الرعبية السعودية
وزارة التعليم
جامعـــة جازان
كلية العلوم
قسم الرياضيات

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Course Title: Calculus 1

Course Code: Math 211

Course Coordinator: Dr. Ahmed Sedki Alhanafi

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Credit: 3

Textbook:

- J. Stewart, Calculus, Early Transcendentals, Sixth Edition, (2008).

Scientific References:

- Calculus, II. Anton, 8th Edition, John Wiley and Sons, (2005).
- Calculus, R. E. Larson, R. P. Hostetler, and B. H. Edwards, 7 Edition, Houghton Mifflin Company, (2002)
- Calculus, G. B. Thomas, Early Transcendentals, 11 Edition, Addition-Wesley, New York (2006)
- Calculus, E. Swokowski, M. Olinic, and D. Pence, 6 Edition, PWS Publishing Company, (1994)

Course Description:

- **The functions**: Definition, Types of functions, domain of the functions, graph of functions, composite functions, properties of functions, Inverse functions.
- **The Limits and continuity**: limit by definition, theorems, limits and continuity of trigonometric functions.
- **Derivatives of functions**: Techniques of differentiation, derivation rules, chain rule, implicit and parametric differentiation, higher derivatives.
- **Applications of differentiation:** The absolute and local maximum and minimum values of a function, Roll's Theorem, The Mean Value Theorem, critical points, increasing and decreasing, concavity, Infliction point, vertical and horizontal Asymptotes and graph of curves.

Learning Outcome:

After finishing the course, the student is expected to be familiar with the followings:

- recognize the importance of calculus in different branches of science and engineering
- Understand the basic rules of functions, limits, continuity, differentiation and its applications.
- Develop the student's logical thinking and providing students with skills necessary to solve problems functions, limits, continuity, differentiation and its applications.

Course Assessments:

- First and Second Midterm Exams
- Quizzes and Homework
- Web based work by Blackboard
- Final Exam

Methods of teaching the course:

- Classroom lectures
- Virtual lectures by blackboard
- Assign students to prepare scientific projects
- Scientific discussions on blackboard
- The use of mini-model of education

Course Description in details:

Chapter title	Topic/Activity	Exp.	Exer.	HW	Due to
Appendix A: Numbers, Inequalities, and Absolute Values	**Intervals, Inequalities, Absolute Value**	1-8	1,4,10,12, 26, 27,44 49, 52	3,6, 8,15, 22, 23, 24, 25, 34, 31, 32,36,37, 58,61	**First Week**
Appendix B: Coordinates Geometry	**Lines, Parallel and Perpendicular Lines**	1-8	3,9,22, 26, 28, 32, 34, 35,42	4,24, 31, 40	
Appendix D: Trigonomet	**Angles, The Trigonometric Functions, Trigonometric Identities, Graphics of the Trigonometric Functions**	**1-6**	**2, 9 ,30, 31, 50,**	**1, 4, 5, 8, 10, 29, 32, 33, 34, 46, 56**	

Ch1: Functions	**1.1 Four Ways to Represent a Function** **Definitions, The Vertical Line Test, Piecewise Defined Functions, Symmetry, Increasing and Decreasing Functions.**	**1,2, 3,6,7 ,8, 9, 11**	**1, 3, 7, 8, 27, 31, 32, 33, 34, 37, 43**	**28, 30, 35, 38**	**Second Week**
	1.2 Mathematical Models: A Catalog of Essential Functions: Polynomials, Power Functions, Rational Functions, Algebraic Functions, Trigonometric Functions, Exponential Functions, Logarithmic Functions	5	1, 2, 3		
	1.3 New Functions from Old Functions Transformations of Functions: Vertical and Horizontal Shifts, Vertical and Horizontal Stretching and Reflecting. Combinations of Functions. Composite	1, 2, 3,5, 6, 7, 8,	2, 29, 31, 34, 37, 42, 50,	3,6, 33, 35, 52	**Third Week**
	1.5 Exponential Functions Laws of Exponentials, The Number e.	1,3	19, 23	1, 20	
	1.6 Inverse Functions and Logarithms 1. Definition, Horizontal Line Test, 2. Definition, Logarithmic Functions, Natural Logarithms, Inverse Trigonometric	1-9,12, 13	3, 5, 6,7 21, 38, 52, 63, 65, 70	8,12, 22, 37, 39, 51, 64, 71	
Ch2:Limits and Derivatives	**2.2 The Limit of a function** 1.Definition, 2. One-Sided Limits, 3. Infinite Limits, 4. Vertical asymptote	1-3, 7-10	4,29-37	5, 38	**Fourth Week**
	2.3 Calculating Limits Using the Limit Laws: The Limit Laws, direct substitution property,1.Theorem,2. Theorem,3.The	1-11	1,3,5,9, 12,18,3 0, 38,42,5	11,13, 15,19, 37	**Fifth Week**
	2.4 The Precise Definition Of A Limit: Definition, definition of left-hand limit, definition of right-hand limit, infinite limits	1-5	1,3, 7,19, 27,36,4 2	2,4, 6,20, 30,43	**Sixth Week**
	2.5 Continuity 1.Definition, 2. Definition,4. Definition,5. Definition,4. Theorem, 5. Theorem, 7. Theorem, 8. Theorem, 9. Theorem	1-9	3,12, 15,16,1 8, 22,24,	13,25, 45	**Seventh Week** **First Midterm Exam**
	2.6 Limits at Infinity, Horizontal Asymptotes 1.Definition, 2.Definition,3.Definition, 5. Theorem, Infinite Limits at infinity	1-11	1,13,16, 25,27,4 6	15, 17, 41, 43	
	2.7 Derivatives and Rates of change Tangents, Velocities, Derivatives, Rate of change	1,2,4 ,5	5,6, 18	7, 20	**Eighth Week**
	2.8 The Derivative as a Function Other notation, How can a Function Fail to be Differentiable?, Higher Derivatives	3-6			
Ch3: Differentiation Rules	**3.1 Derivatives of Polynomials and Exponential Function** **Constant function, Power functions, New**	**1-9**	**16,22**	**9,15**	**Ninth Week**

	3.2 The Product and Quotient Rules	**1-5**	**1-34 (even)**	**1-34 (0dd)**	**Ninth Week**
	3.3 Derivatives of Trigonometric functions	1-6	1-16 (even),	1-16 (odd), 23	
	3.4 The Chain Rule	1-9	7-54 (eve	7-54 (odd)	
	3.5 Implicit Differentiation: Derivatives of Inverse Trigonometric functions	1-5	5-30 (even), 49-60	5,7,9,15,17 ,25,39, 51,55	**Tenth Week**
	3.6 Derivatives of Logarithmic functions:	1-8	2-34 (even),	2-22(odd), 33, 45, 51	
Ch4:Application of Derivatives	**4.1 Maximum and Minimum Values** Absolute maximum and absolute minimum, local maximum and local minimum, the Extreme Value Theorem, Fermat's Theorem, critical	1-4,8	29,31,33, 36,47,48, 49,50,	35, 39, 51,	**Eleventh Week**
	4.2 The Mean Value Theorem Rolle's Theorem, The Mean Value Theorem,	3	1,2,9,10,	3, 11	
	4.3 How Derivatives Affect the Shape of a Graph Increasing and Decreasing Test, The First Derivative Test, Concavity Test, The Second	1-6	9,10, 12,13,33,	11, 15, 21,41	**Twelfth Week**
	4.4 Indeterminate Forms and L'Hopital's Rule: L'HOSPITAL's Rule, Indeterminate Products, Indeterminate Differences, Indeterminate Powers	1-9	1,5,7,9, 11,17,19,25, 29,31,40	2,4,6,8,10, 12,20,26, 40,52	**Second Midterm Exam**

Mid –Term Exams:

The first mid-term exam will be given during the **7th week.**
The second mid-term exam will be given during the **12th week.**

Quizzes:

Quizzes will relate to current and previous topics. A quiz may be given at any time during any class period -- immediately after a lecture, at the beginning or end of a class, etc.
There will be no make-up quizzes -- none even later during the same class period. Quizzes will be given only to those students who are present when the quizzes are passed out.