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**Department of Mechanical and Mechatronics Engineering**

**College of Engineering**

**University of Salahaddin**

**Subject: Mathematics I**

**Course Book-** 1st year students - Semester 1

**Lecturer's name: MS. Khatoon Y. IbrahimMSC**

**Academic Year: 2022/2023**

**Course Book**

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| **1. Course name** | Mathematics I |
| **2. Lecturer in charge** | Ms. Khatoon Yaseen Ibrahim |
| **3. Department/ College** | Mechanical-Mechatronics Eng. Dept. / College of Engineering |
| **4. Contact** | e-mail: Khatoon.Ibrahim@su.edu.krdTel: (optional) |
| **5. Time (in hours) per week**  |  Theory: 3 Tutorial: 1  |
| **6. Office hours** |  |
| **7. Course code** | 107 |
| **8. Teacher's academic profile**  | MSc in Composite Materials  |
| **9. Keywords** | Functions, Graphs, Inverse of Functions, Trigonometric Functions, Hyperbolic Functions, Exponential and Logarithmic Functions.  |
| **10. Course overview:**  This course provides an introduction to the fundamental mathematical objects and techniques needed by engineers and also it will provide students with skills and knowledge in different types of functions, limits and derivatives which would enable them to devise solutions for given situations they may encounter in their engineering profession. Topic areas include Rapid review of pre – university mathematics, Functions and their graphs, Inverse of functions ,Trigonometric functions, Hyperbolic Functions, Exponential and Logarithmic Functions, Application of exponential and logarithmic Functions.  |
| **11. Course objective:**The main objective of this course is to give the students some fundamental knowledge in special topics in mathematics which help them to solve the different kind of problems in different areas of studying (and working - in future) which they will encounter throughout the engineering disciplines. It is aimed to understand the definition of different types of functions algebraically and graphically. Solve problems include Trigonometric Functions, Hyperbolic Functions and Exponential and Logarithmic Functions. Find inverse of different functions. |
| **12. Student's obligation**The attendance of students at all lectures is required since being absent from class will inhibit student’s ability to fully participate in class discussions and problem solving sessions and will therefore affect his/her grade. The student is required to continuously submits homework and assignments and expect quizzes any time. |
| **13. Forms of teaching*** Power point presentations for the head titles, definitions and graphs.
* Elaborations and explanations of the subjects, analysis and derivation for necessary equations, solution of examples and problems on white board.

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| **14. Assessment scheme** The final grade in this course will be determined as follows:‌ Midterm Examination 20 % Course work and assignments 20 % Final Examination 60 %\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Total Marks 100% |
| **15. Student learning outcome:**At the end of the course, students will be expected to :* Demonstrate an understanding of the fundamental concept of mathematical functions and their graphs and all of its properties.
* Define and apply the concepts of limit and rules for computation and continuity.
* Have an understanding of the importance of differential equations in the engineering.
* Use derivatives to solve variety of problems.
* Learn to describe properties of transcendental functions.
* Learn the basic algebraic properties of the logarithmic and power functions and their derivatives.
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| **16. Course Reading List and References‌:** 1. Calculus, International Edition, By Thomas’, 2005.
2. Thomas’ Calculus 12th edition, Thomas, Weir and Hass, Pearson Addison Wiley, 2010.
3. Calculus, 2nd edition, Steven G. Krantz McGraw Hill, 2011.
4. Calculus, 11th Edition, By Thomas’, 2013.
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| **17. The Topics:** | **Lecturer's name** |
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| **Week** | **Hours** | **Topics** |
| **1** | **4** | Coordinates and Graphs in the Plain, The Slope of a line and Equations of a straight line |
| **2** | **4** | Functions and their graphs  |
| **3** | **4** | Absolute function, Inverse function |
| **4** | **4** | Trigonometric functions and their graphs |
| **5-6** | **4** | Angle Sum and Difference, Double Angle and Half Angle Formulas |
| **7** | **4** | Transcendental Functions, Logarithmic functions |
| **8** | **4** | Exponential Functions |
| **9-10** | **8** | Applications of exponential and logarithmic functions |
| **11** | **4** | Hyperbolic Functions |
| **12** | **4** | Composite Functions |
| **13** | **4** | Inverse Functions |
| **14** | **4** | Inverse of trigonometric Functions |
| **15** | **4** | Inverse of hyperbolic functions |
| **16** |  Final Exam |

  | Ms. Khatoon Yaseen Ibrahim |
| **18. Practical Topics (If there is any)** |  |
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| **19. Examinations:*****1. Compositional:*** ***2.******True or false type of exams:******3. Multiple choices:***. |
| **20. Extra notes:** |
| **21. Peer review پێداچوونه‌وه‌ی هاوه‌ڵ** .‌‌  |