Department of Mathematics

College of Education

Salahaddin University - Erbil

Subject: Linear Algebra I

Course Book – Year 2

Lecturer's name: Dr. Sanhan M. S. Khasraw

Academic Year: 2023/2024-First Semester

Course Book

1. Course name	Linear Algebra I
2. Lecturer in charge	Dr. Sanhan Muhammad Salih Khasraw
3. Department/ College	Mathematics/Education
4. Contact	e-mail: sanhan.khasraw@su.edu.krd Tel: (optional)
5. Time (in hours) per week	Theory: 3+3 Practical: 0
6. Office hours	Sunday 8:30-10:30 (Group A) Monday 10:30am-12:30pm (Group B) Wednesday 8:30-9:30 (Group A), 9:30-10:30 (Group B) or by appointments
7. Course code	
8. Teacher's academic profile	1. B.Sc. in Mathematics, 1999, Salahaddin University-Erbil 2. M.Sc. in Algebra, 2005, Salahaddin University-Erbil 3. PhD in Algebra, 2015, University of Birmingham, UK.
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 some basic ideas of abstract algebra and techniques of proof which will be useful for future courses in pure mathematics. The main aim of the course is

1. To introduce the concept of vector spaces, subspaces, linear independence, basis and transition matrices,

2. To introduce the concept of linear transformation and its connection with matrices.

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.
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. Write the relationships between A (being invertible) , det A, AX = 0 having a solution, the rank of A and linear independence
3. Find the kernel, rank, range and nullity of a linear transformation

16. Course Reading List and References:

1. Linear Algebra by Serge Lang**;**

2. An introduction to linear algebra by V. Krishnamurthy, V.P. Mainra and J. L. Arora;

3. Elementary linear algebra by Bernard Kolman.

17. The Topics:	**Lecturer's name**
Week 1: Review on set theory, matrix theory, and calculus. Week 2: Fields and vector spaces. Week 3: Subspaces and linearly dependent. Week 4: linearly independent, linear combination and span.	Dr. Sanhan

Week 5: Sum and direct sum of subspaces. Week 6: Finite dimensional vector spaces, basis and dimension of a vector space. Week 7: Coordinate vectors and transition matrix. Week 8: Exam. Week 9: Linear transformations, sum and scalar multiplication of linear transformations. Week 10: Kernel and image of Linear transformations, rank and nullity of Linear transformations. Week 11: Composition of linear transformations, inverse of linear transformations and isomorphic spaces. Week 12: How to find left and right inverses for linear transformations. Week 13: Matrix of linear transformations and normal form. Week 14: Exam.	
18. Practical Topics (If there is any)	
The practical of all topics in part-17 will be given during the academic year.	Dr. Sanhan

19. Examinations:

1. Compositional: In this type of exam the questions usually starts with Explain how, What are the reasons for…?, Why…?, How….?
With their typical answers
Examples should be provided

2. True or false type of exams:

In this type of exam a short sentence about a specific subject will be provided, and then students will comment on the trueness or falseness of this particular sentence. Examples should be provided

3. Multiple choices:
In this type of exam there will be a number of phrases next or below a statement, students will match the correct phrase. Examples should be provided.
Will do

20. Extra notes:
N/A

21. Peer review	**پێداچوونەوەی هاوەڵ**