



### Maths 121 Syllabus

1. College	Science										
2. Department	Mathematics										
3. Program	B.Sc in Mathematics										
4. Course code	Maths 121										
5. Course title	Calculus and Analytic Geometry I										
6. Course credits:	Lecture Hours: 3	Lab Hours: 0	Credit Hours: 3								
7. Pre-requisites:	None										
8. Course web-page:	<a href="https://www.mathxl.com">https://www.mathxl.com</a>										
9. Lectures Timing & Location											
10. Course coordinator	Dr. Ahmed Matar										
11. Academic year	2017-2018										
12. Semester:	✓	First		Second		Summer					
13. Textbook(s):	Thomas Calculus ( Early Transcendental ), 12th edition ( Pearson )										
14. References:	Calculus, by Smith and Minton. 4 <sup>th</sup> edition (McGraw-Hill).										
15. Other resources used (e.g. e-Learning, field visits, periodicals, software, etc.):	<ul style="list-style-type: none"> <li>Paul's Online Math. Notes : <a href="http://tutorial.math.lamar.edu">http://tutorial.math.lamar.edu</a></li> <li>Salman Khan Academy: <a href="http://www.khanacademy.org/math/calculus/differential-calculus/">http://www.khanacademy.org/math/calculus/differential-calculus/</a></li> </ul>										
16. Course description (from the catalog):	<p><i>Algebra. Functions and graphs. Trigonometry. Conic sections. Limits and continuity. Derivatives and integrals . Applications of derivatives which include Mean-Value Theorem , extrema of functions and optimization. Definite integrals and the Fundamental Theorem of Calculus. Derivatives and integrals of exponential, logarithmic and inverse trigonometric functions</i></p>										
17. Course Intended Learning Outcomes (CILOs):	Students who successfully complete this course should be able to:										
	<b>Mapping to PILOs</b>										
<b>CILOs</b>	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>	<i>k</i>
1. Recall some algebraic and transcendental functions and their properties.	✓			✓							
2. Evaluate limits of functions both geometrically and algebraically.	✓			✓							
3. Examine continuity of various types of functions at a point or on a set.	✓										
4. Find derivatives of functions by using the definition.	✓										
5. Use differentiation rules to find derivatives of explicit and implicit functions.	✓			✓							

6. Find slopes and equations of tangent and normal lines.	√			√							
7. Recognize the relation between differentiation and integration.	√										
8. Use the fundamental theorem of calculus to evaluate definite integrals.	√			√							
9. Evaluate integrals by using the substitution method.	√			√							
10. Employ differentiation to describe the behavior of functions.	√		√	√							
11. Use differentiation to sketch functions.	√		√								
12. Apply derivatives to solve real life problems such as optimization and related rates.	√		√			√					

<b>18. Course assessment:</b>			
<i>Assessment Type</i>	<i>Number</i>	<i>Weight</i>	<i>Date</i>
<i>Quizzes</i>	-	-	
<i>Tests</i>	<b>2</b>	50%	TBA
<i>Laboratory/Practical</i>	-	-	-
<i>Assignments/Online Homework's</i>	<b>22</b>	10 %	See Weekly Problems Sheet
<i>Projects/Case Studies</i>	-	-	-
<i>Final</i>	<b>1</b>	40%	<b>Comprehensive</b>
<b>Total</b>	<b>25</b>	<b>100%</b>	

#### **19. Attendance Policy:**

*Extracts from the University Bulletin regarding withdrawal and enforced withdrawal:*

*A student's absence from lectures or classes in excess of 25% of the total assigned session will result in an automatic withdrawal of the student from the course, regardless of the causes for his/her absence.*

*a) A grade of (W) is given to a student who misses 25% or more of the total sessions assigned to the course if he/she presents a valid excuse for his/her absence.*

*b) A grade of (WF) is given to a student who misses 25% or more, but with no valid excuse.*

#### **20. Academic Honesty and Plagiarism:**

*All students are expected to follow the specific rules of academic honesty and plagiarism as per The Regulation of Professional conduct Violations for University of Bahrain Students, decision # 4/2006. Please refer the UoB website-Deanship of Students Affairs-Guidance Office.*

## 21.Course Weekly Breakdown:

<b>Week</b>	<b>Date</b>	<b>Topics covered</b>	<b>CILOs</b>	<b>Teaching Method</b>	<b>Assessment</b>
1	17/09/17	2.2: Limit of a Function & Limit Laws	1,2	Lecture & Problem solving	HW 1, Test 1 & Final Exam
2	24/09/17	2.4: One-Sided Limits 2.5: Continuity	1,2 3	Lecture & Problem solving	HW 2, HW 3, Test 1 & Final Exam
3	01/10/17	2.5: Continuity 2.6: Limits Involving Infinity	3 1,2	Lecture & Problem solving	HW 3, HW4, Test 1 & Final Exam
4	08/10/17	3.2: The Derivatives as a Function 3.3: Differentiation Rules	4,6 5,6	Lecture & Problem solving	HW 5, HW 6, Test 1 & Final Exam
5	15/10/17	3.3: Differentiation Rules 3.5: Derivatives of Trigonometric Functions	5,6 5,6	Lecture & Problem solving	HW 6, HW 7, Test 1 & Final Exam
6	22/10/17	3.6: The Chain Rule	5,6	Lecture & Problem solving	HW 8, Test 1 & Final Exam
7	29/10/17	3.7: Implicit Differentiation 3.8: Derivatives of Inverse Functions and Logarithms	5,6 5,6	Lecture & Problem solving	HW 9, HW 10, Test 1 & Final Exam
8	5/11/7	<b>Mid-Semester break</b>			
9	12/11/17	3.9: Inverse Trigonometric Functions 3.10: Related Rates	1 12	Lecture & Problem solving	HW 11, Test 2 & Final HW 12, Test 2 & Final
10	19/11/17	3.11: Linearization and Differentials 4.8: Anti-derivatives	5,12 7	Lecture & Problem solving	HW 13, HW 14 , Test 2 & Final Exam
11	26/11/17	5.3: The Definite Integral 5.4: The Fundamental Theorem of Calculus	8 8	Lecture & Problem solving	HW 15, HW16, Test 2 & Final Exam
12	03/12/17	5.5: Indefinite Integrals & the Substitution Method 5.6: Substitution and Area Between Curves	8,9 8,9	Lecture & Problem solving	HW 17, HW 18, Test 2 & Final Exam
13	10/12/17	7.3: Hyperbolic Functions 4.1: Extreme Values of Functions	5 10	Lecture & Problem solving	HW 19, HW 20 & Final Exam
14	17/12/17	4.3: Monotonic Functions & 1 <sup>st</sup> Derivative Test 4.4: Concavity & Curve Sketching	10 10,11	Lecture & Problem solving	HW 21, HW 22 & Final Exam
15	24/12/17	4.6: Applied Optimization	12	Lecture & Problem solving	Final Exam
16	31/12/17	Review			Final Exam

### Weekly Problems & Important Dates

Week	Date	Topics covered	Examples	Problems	Important Dates
1	17/09/17	2.2: Limit of a Function & Limit Laws	1-5, 6,7,9,10	1-4,11-50,63	<b>21/9 Hijri new year</b>
2	24/09/17	2.4: One-Sided Limits 2.5: Continuity	1,2,5,6 1,2,3,6,10	1-4,11-18,21-40 1-16,25-30,39-48	
3	01/10/17	2.5: Continuity 2.6: Limits Involving Infinity	1,2,3,6,10 2,3,9,11,12	1-16,25-30,39-48 1-8,13-48,53-58	
4	08/10/17	3.2: The Derivatives as a Function 3.3: Differentiation Rules	1,2 1-10	1-12,19,20 1-54, 57-58,61-64	
5	15/10/17	3.3: Differentiation Rules 3.5: Derivatives of Trigonometric Functions	1-10 1,2,5,6	1-54, 57-58,61-64 1-34,55,56	
6	22/10/17	3.6: The Chain Rule	1-6,8	1-90	
7	29/10/17	3.7: Implicit Differentiation 3.8: Derivatives of Inverse Functions and Logarithms	1-5 3, 5, 6, 7	1-40 11-96	<b>29/10-30/10 Ashura holiday</b>
8	5/11/7	<b>Mid-Semester break</b>			
9	12/11/17	3.9: Inverse Trigonometric Functions 3.10: Related Rates	2,3 2,3,5	21-42 3-12,20,21,23, 31-33,40	
10	19/11/17	3.11: Linearization and Differentials 4.8: Anti-derivatives	1-3 1, 2, 3, 6	1-14 25-70, 91-113	
11	26/11/17	5.3: The Definite Integral 5.4: The Fundamental Theorem of Calculus	2 2,3	9-14 1-34, 39-56,65-68	<b>30/11 Prophet birthday</b>
12	03/12/17	5.5: Indefinite Integrals & the Substitution Method 5.6: Substitution and Area Between Curves	1-9 1,2	1-66, 71-76 1-46	
13	10/12/17	7.3: Hyperbolic Functions 4.1: Extreme Values of Functions	1-2 1-4	1-24 21-30,45-52	
14	17/12/17	4.3: Monotonic Functions & 1 <sup>st</sup> Derivative Test 4.4: Concavity & Curve Sketching	1,2 7	19-24 9-22	<b>16/12-17/12 National day</b>
15	24/12/17	4.6: Applied Optimization	1-3	1-14,20-21,29-36	
16	31/12/17	Review			<b>4/1 Last day of classes</b>