Department of Mathematics

College of Education

University of Salahaddin

Subject: Ring Theory (Second Course)

Course Book – (Year 3)

Lecturer's name Dr. Neshtiman N. Sulaiman

Academic Year: 2022/2023

Course Book

1. Course name	Group Theory
2. Lecturer in charge	Neshtiman N. Sulaiman
3. Department/ College	Mathematics / Education
4. Contact	e-mail: neshtiman.suliman@su.edu.krd Tel: (optional)
5. Time (in hours) per week	Theory: 3 Practical:
6. Office hours	Sunday(10:30-12:30), Thursday (8:30-10:30)& wedensday:9:30-10:30 &(10:30-11:30) or by appointment.
7. Course code	
8. Teacher's academic profile	BSc. 1988 at University of Salahaddin / College of Education / Erbil / Iraq MSc. 1994 at University of Al-Mustansria /College of Education/Baghdad/Iraq PhD. 2013 at University of Salahaddin / College of Education / Erbil / Iraq **Specific specialization:** Algebra(Derivation prime Γ-rings) **Subject under teaching:** During my work in University of Salahaddin , I have taught the following courses at all the four undergraduate levels . 1- Calculus. 2- Advanced Calculus 3- Abstract algebra (Group Theory and Ring Theory) 4- Linear Algebra 5- Extension field. 6- Finite Mathematics. 7- Module Theory. 8- Programming(Pascal+Matlab+Fourtran+Quic basic,..) 9- Fundamental logic
9. Keywords: Group, Subgroup, Normal, Homomorphism.	

10. Course overview:

The main topic of the course is to introduce students to Ring Theory, including the Fundamental theorem. We'll also cover the structure of a commutative rings and various other rings as integral domain Principal ideal ring & … etc. Also I introduce the fields including some types in ideals . If we have time, I'll also give a brief introduction to polynomial rings.

11. Course objective

1- Students should be able to demonstrate an understanding of the basic definitions and theorems of abstract algebra.

2- Students should be able to complete problems and proofs which demonstrate both an understanding of the mechanics of the topic as well as an understanding of the basic underlying theories.
3- Students should be able to follow and to construct a formal mathematical proof using each of the following methods: a direct proof, a proof by contradiction and a proof by induction.
4- Students should be able to communicate mathematical ideas both in written and oral form for a variety of audiences.
5- Students should be able to identify some of the key historical figures in the field of abstract algebra.
6- Students should be able to demonstrate an understanding of the relationship of abstract algebra to other branches of mathematics and to related fields.
7. Students should be able to independently explore related topics using resources other than the text.

12. Student's obligation

1- Attendance.
2- Quiz.
3- tests about some questions after each month.
4- There examinations will be given, each 40%.
5- Final exam 60%.

13. Forms of teaching

1- data show
2- whiteboard
3- Power point

14. Assessment scheme

1- Attendance.
2- Quiz. 3%
3- Participation and discussion in the class 3%
4- Assignments (H.W) 2%
5- Tests about some questions after each month. 2%
6- Midterm tests 2(each 15%) 30% (December , March)
7- Final Examination 60%

15. Student learning outcome:

1- Students will read, interpret, and use the vocabulary, symbolism, and basic definitions used in abstract algebra, including binary operations, relations, groups, subgroups, homomorphisms, rings, and ideals.
2- Students will develop and apply the fundamental properties of abstract algebraic structures, their substructures, their quotient structure, and their mappings. Students will also prove basic theorems such as Lagrange's theorem, Cayley's theorem, and the fundamental theorems for

groups and rings.

3- Students will use the facts, formulas, and techniques learned in this course to prove theorems about the structure, size, and nature of groups, subgroups, quotient groups, rings, subrings, ideals, quotient rings, and the associated mappings. Students will also solve problems about the size and composition of subgroups and quotient groups; the orders of elements; isomorphic groups and rings; and the composition of ideals.

16. Course Reading List and References:

1-J. B. Fraleigh "*A First Course in Abstract Algebra*". Addison Wesley publishers. Reading, Mass. (1982)

2- I. N. Herstien, "*Topics in Algebra"*, John Wieley and Sons, New-York, (1975).

3- D. Burten, " *An Introduction to Modern Abstract Algebra*". Addison Wesley.

4- S. Singh & Q. Zameeraddin, "*Modern Algebra*". Vikas publishing house, (2000)

5- Dummit & Foote. "*Abstract Algebra*", (2007)

6- J.petere , cameon," *Introduction to Modern Algebra"* (2008).

7- د.بروين علي حمادي " الجبر المجرد الزمر والحلقات " منشورات جامعة عمر المختار البيضاء.

17. The Topics:	Lecturer's name
Second Course: Ring theory **1& 2 Week 16/1-23/1:** Rings, definitions and examples. **3 &4 & 5 Week 30/1--6/2-13/2:** Some types of Rings **6 Week 20/2:** Subrings **7&8 Week 27/2-6/3:** Ideals **9 Week:** Exam **10 & 11 week: holiday** **12&13&14 Week 27/3- 3/4- 10/4:** Quotient Rings **15 &16 Week 17/4-24/4:**. Homomorphisms Final exam	Neshtiman N. Sulaiman
18. Practical Topics (If there is any)	

19. Examinations:

There will be two two-hour examinations given during the semester (each announced at least one week of prior notice) and a final examination.

• Homework I will collect homework every two week .

.* Quiz every week.

20. Extra notes:

21. Peer review	**پێداچوونەوەی هاوەڵ**