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**Department of *Aviation***

**College of Engineering**

**University of Salahaddin**

**Subject: *Mathematics***

**Course Book – *For example (Year 1)***

**Lecturer's name Msc. *Mustafa Mohammed Mohammed***

**Academic Year: *2022/2023***

**Course Book**

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| **1. Course name** | **Mathematics I** |
| **2. Lecturer in charge** | **Lecturer MSc. Mustafa Mohammed Mohammed** |
| **3. Department/ College** | **Aviation Dept. / College of Engineering** |
| **4. Contact** | **e-mail: mustafa.mohammed@su.edu.krd****Tel:**  |
| **5. Time (in hours) per week**  | **Theory: 4****Practical: 0**  |
| **6. Office hours** | **4 hours** |
| **7. Course code** | **107**  |
| **8. Teacher's academic profile**  | **-BSc. Electrical engineering /Rafidain University 2007.****-MSc. Communications eng. And networks/ Birmingham university 2014.****Assistant lecturer / Erbil international university/2017-2019****Assistant lecturer / Nobel institute/2020-2021.****Assistant lecturer / salahddin university/2022.****-20 participation in workshops for higher education.****International trainer in e-government 2016-2022** |
| **9. Keywords** | **Derivatives and partial derivatives, Differential equation, Maxima and minima evaluation. Integration and applications, hyperbolic functions.**  |
| **10. Course overview:** Engineering is one of the most important applications for mathematic discipline. All new developments in Engineering have stimulated areas of mathematics research. So mathematics can be considered as a main branch of Engineering developments exactly for later century, for that it should be taking in consideration the relationship between mathematics and Engineering. So mathematics takes a main role in Engineering education. New demonic of Engineering profession and inadequate mathematics ability of the mathematics education. The course starts with the review of the main principle of mathematics, application of derivatives with different application of definite integrals such as areas of non-geometric shapes and volumes that can be interface to engineers requirement in life especial for the major  |
| **11. Course objective:**The aviation engineers during the application may need to evaluate the area and volumes of non-geometric shapes such as area of aircraft body and parts, they may need to evaluate and calculate complex shapes in plane during maintenance and design. So the course provides the students with the fundamentals for solution and analysis. * Deferential calculus for function of one variable, limit, continuity and mean principle.
* Derivatives and their application(maxim, minima and optimization)
* Integral calculus application of definite integral (area and volume of non-geometric shape).
* Method of integration.
* Analytic geometric function, inverse trigonometric function, exponential and logarithmic fun.
* Hyperbolic, function and its application.
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| **12. Student's obligation**The students are asked to attend al the lectures and they should arrive on time to the class and that is their responsibility to find out what assignment to be made when they are absent. They should active participation in the class for their successes. The student must participate in all quizzes and exams. He has to present all the home work at the required time.  |
| **13. Forms of teaching**Using a whiteboard tool to cover in details all the required explanation. |
| **14. Assessment scheme**- Midterm Exam : 20 %-Home works And Quizzes : 20 %-Final Exam: 60 %‌ |
| **15. Student learning outcome:**- They are expecting how to use calculus to solve the problem courses in mathematics and direct application in life.- Their ability to use graphical, numerical and other ideas of mathematics.- Students will use new technology to enhance their mathematical thinking and solve other problems.- The students will able to identify ordinary and differential equation, linear equation, solution of differential equation.- the student will be able to perform with irregular shapes as (area, volume,…) lengths of path, length of roads, dam dimension….)  |
| **16. Course Reading List and References‌:**▪ Key references:* Thomas G.B, calculus 2008. Revised by Maurice D. weir, Joel Hass and Frank R. Giordano. Pearson Education, Inc., 11th Edition.
* Thomas G.B, calculus 2010. Revised by Maurice D. weir, Joel Hass and Frank R. Giordano. Pearson Education, Inc., 12th Edition.
* Calculus one variable. 9th Edition 2003. By Salas Hille.
* Calculus and Analytic Geometry 2003 by R. Finney and G. Thomas: 10th Edition.
* Calculus, 2003 by James Stewart 5th Edition.
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| **17. The Topics:** | **Lecturer's name** |
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| **Week 1:** Rate of change of a function, Function & Graph**Week 2:** Absolute values and abs. Function**Week 3:** Slope, Tangent and Derivatives**Week 4:** Limits of Function values**Week 5:**  Continuous Function**Week 6:**  Derivatives, Differential Rules, Velocity, acceleration **Week 7:** Derivative of trigonometric Fun **Week 8:** Chain Rule, implicit differentiation **Week 9 :**Linearization, Estimate of change**Week 10:** Application of derivative **Week 11:** Maxima, minima, local and abs value of fun.**Week 12 :** Optimization**Week 13 :** Hopital Rule**Week 14:** Integration, Definite Integrals, Integration by substitution.**Week 15:** Application of definite integration Area between curves **Week 16 :** Calculating volumes, slicing method**Week 17** : Volume of Revolution**Week 18** : Shell and washer method. of volumes **Week 19:** Transcendental function Introduction inverse of Trigonometric fun.**Week 20:**Natural logarithm and its derivative **Week 21 :**Exponential fun and its derivative**Week 22:**Ordinary logarithm and its derivative**Week 23:** Methods of integration, integration by parts**Week 24:** Trigonometric substitution and 2nd degree equation**Week 25:**Partial Fractional method**Week 26:** Hyperbolic fun, introduction, derivative**Week 27:** Integration of Hyperbolic function |

 | **Mustafa mohammed mohammed**  |
| **18. Practical Topics (If there is any)** |  |
| There are no practical topics.  |  |
| **19. Examinations:*****1. Compositional:*** All mathematic problems based on analysis and the student has to finish all the calculations needed with final result to be about their solution. |
| **20. Extra notes:**The students should support themselves be able to solve and design project daily by them and not neglect the subject. |
| **21. Peer review :** |