King Abdulaziz University
Department of Mathematics

Academic year summer-1438
summer-2017

Math 110 (S & E) Syllabus / Summer Term

Book: Calculus Early Transcendentals by James Stewart 7th edition **(No Calculator)**

		Lectures			
Chapter Title	**Section**	**Theoretical (Definitions & Theorem)**	**Examples**	**Exercises**	**HW**
Appendixes	**Appendix A Numbers, Inequalities and Absolute Values**	• Intervals (Table). • Inequalities . • Absolute value . • Properties (1-6).	4,7 Read 1,2,3,6,8		
	Appendix B Coordinate Geometry and lines	• Slope of line. • Point-slope form of the equation of a line. • Slope-Intercept form of the equation of a line. • Parallel and perpendicular lines.	4 Read 7,8		
	Appendix D Trigonometry	• Angles (convert formula). • The Trigonometric functions. • Trigonometric identities, 6-11, 15. • Graphs of the trigonometric functions (sin, cos, tan only) (domain, period of all) (range of sin, cos, tan only).	1,4	4,33	1-12(odd) 29-34(odd)

Ch1: Functions and Models	**1.1 Four ways to represent a function**	• **Definition: Function, Domain and Range of a (polynomial, absolute , rational, radical of first and second degree) functions.** • **Graphs of Functions * and vertical line test.** • **Piecewise defined functions.** • **Symmetry (Odd & even) functions.** • **Increasing and Decreasing Functions.**	**2,6,7,8,11 Read 1**	**9,31,33, 34, 38, ,45,76.**	**7-10,32, 42,43, 47,73-78**
	1.2 Mathematical Models: A Catalog of essential functions	• **Essential functions (Polynomials, power, rational, algebraic, trigonometric, exponential and logarithmic).**	**5**	**2**	**1**
	1.3 New functions from old functions	• **Transformation of functions.** **i) Vertical and horizontal shifts.** **ii) Vertical and horizontal reflecting.** • **Combination of functions (f±g, f.g, f/g, Composite Functions) and their domain.**	**1 (without $y=2\sqrt{x}$),2, 3(b) add to example (3) Sketch the graph of** **(c) $y=\|cosx\|$** **(d) $y=\|cosx\|+3$** **(e) $y=cos\left(x-\frac{\pi}{2}\right)$** **Then find the domain and range , 6-9**	**1(a-f) Add to exercise (1) and solve it for $y=e^x$ and $y=x^2$ 30**	**29-37(odd) ,39 ,45 *try to skech** **$y=cosx-3$** **$y=2+cosx$** **$y=\|sinx\|$** **$y=\|sinx\|+3$** **Then find the domain and range**
	1.5 Exponential Functions	• **Laws of Exponents.** • **The Number e.**	**1**	**2,13,14,19 ,20**	**1,3,17**
	1.6 Inverse Functions and Logarithms	• **Definition1: (1-1) & horizontal line. text.** • **Definition 2: Inverse Functions.** • **How to find the inverse function.** • **Logarithmic functions.** • **Natural logarithm.** • **Graphs and growth of natural logarithm.** • **Inverse of Trigonometric Functions: ($sin^{-1}, cos^{-1}, tan^{-1}$ only).**	**1,2 Add prove that the function $y=\sqrt[3]{\frac{x+2}{2}}$ is 1-1 "by def." 4, Replace f(x) in example(5) by $f(x)=\sqrt{x-1}$ 7-13 Read 3,6**	**22,23, 37(b),40,48(a) ,51(a,b), 53(a), 64,68.**	**21-26(odd) 35-41(add) 52, 57**

Ch2: Limits and derivatives	**2.2 The Limits of a Functions**	• **Definition1-6.** • **One-sided limits.** • **Infinite limits: (vertical asymptote).** • **Figure 17.**	**1,7-10**	**9, 35,38**	**4,7,8,11, 12**
	2.3 Calculating Limits Using the Limits Laws	• **The Limits Laws 1-11** • **Theorem1,2.** • **The squeezed theorem+ Figure 7.** • **limit of trigonometric function(by theorem)*P.192 relation 2, P.193 relation 3 +relations in 'notes in math110'.**	**2(a)-9,11** **P. 196: 5,6**	**15,23,28, ,57** **P.198: 40, 42, ,45, 46 ,47, 48**	**12, 19, 20,22,25, 27, 29, 31, 32,35-37,** **P. 198: 39**
	2.5 Continuity	• **Definition1: Continuity at A number.** • **Definition2: Continuity from the right and from the left.** • **Theorem 4-9.** • **Theorem 10: The intermediate value theorem.**	**2(a-c),6,8,9 Read5,7**	**3,45**	**17,20,21,25, 38, 41,46**
	2.6Limits at infinity	• **Definition1-3.** • **Theorem 4-6.** • **Infinite limits at infinity.** • $\lim_{n\to\infty} ax^n$ **if n odd or even.**	**1-11**	**34,43**	**19,26,33, 35 , 43, 44**
	2.7 Derivatives and rates of charge	• **Tangents.** • **Definition 1,2.** • **Derivatives.** • **Definition 4, 5.**	**1,4,5**		
	2.8 The Derivatives as a Function	• **Formulas 1, 2.** • **Other Notations.** • **Definition 3, Theorem 4.** • **Higher Derivatives.**	**3,5,7**		**29,49**

Ch3: Differentiation Rules	3.1 The Derivative of polynomials and exponential function	• Constant functions. • Power functions. • <u>Definition of normal line P.176.</u> • New derivatives from old. • Derivative of the natural exponential function.	1-6,8	23	3-35(odd)
	3.2 The product and quotientrules	• The product rule. • Quotient rule.	1-5		3-33(odd)
	3.3 Derivatives of Trigonometric Functions	• Formulas 4-6. • Derivative of Trigonometric Functions.	1,2(diff.only),4	21,	1-7(odd), 49
	3.4 The Chain Rule and Parametric Equations	• The Chain Rule. • The power rule combined with the chain rule. • Formula 5.	1-9	33,53	1-15(odd),44,47,48
	3.5 Implicit Differentiation	• Derivatives of Inverse Trigonometric Functions.	1, 2(a,b), 3-5	12,26	5-11(odd),25,35,37,49,55
	3.6 Derivatives of Logarithmic Functions	• Formulas 1-4. • Logarithmic differentiation.	1-8	19,52	3-17(odd),31,43-47

*** The graphs that students must Know:**

Y=sin x, y=cos x, y=tanx

Y=x, y=|x|, y=$\sqrt{x}$,

Y=x^2 , (and similarly y=x^4 , y=x^6 , …etc)

Y=x^3 , (and similarly y=x^5 , y=x^7 , …etc)

Y= $\frac{1}{x}$, (and similarly Y=$\frac{1}{x^3}$, Y=$\frac{1}{x^5}$ …etc)

Y=$\frac{1}{x^2}$, (and similarly Y=$\frac{1}{x^4}$, Y=$\frac{1}{x^6}$ …etc)

Exponential function, logarithmic function.

Note: see the **workshop** at hashoaib.kau.edu.sa

Marks distribution:-

	First Exam	Second Exam	Final Exam
Time ; marks	120 min; 31 marks	120 min; 31 marks	120 min; 43 marks

Note

Appendices A&B are not included in the exams.

With sincerest gratitude,

Dr. Hatoon Shoaib