

## SYLLABUS AND CONTENTS OF MATH 101 (1439/1440)

**Course Name:** Differential Calculus

**Credit Hours:** 3 hours

**Course Number:** Math 101

**Actual Hours:** 5 hours

**Prerequisite:** ---

**Course Coordinator:** Dr. Amr Abdulaty

**Phone:** 94583

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**Semester:** first Semester 1439-1440

### Instructor Information

**Instructor** .....

**Office** .....

**E-mail** .....

**Office Hours** .....

### Textbook:

Differential Calculus, Third Edition, 2017

### Authors:

Ibraheem Aloyan, Nasser Bin Turki, Tahsin Ghazal, Obaid Al-Gahtani and Khaled Khashan

### References:

- Swokowski, E, W; Olinick, M; Penece, D. Calculus, Sixth Edition, PWS Publishing Company, 1994.
- Larson, R & Edwards, R. **Calculus**, Tenth Edition, Cengage Learning, 2014.
- Anton, H; Bivens, I & Davis, S. **Calculus Early Transcendentals**, Ninth Edition, Wily & Sons, 2009.

### Evaluation:

The evaluation of the students will be continuous during the course and depends on the following:

#### Mid Term Exam

1 <sup>st</sup>	25
2 <sup>nd</sup>	25

**Home works** 10 (2 home works)

**Final Exam** 40

### تعليمات مهمة:

- الخطة التي بين أيديكم أبنائنا الطلاب هي خطة مختصرة تتضمن الأشياء المهمة في المقرر. الخطة التفصيلية وكل ما يتعلق بالمقرر موجود على موقع التحضيرية على الرابط:

<http://cfy.ksu.edu.sa/male/ar/node/703>

- يحتسب الغياب منذ اليوم الأول من الفصل الدراسي إلى آخر يوم قبل الاختبارات النهائية.
- في حال تأخر الطالب عن المحاضرة عشر دقائق يعتبر غائبا، وفي حالة حضوره خلال العشر دقائق الأولى يسجل متأخرا.
- يحرم الطالب من المقرر إذا تجاوزت غياباته ٢٥% من ساعات الحضور.

## Course Schedule and Contents:

Chapter	Weeks	Section	Examples	Exercises for Students
<b>Chapter One Functions</b>	1	1.1 Set of Numbers and Inequalities	All Examples	1,4,5,7,8,10,11,12,14,17,19,21,23.
	2	1.2 Functions: Basic Definitions and Examples	All Examples	1,4,8,9,10,11,12,14,15,17,18
		1.3 Properties of functions, and their combination	All Examples	6,11,12,13,16,17,21,24,25,26,30,31,32,35,38,39,42,44,45,50,51,54
	3	1.4 Inverse Functions	All Examples	1,3,6,9,11,12,16,18,20,23,25,31,33,35,37,39
	3+4	1.5 Trigonometric Functions	All Examples	1,4,5,8,11,15,17,19,20,21,22,24,25
	4	1.6 The Inverse Trigonometric Functions	All Examples	2,4,5,7,10
<b>Chapter Two Limits and Continuity</b>	5	2.1 Definition of Limit	All Examples	3,8,11,13,14,18,20,29,38,45,46
	5+6	2.2 Limits Laws	All Examples	2,4,5,7,8,11,13,14,16,19,21,26,27,29,30,31,34,35,37,38,41,43,46,48,49,53,54,55,57,63,64,66,67,69,71,73,74
	6+7	2.3 Limits Involving Infinity	All Examples+ Ex.21	1,2,6,7,10,13,15,16,18,20,22,24,25,26,28,30,32,35,36,37,38,41,44,45,47,50,52,54,55,58,60,61
	7	2.4 Continuity of Functions	All Examples+ Ex.57	2,3,4,7,8,10,12,13,16,18,19,22,25,27,29,30,32,34,36,40,42,43,45,46,47,52,53,55,58,60
<b>Chapter Three Differentiation</b>	8	3.1 The Derivative and the Tangent Line Problem	All Examples	2,6,8,10,13,15,16,17,19,21,22,24,27,28,30,33,35
	8+9	3.2 Differentiation Rules	All Examples	1,4,5,8,12,14,16,17,18,19,23,24,26,28,30,33,34,35,37,38,39,40,41,44
	9	3.3 Derivatives of Trigonometric functions	All Examples	1,3,5,7,10,11,13,16,19,20,21,23,25,27,28,31,34
	10	3.4 The Chain rule	All Examples	2,5,6,8,9,12,13,15,16,20,21,26,27,29,30,34,38,39,40,42,44,45,47
		3.5 Implicit Differentiation	All Examples	3,5,8,12,13,14,15,17,19,20,22,25,27,30,31,34
	11	3.6 Higher Order Derivatives	All Examples	1,4,6,7,10,12,13,14,16,18,19,22,23,26,27,29,32,34,35,37,38,40,42,43,44
3.7 The Derivative of Inverse Functions		All Examples	3,4,7,8,11,12,13,15,17,18,22,24	
<b>Chapter Four Applications of Differentiation</b>	12	4.1 Extrema of Functions	All Examples	1,2,5,6,8,10,14,16,18,19,20,21,23,24
		4.2 The Mean Value Theorem	All Examples	2,3,5,6,7,11,13,15,17,19,21,23,25,27,28,29
	13	4.3 Increasing and Decreasing Functions	All Examples	3,4,5,7,11,13,15,17,19,21,22,24,27,28,29,32,35,36,37,38
		4.4 Concavity	All Examples	2,3,5,6,7,8,9,10,11,12,15,19,22,25,28,30,32,33,34,36,37,41,42,44,47,49
	14	4.5 Curve sketching	All Examples	1,5,8,10,11,14,15,18,20,23,24,27,28,31,32
		4.6 Optimization Problems	All Examples	2,4,7,8,10,11,13

## Proof of Theorems

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1	Theorem 2.2.1	<b>86</b>
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3	Theorem 3.2.1	<b>164</b>
4	Theorem 3.3.1	<b>179</b>
5	Theorem 3.7.2 (Derivative of Inverse Trigonometric Functions)	<b>219</b>