# KOMAR UNIVERSITY OF SCIENCE AND TECHNOLOGY
## (KUST)

| Calculus I COURSE SYLLABUS | | | |
|---|---|---|---|
| **Course Title** | **Calculus I** | | |
| **Course Code** | **MTH 1410** | **No. of Credits** | **4** |
| **Department** | **All MLS and Engineering Departments** | **College** | **MLS\ Engineering** |
| **Pre-requisites Course Code** | **Talent Science** | **Co-requisites Course Code** | |
| **Course Coordinator(s)** | **Dr. Hothefa Shaker Jassim** | | |
| **Email** | **Hothefa.shaker@komar.edu.iq** | **IP No.** | **117** |
| **Other Course Teacher(s)/Tutor(s)** | **None** | | |
| **Class Hours** | **Tuesday and Thursday: (16:00 – 17:50)** | | |
| **Contact Hours** | **Monday and Wednesday (13:00- 16:00)** | | |
| **Course Type** | **■University course ☐College course ☐Department course ☐ Elective** | | |
| **Offer in Academic Year** | **Spring 2015** | | |

**COURSE DESCRIPTION**

Calculus I offers students their first opportunity to attempt collegiate level mathematics. This course is a comprehensive introduction to mathematics. The course furthermore presents simple series and thoroughly introduces the concept of summation. We begin by introducing the notion of a limit. Limits are essential to defining derivatives and integrals. By the end of the semester you should know precise definitions of continuity, the derivative, and the integral and understand the fundamental theorem of calculus which relates the latter two.

**COURSE OBJECTIVES**

Describe the main concepts calculus, to learn about derivatives, integrals, and the fundamental theorem of calculus that gives the relation between derivatives and integrals

**COURSE LEARNING OUTCOMES**

After participating in the course, students would be able to:

**A. Understanding (Weight out of 23%)**

**A1**. Recognize the terms domain and range, Even and odd functions and their graph. (A)

**B. Knowledge (Weight out of 45%)**

**B1:** Find the slop and formula of tangent. (A)

**B2**. Define and Determine limits of simple expressions by use the algebra of limits and l'Hôpital's rule. (A)

**B3.** Find the first, second derivative and find the summation without sigma notation. (A)

**C. Application (Weight out of 32%)**

**C1**. Apply first derivative, and the second derivative to sketch a graph. (B)

**C2**. Apply the rules and techniques of integration. (B)

## Theory Grade Distribution (out of 100%)

| Assessment Tools | Weight Out of 100% | CLO's | | | | | |
|---|---|---|---|---|---|---|---|
| | | A 1 | B1 | B2 | B3 | C1 | C2 |
| Quizzes | 15 % | 3 | 2 | 2 | 3 | 3 | 2 |
| Homework | 10 % | 2 | - | 2 | 2 | 2 | 2 |
| Midterm Exam | 20% | 8 | 4 | 4 | 4 | - | - |
| Tests | 15% | - | - | - | 6 | 6 | 3 |
| Final Exam | 40% | 10% | 4% | 6% | 6% | 7% | 7% |
| Total out of 100 % | | 23% | 45% | | | 32% | |
| | | Understanding | Knowledge | | | Application | |

## GUIDELINES ON GRADING POLICY

| Points | Percentage Scores | Grade |
|---|---|---|
| A | 95–100 | 4.0 |
| A- | 90-94 | 3.7 |
| B+ | 87–89 | 3.3 |
| B | 83-86 | 3.0 |
| B- | 80-82 | 2.7 |
| C+ | 75–79 | 2.3 |
| C | 70-74 | 2.0 |
| C- | 65-69 | 1.7 |
| D+ | 60–64 | 1.3 |
| D | 55-59 | 1.0 |
| D- | 50-54 | 0.7 |
| F | 0–49 | 0 |
| I | Incomplete Course Work | |
| W | Official Withdrawal | |

**Note:** The minimum passing grade to pass this course is C- which is equivalent to 65%.

## COURSE CONTENT

Course topics include:

Chapter 1: Functions (LOC # 1)
Chapter 2: Limits and Continuity (LOC # 2)
Chapter 3: Differentiation (LOC #3)
Chapter 4: Application of Derivatives (LOC # 4)
Chapter 5: Integration (LOC # 5)
Chapter 6: Applications of Definite Integrals (LOC # 5)

**COURSE TEACHING AND LEARNING ACTIVITIES**

**Course Teaching and Learning Activities: (short description)**

1. Student will be taking a short-sided assessment consisting of 3-4 questions from the week worth of lessons. They will be given the first 15 minutes of class every week.
2. Interactive class discussion
3. Hands-on exercises.
4. Assignments.
5. Tests.
6. All students will be given the opportunity to earn extra credit points throughout the semester. However, the extra credit offered will not exceed one full letter grade of the student's total grade for the quarter.

**COURSE ASSESSMENT Tools**

| Assessment Tool | Weight | Description |
|---|---|---|
| Homework & Assignments | 10% | 3 group assignments will be done in class |
| Quizzes | 15% | Quizzes. There will be 5 quizzes worth to 15 % (Best 4 will be considered). Pop quizzes are included. |
| Midterm | 25% | Covered chapter 1,2 and some of chapter 3. |
| Test 1 | 10% | Covered chapter 4 and 5. |
| Final Exam | 40% | All chapters will be covered |

**Textbooks:**

**Thomas Calculus**
G. B. Thomas, et. al.
Pearson 2010, 12th Edition
ISBN-10: 0-321-63632-5
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**References:**

1- Calculus
James Stewart
Cengage Learning 2012, 7th Edition
ISBN-10: 0538497815 | ISBN-13: 978-0538497817|

2- Engineering Mathematics
Author : John Bird
Routledge2010, 6th Edition
ISBN-10: 0080965628 | ISBN-13: 978-0080965628

3- Calculus
Author: Ron Larson
Cengage Learning 2013, 10th edition
ISBN-10: 1285057090 | ISBN-13: 978-1285057095

**COURSE POLICY *(including plagiarism, academic honesty, attendance etc)***

**Classroom Expectations Policy**

Students are expected to come to class on time and expected and attend each class for the entire semester. Students are responsible for material presented in lectures. Students should prepared and ready to work. Students are to respect each other and their property. Students are expected to be responsible for their work – making sure all assignments are turned in on time. Students are not permitted to eat or drink in the classroom.

Attendance is taken at the beginning of each class. Only students with official KUST absences, family crises, and illness are excused from class. Three occasions of lateness count as one absence. The student who misses 10 percent of the course classes will be placed on probation. **Class attendance will be part of the final grade.**

**Make-up Policy**

Since all examinations are announced in advance, **zero grade** will be given to any missed examination unless a student has an acceptable reason such as illness (MUST bring MC), for not being able to take the examination during **all** those days when the examination was announced.

**Homework Policy**
Students are expected to complete homework to be turned in the next day of class at the beginning of the period. (unless otherwise specified) The homework must be headed with name, date, and the problems assigned. Late work will be accepted only one day late, and the student will receive partial credit at that time.

Students must be prepared in case to present homework problems on the board the next day.
Copying of homework will result in an automatic **0.**

**Calculators:** calculators are allowed and may be useful in class only.

**Academic Dishonesty**
Students who violate university standards of academic integrity are subject to disciplinary sanctions, including failure in the course and further punishment by the University Consul.

**GUIDELINES FOR SUCCESS**

**Be Responsible**

1. Be on time and be prepared with daily material, completed assignments and prepared questions
2. Follow the student Code of Conduct, and always act with academic honesty*

**Be Respectful**

1. Speak kindly to others
2. Listen quietly to others
3. Understand that others may have different opinions

**Be Ready to Learn**

1. Arrive on time and bring your supplies to class every day
2. Keep food out of sight/no sharing
3. Electronics should be stowed and in the off position during class

## Course calendar: Please check the academic calendar for fall2015

**Note:** Supplementary problems will be given either as homework or hands on exercises during the class, two difficulty levels will be followed:

1- Level A which is classified as easy.
2- Level B which is classified as average to difficult.

| Week | Beg/End Dates | Topics (Chapters) | Course Task and Requirement | |
|---|---|---|---|---|
| **1** | 28/02/2016 **to** 3/03/2016 | 1.1 Introduction to function<br>1.2 Functions and Their Graphs<br>1.3 Combining Functions; Shifting and Scaling Graphs | **1.1 (Page 11)**<br>**HW#1,2,4,6,718,19,25,28,49,53**<br>**Quiz #1** | LOC # A1 |
| **2** | 6/03/2016 **to** 10/03/2016 | 1.4 Trigonometric Functions<br>1.5 Graphing with Calculators and Computers<br>1.6 Composition of functions | | |
| **3** | 13/03/2016 **to** 17/03/2016 | 1.7 Exponential Functions<br>1.8 Inverse Functions and Logarithms | **1.2 (Page 19)**<br>**HW #3,4,6,8,10,13,33,34,49,50**<br>**Assignment #1** | |
| **Nawroz holiday** | | | | |

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|---|---|---|---|---|
| **4** | 27/03/2016<br>**to**<br>31/03/2016 | 1.9 Logarithmic and Exponential function<br>Rates of Change and Tangents to Curves | **1.3 (Page 28)**<br>**HW #**<br>**13,14,31,32,33,34,35,36** | LOC # A1 |
| **5** | 3/ 04/2016<br>**to**<br>7/ 04/2016 | 2.1 Introduction to Limits<br>2.2 The Precise Definition of a Limit<br>2.3 One-Sided Limits<br>2.4 Continuity | | LOC #B1 |
| **6** | 10/04/2016<br>**to**<br>14/04/2016 | 2.5 Limits Involving Infinity; Asymptotes of Graph<br>3.1 Tangents and the Derivative at a Point<br>3.2 The Derivative as a Function | **2.2 (Page 54)**<br>**HW #3,11,25,24,26,35,39, 40,45,46,**<br>**Quiz #2** | LOC # B3 |
| **7** | 17/04/2016<br>**to**<br>21/04/2016 | 3.3 Differentiation Rules<br>3.4 The Derivative as a Rate of Change<br>3.5 Derivatives of Trigonometric Functions<br>3.6 The Chain Rule | **3.1 (Page 105)**<br>**HW # 11,13,14,15,18,21,22**<br>**Assignment # 2** | |
| | **Midterm Exam** | | | |
| **8** | 1/05/2016<br>**to**<br>5/05/2016 | 3.7 Implicit Differentiation<br>3.9 Inverse Trigonometric Functions<br>3.10 Related Rates<br>4.1 Extreme Values of Functions<br>4.2 The Mean Value Theorem | **3.3 (Page 122)**<br>**HW # 13,17,18,23,33,36**<br>**3.5 (Page 139)**<br>**# 13,177,8,11**<br>**Quiz # 3** | LOC # B3 |
| **9** | 8/05/2016<br>**to**<br>12/05/2016 | 4.3 Monotonic Functions and the First Derivative Test<br>4.4 Concavity and Curve Sketching<br>4.5 Indeterminate Forms<br>4.6 Applied Optimization | **4.1 (Page 189)**<br>**HW # 15,16,18,27,28,41,55** | LOC # C1 |
| **10** | 15/05/2016<br>**to**<br>19/05/2016 | 4.7 Anti Derivatives<br>5.1 Area and Estimating with Finite Sums<br>5.2 Sigma Notation and Limits of Finite Sums | **4.2 (Page 196)**<br>**HW # 1,3,4,7,9,11,15,19,21**<br>**4.5 (page 202)**<br>**1,3,4,7,9,11,15**<br>**Quiz # 4** | LOC # C2 |
| **11** | 22/05/2016<br>**to**<br>26/05/2016 | 5.3 The Definite Integral<br>5.4 The Fundamental Theorem of Calculus | **Assignment #3** | |
| **12** | 29/05/2016<br>**to**<br>2/06/2016 | 5.5 Indefinite Integrals and the Substitution Method<br>6.1 Introduction of Techniques of Integration<br>6.2 Integration by Parts | **(Page 282)**<br>**HW 7,16,18,26,27,28,30,32,41,43**<br>**Quiz # 5** | |

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|---|---|---|---|---|
| **13** | 5/06/2016<br>**to**<br>9/06/2016 | 6.3 Integration by substitutions<br>6.3 Integration of Rational functions by Partial fractions. | **(Page 290)**<br>**HW # 1,3,5,6,8,9,11,15,19,21,**<br>**Test #1** | LOC # C2 |
| **14** | 12/06/2016<br>**to**<br>16/6/2016 | 6.3 Integration of Rational functions by Partial fractions.<br>6.3 Integration of Rational functions by Partial fractions. | **(Page 376)**<br>**HW # 37,40,41,47,53** | |
| **15** | **Study week** | | | |
| **16** | **FINAL EXAM** | | | |