Classes meet: TTh 3:30–4:45 in Bliss 205.

Professor: Kamal Khuri-Makdisi, Bliss 311, phone 4234. The best way to contact me is to send e-mail to **kmakdisi@aub.edu.lb** . My office hours will be announced soon. Also, you should always feel free to contact me by e-mail at other times, if you have any questions. You can also contact me by e-mail or through the discussion forum in Moodle.

Required textbook: Michael Artin, *Algebra*, 2nd edition, available at the AUB Bookstore.

Optional, but useful, supplementary textbooks: The first five can be borrowed from Jafet Library; the sixth is only available online.

    1) Friedberg, Insel, and Spence, *Linear Algebra*

    2) Hoffman and Kunze, *Linear Algebra*

    3) Curtis, *Linear Algebra: an Introductory approach* — available online from AUB computers at
`https://link.springer.com/book/10.1007/978-1-4612-1136-5`

    4) Roman, *Advanced Linear Algebra* — another book available electronically from AUB at
`https://link.springer.com/book/10.1007/978-0-387-72831-5`

    5) Greub, *Linear Algebra* — yet another book available electronically from AUB at
`https://link.springer.com/book/10.1007/978-1-4684-9446-4`

    6) Treil, *Linear Algebra Done Wrong*, available electronically at
`https://sites.google.com/a/brown.edu/sergei-treil-homepage/linear-algebra-done-wrong`

Course requirements: The grade will be based on 15% weekly problem sets, 35% midterm, and 50% final. If needed, I may give brief quizzes at other points in the semester.

It is **very important** to keep up with the homework in this course, otherwise you will do badly on the midterm and the final exam. The problem sets will be challenging — it's the only way to really learn the mathematics.

You may discuss homework problems with your classmates but you may **not** solve homework together. You must write your problem set **in your own words, based on your own understanding of the solution.** I encourage you to look up material in other books and articles, but if you use this resource in your solution of a problem, please give a reference to the text you used for each problem. **You MUST include in EACH problem set the names of any people you discussed the problem with, and full references to any books or websites you used in solving the problems.**

Prerequisites for this course: Math 241 or the equivalent, and also preferably Math 219 but Math 218 will do provided you review some of your linear algebra at a more conceptual level from the above books. Specifically, in linear algebra, you should be comfortable with abstract vector spaces and subspaces, linear transformations, characteristic polynomials and diagonalization of matrices, and orthonormal bases in inner product spaces. In abstract algebra, you should be familiar with groups, subgroups, quotient groups, rings (including the definition of a field), ideals, quotient rings, and homomorphisms of groups or of rings. We start at the conceptual level of Math 241 and build up from there.

Topics to be covered: this list is subject to change.

    0. Review Chapter 1, on matrices, on your own.

    1. Brief review of topics from Math 219 (Chapter 3 and Sections 4.1–4.6, plus discussion of determinants).

    2. Orthogonal linear transformations, bilinear and Hermitian forms, spectral theorem (most of Chapters 5 and 8; possibly some topics from Chapter 9).

Midterm quiz
---

    3. Polynomial rings over a field and factorization; review of other results from ring theory, as needed (brief selections from Chapters 11 and 12 and/or from the Math 241 textbook).

    4. Modules over a Euclidean domain with application to Jordan canonical form and rational canonical form. Other topics if time permits (Chapter 14 and Section 4.7).

Statement from the Accessible Education Office: AUB strives to make learning experiences as accessible as possible. If you anticipate or experience academic barriers due to a disability (including mental health, chronic or temporary medical conditions), please inform me immediately so that we can privately discuss options. In order to help establish reasonable accommodations and facilitate a smooth accommodations process, you must also register with the Accessible Education Office, West Hall 304, Extension 3168, accessibility@aub.edu.lb

Other AUB Policies: By signing up for this course, you confirm that you have read and accepted the terms and provisions of AUB's **Privacy Statement** and policies on **Academic Integrity** and **Non-Discrimination**.