



**Math 110 (S & E) Syllabus / Term (1)**  
**Book: Calculus Early Transcendentals by James Stewart 7<sup>th</sup> edition**

<b>Lectures</b>					
<b>Chapter Title</b>	<b>Section</b>	<b>Theoretical (Definitions &amp; Theorem)</b>	<b>Examples</b>	<b>Exercises</b>	<b>HW</b>
<b>Appendixes</b>	<b>Appendix A Numbers, Inequalities and Absolute Values</b>	<ul style="list-style-type: none"><li>• Intervals (Table )</li><li>• Inequalities</li><li>• Absolute value Properties (1-6)</li></ul>	<b>4,7</b> <b>Read 1,2,3,6,8</b>		
	<b>Appendix B Coordinate Geometry and lines</b>	<ul style="list-style-type: none"><li>• Slope of line</li><li>• Point-slope form of the equation of a line.</li></ul>	<b>4</b> <b>Read 7,8</b>	<b>35</b>	
	<b>Appendix D Trigonometry</b>	<ul style="list-style-type: none"><li>• Angles (convert formula)</li><li>• Trigonometric functions</li><li>• Trigonometric identities.</li><li>• Graphs of the trigonometric functions (domain \$ range).</li></ul>	<b>1,4</b>	<b>4,30</b>	<b>1-12(odd) 29- 34(odd)</b>

## Ch1: Functions and Models

<b>Ch1: Functions and Models</b>	<b>1.1 Four ways to represent a function</b>	<ul style="list-style-type: none"> <li><b>Definition: Domain and Range of a (polynomial, absolute , rational, radical of first and second degree) Functions- see the workshop at <a href="http://rallehabi.kau.edu.sa">rallehabi.kau.edu.sa</a></b></li> <li><b>Graphs of Functions and vertical line test.</b></li> <li><b>Piecewise defined functions.</b></li> <li><b>Symmetry (Odd &amp; even) functions.</b></li> <li><b>Increasing and Decreasing Functions</b></li> </ul>	<b>2,6,7,8,11 Read 1</b>	<b>9,31,33,34,76, 38,42,45.</b>	<b>7-10, 32-34,43, 47,73-78</b>
	<b>1.2 Mathematical Models: A Catalog of essential functions</b>	<ul style="list-style-type: none"> <li><b>Essential functions (Polynomials, power, rational, algebraic, trigonometric, exponential and logarithmic)</b></li> </ul>	<b>5</b>	<b>2</b>	<b>1</b>
	<b>1.3 New functions from old functions</b>	<ul style="list-style-type: none"> <li><b>Transformation of functions.</b> <ul style="list-style-type: none"> <li>i) Vertical and horizontal shifts.</li> <li>ii) Vertical and horizontal reflecting.</li> </ul> </li> <li><b>Combination of functions (<math>f \pm g</math>, <math>f \cdot g</math>, <math>f/g</math>, Composite Functions) and their domain.</b></li> </ul>	<b>1,2,3(b) , 6-9</b>	<b>1(a-f)</b>	<b>29-37(odd), ,39 ,45</b>
	<b>1.5 Exponential Functions</b>	<ul style="list-style-type: none"> <li><b>Laws of Exponents</b></li> <li><b>The Number e.</b></li> </ul>	<b>1</b>	<b>2,13,14,19,20</b>	<b>1,3,17</b>
	<b>1.6 Inverse Functions and Logarithms</b>	<ul style="list-style-type: none"> <li><b>Definition1: (1-1) &amp; horizontal line text.</b></li> <li><b>Definition 2: Inverse Functions.</b></li> <li><b>How to find the inverse function.</b></li> <li><b>Logarithmic functions</b></li> <li><b>Natural logarithm.</b></li> <li><b>Graphs and growth of natural logarithm</b></li> <li><b>Inverse of Trigonometric Functions</b></li> </ul>	<b>1,2(by graphs) 4-13 Read 3,6</b>	<b>22,23, 37(b),40, 48(a),51(a,b), 53(a), 57, 64.</b>	<b>21-26(odd) 35-41(all) 52</b>
	<b>2.2 The Limits of a Functions</b>	<ul style="list-style-type: none"> <li><b>Definition1-6</b></li> <li><b>Fig17</b></li> <li><b>One-sided limits</b></li> <li><b>Infinite limits (vertical asymptote)+limit of trigonometric function(by theorem)*</b></li> <li></li> </ul>	<b>1 , 7-10</b>	<b>12 35,38</b>	<b>4,8,11</b>
<b>Ch2: Limits and derivatives</b>	<b>2.3 Calculating Limits Using the Limits Laws</b>	<ul style="list-style-type: none"> <li><b>The Limits Laws</b></li> <li><b>Theorem1,2</b></li> <li><b>The squeezed theorem.</b></li> </ul>	<b>2(a)-9,11</b>	<b>15,23,28, 29,57</b>	<b>12, 19, 20,22,25, 27, 31, 32,35-37</b>

<b>Ch3: Differentiation</b>  <b>Rules</b>	<b>2.5 Continuity</b>	<ul style="list-style-type: none"> <li>• <b>Definition1: Continuity at A number.</b></li> <li>• <b>Definition2: Continuity from the right and from the left</b></li> <li>• <b>Definition3: Continuity on an interval.</b></li> <li>• <b>Theorem4-10</b></li> </ul>	<b>2(a-c),4,6,8,9, 10 Read 5,7</b>	<b>46</b>	<b>17,20,21,25 , 38, 41,45</b>
	<b>2.6 Limits at infinity</b>	<ul style="list-style-type: none"> <li>• <b>Definition1-3</b></li> <li>• <b>Infinite limits at infinity</b></li> <li>• <b>Theorem</b></li> <li>• <b>Lim<sub>x-&gt;<math>\infty</math></sub> (ax<sup>n</sup>) if n odd or even</b></li> </ul>	<b>1-11</b>	<b>34,43</b>	<b>19,26,33, 35 , 43, 44</b>
	<b>2.7 Derivatives and rates of charge</b>	<ul style="list-style-type: none"> <li>• <b>Tangents</b></li> <li>• <b>Definition1-2</b></li> <li>• <b>Derivatives</b></li> <li>• <b>Definition 4</b></li> </ul>	<b>1,4,5</b>		
	<b>2.8 The Derivatives as a Function</b>	<ul style="list-style-type: none"> <li>• <b>Formulas 1,2</b></li> <li>• <b>Definition 3,Theorem 4</b></li> <li>• <b>Higher Derivatives</b></li> </ul>	<b>3,5,7</b>		<b>29,49</b>
	<b>3.1 The Derivative of polynomials and exponential function</b>	<ul style="list-style-type: none"> <li>• <b>Constant functions</b></li> <li>• <b>Power functions</b></li> <li>• <b>New derivatives from old</b></li> <li>• <b>Exponential functions</b></li> </ul>	<b>1-6,8</b>	<b>23</b>	<b>3-35(odd)</b>
	<b>3.2 The product and quotient rules</b>	<ul style="list-style-type: none"> <li>• <b>The product rule</b></li> <li>• <b>Quotient rule</b></li> </ul>	<b>1-5</b>		<b>3-33(odd)</b>
	<b>3.3 Derivatives of Trigonometric Functions</b>	<b>Derivative of Sine Function, Derivative of Cosine Function, Derivative of other Basic Trigonometric Function.</b>	<b>1,2(diff.only),4 -6</b>	<b>21,40,46 42, ,45 ,47, 48</b>	<b>1-7(odd), 39,49</b>
	<b>3.4 The Chain Rule and Parametric Equations</b>	<b>The Chain Rule.</b>	<b>1-9</b>	<b>33,53</b>	<b>1- 15(odd),44, 47,48</b>
	<b>3.5 Implicit Differentiation</b>	<b>Implicit Differentiation, Derivatives of Higher Order, Derivatives of Inverse Trigonometric Functions.</b>	<b>1- 2(a,b)-5,</b>	<b>12,26</b>	<b>5- 11(odd),25, 35,37,49,55</b>

	<b>3.6 Derivatives of Logarithmic Functions</b>	• <b>Derivatives of Logarithmic Functions</b>	<b>1-8</b>	<b>19,52</b>	<b>3-17(odd),31,43-47</b>
<b>Ch4: Applications of Differentiation</b>	<b>4.1 Maximum and Minimum Values</b>	• <b>Definition 1,2,6 Extreme Value Theorem , Critical Number.</b>	<b>4,7,8 Read 2,3</b>	<b>4</b>	<b>5,29,47,53</b>
	<b>4.2 The Mean Value Theorem.</b>	• <b>Rolle's Theorem, The Mean Value Theorem.</b>	<b>3</b>	<b>1,12</b>	<b>1,13</b>
	<b>4.3 How derivatives affect the shape of a graph</b>	• <b>Increasing/decreasing test Monotonic Function and Concavity, First and second derivative Test Test for Concavity. Definition: inflection point</b>	<b>1,2,6 Read 7</b>	<b>12</b>	<b>9,19</b>

**Marks distribution :-** First Exam (120 min; 33 marks); Second Exam (120 min; 33 marks); Final Exam (120 min; 44 marks);

### Note

Appendices A&B are not included in the exams.

Exam1 will held on the week 20-12-1436H from Appendix D, sec.1.1-end of sec.1.5.

Exam2 from sec.1.6-end of sec.2.8.+P192,193,198 on the first week of (to be arrange later)

Final exam: All chapters

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