

Department of Mathematics College of Education Salahaddin University - Erbil

Subject: Advanced Linear Algebra

Course Book – MSc. Study

Lecturer's name: Dr. Fryad Husein Abdulqadr

Academic Year: 2023/2024-First Semester

Course Book

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| **1. Course name** | Linear Algebra |
| **2. Lecturer in charge** | Dr. Fryad Husein Abdulqadr |
| **3. Department/ College** | Mathematics/Education |
| **4. Contact** | e-mail: [sanhan.khasraw@su.edu.krd](mailto:sanhan.khasraw@su.edu.krd)  Tel: (optional) |
| **5. Time (in hours) per week** | 3 hours |
| **6. Office hours** | Monday 10:30am-12:30pm  Thursday 10:30am-12:30pm or by appointments |
| **7. Course code** |  |
| **8. Teacher's academic profile** | 1. B.Sc. in Mathematics, 1998, Salahaddin University-Erbil 2. M.Sc. in Functional Complex Analysis, 2002, Salahaddin University-Erbil 3. PhD in Algebraic Graph Theory, 2015, University of Mosul-Iraq. |
| **9. Keywords** | Vector spaces, Linear transformations, Bilinear forms. |
| **10. Course overview:**  This course aims to introduce the basic ideas and techniques of linear algebra for use in many other lecture courses. The course will also introduce the concept of normed space and operator theory which are used in many other areas of Mathematics. | |
| **11. Course objective:**  Students will be able to apply the concepts and methods described in the syllabus, they will be able to solve problems using linear algebra, they will know a number of applications of linear algebra, and they will be able to follow complex logical arguments and develop modest logical arguments. The text and class discussion will introduce the concepts, methods, applications, and logical arguments; students will practice them and solve problems on daily assignments, and they will be tested on quizzes, midterms, and the final. | |
| **12. Student's obligation**   1. Students have an obligation to arrive on time and remain in the classroom for the duration of scheduled classes and activities. 2. Students have an obligation to write, homeworks, tests and final examinations at the times scheduled by the teacher or the College. Students have an obligation to inform themselves of, and respect, College examination procedures. 3. Students have an obligation to show respectful behaviour and appropriate classroom deportment. Should a student be disruptive and/or disrespectful, the teacher has the right to exclude the disruptive student from learning activities (classes) and may refer the case to the Director of Student Services under the Student Code of Conduct. | |

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| 4. Electronic/communication devices (including cell phones, mp3 players, etc.) have the effect of disturbing the teacher and other students. All these devices must be turned off and put away. Students who do not observe these rules will be asked to leave the classroom | |
| **13. Forms of teaching**  Different forms of teaching will be used to reach the objectives of these courses to the students: power point presentation for the course outline, head titles, definition, discussion and conclusions. Also, we shall use the blackboard for solving and explaining the examples. | |
| **14. Assessment scheme**  The assessment is divided up as follows:   1. 30% from two 2-hour class tests during the year; 2. 10% from example classes. | |
| **15. Student learning outcome:**  After completing Linear Algebra, the student should be able to:   1. Prove algebraic statements about vector addition, scalar multiplication, inner products, projections, norms, orthogonal vectors, linear independence, spanning sets, subspaces, bases, dimension and rank 2. Proving some theorems about normed and inner product space. 3. Proving some properties of linear operators. | |
| **16. Course Reading List and References:**   1. Linear Algebra by Serge Lang**;** 2. Introduction to functional analysis, Erwin/ 3. Elementary linear algebra by Bernard Kolman. | |
| **17. The Topics:** | **Lecturer's name** |
| Week 1-2: Review of linear algebra.  Week 3-4: Normed linear spaces.  Week 5-6: Linear operators.  Week 7-8: Linear fractional  Week 9-10: Inner product space.  Week 11: Hilbert space.  Week 12: Examination  Week 13: Space of bounded linear functional  Week14: Closed Graph Theorem | Dr. Fryad Hisein Abdulqadr |

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| **18. Practical Topics (If there is any)** |  |
| **19. Examinations:**  In the examinations, the questions usually starts with Explain how, What are the reasons for…?, Why…?, How….? Prove that, ….  With their typical answers Examples should be provided | |
| **20. Extra notes:** | |
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