MATH 3131 Honors in Linear and Abstract Algebra II
Course Outline Spring 2023-2024

- **Instructor(s)**
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- **Teaching Assistant(s)**
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- **Meeting Time and Venue**
  <u>*Lectures:*</u>

  Date/Time: Wednesday and Friday, 13:30 – 14:50

  Venue: Room 4502

  <u>*Tutorials:*</u>
  Date/Time: Monday, 19:00-19:50

  Venue: Room 2463

- **Course Description**
  Credit Points: 3
  Pre-requisite: MATH 2131 Honors in Linear and Abstract Algebra I
  Exclusion: NIL
  Brief Information/synopsis:
      This course is for honored students. It is continuation of Honors in Linear and
  Abstract Algebra I. It covers basic concepts and theorems on abstract algebra
  including groups, rings, modules and fields.

- **Intended Learning Outcomes**
  Upon successful completion of this course, students should be able to:

No.	ILOs
1	Recognize and use appropriately important technical terms and definitions.
2	Use algebraic techniques to formulate and apply the fundamental theorems in concise form.
3	Understand and apply the basic concepts and theorems in abstract algebra.
4	Understand and apply the techniques of abstract algebra.
5	Able to write rigorous proof

- **Assessment Scheme**
  - Homeworks
  - Examinations

Assessment	Assessing Course ILOs
30% Homework	1, 2, 3, 4
30% Midterm	1, 2, 3, 4
40% Final	1, 2, 3, 4

- The grading is assigned based on students' performance.

- **Student Learning Resources**
  Recommended Reading:
  Text(s):
  D.S. Dummit, R.M. Toote "Abstract Algebra", 3rd edition.
  J.A. Gallian, "Contemporary Abstract Algebra", 10th edition.
  M. Artin, "Algebra", 2nd edition.
  P. Aluffi, "Algebra: Chapter 0", GMS 104.

- **Teaching and Learning Activities**
  Scheduled activities: 4 hrs (lecture + tutorial)

- **Course Schedule**
  Keyword Syllabus:
  - Group, subgroup, cyclic groups, abelian groups, homorphism, kernel, normal subgroups, quotient group, product groups, cosets, group actions, orbits, p-groups. Lagrange Theorem, Cayley's theorem, Sylow's Theorems.
  - Ring, polynomial ring, homomorphism, ideals, quotient ring, fraction, Euclidean domain, principal ideal domain (PID), unique factorization domain (UFD)
  - Module, free module, generator and relation, Noetherian properties, structure of Abelian group.
  - Field, algebraic element, transcendental element, field extension, irreducible polynomial, finite field.