DALHOUSIE UNIVERSITY

Faculty of Science Course Syllabus
Department of Mathematics & Statistics
MATH 4045/5045: Advanced Algebra I
Fall 2016

Instructor: *Karl Dilcher*   *dilcher@mathstat.dal.ca*   *Chase 325*

Lectures: *MWF 1:35—2:25 pm*   *Dunn 302*

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Course Description
Introduction to module theory: modules, submodules, quotient modules, module homomorphisms, generators for modules, direct sums, free modules, tensor products, exact sequences, projective modules, injective modules, and flat modules. Modules over principal ideal domains. Additional topics may include homological algebra, Ext and Tor Functors, symmetric and exterior algebras.

Course Prerequisites:
MATH 3032

Course Objectives/Learning Outcomes
Through the study of module theory and related topics, students will learn some important topics of modern algebra. In the process, topics from third-year algebra will be reviewed, applied and reinforced. In particular, the stage will be set for further studies in algebra, most importantly for the follow-up course, Advanced Algebra II.

Course Material
The course content will be based on parts of the following two books:
- D.S. Summit and R.M. Foote, Abstract Algebra, 3rd Ed., Wiley 2004;
- T.W. Hungerford, Algebra, Springer, 1980.
Copies of both books, which are still in print, will be placed on reserve.
Course website: http://www.mathstat.dal.ca/~dilcher/4045/

Course Assessment

Component	Weight (% of final grade)	Date
Midterm test	*20%*	*TBA*
Final exam	*50%*	*TBA (during exam period)*
Assignments	*30%*	*weekly*

Other course requirements
This course is crosslisted as both an undergraduate and a graduate course. There will be one or more additional questions on most problem sets for students registered in the graduate version of the course (MATH 5045) and there will be an additional section on the final exam.

Conversion of numerical grades to Final Letter Grades follows the <u>Dalhousie Common Grade Scale</u>

A+ (90-100)	**B+** (77-79)	**C+** (65-69)	**D**	(50-54)
A (85-89)	**B** (73-76)	**C** (60-64)	**F**	(<50)
A- (80-84)	**B-** (70-72)	**C-** (55-59)		

Course Policies

Late assignments will normally not be accepted. However, reasonable accommodations will be made in the case of special circumstances.

Course Content
Introduction
Brief review of ring theory
Some category theory
Modules, submodules, homomorphisms
Exact sequences
Free modules and vector spaces
Projective and injective modules
Hom and duality
Tensor products
Modules over a principal ideal domain
Algebras

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ACCOMMODATION POLICY FOR STUDENTS

Students may request accommodation as a result of barriers related to disability, religious obligation, or any characteristic protected under Canadian Human Rights legislation. The full text of Dalhousie's Student Accommodation Policy can be accessed here:
http://www.dal.ca/dept/university_secretariat/policies/academic/student-accommodation-policy-wef-sep--1--2014.html

Students who require accommodation for classroom participation or the writing of tests and exams should make their request to the **Advising and Access Services Centre (AASC)** prior to or at the outset of the regular academic year. More information and the ***Request for Accommodation*** form are available at www.dal.ca/access.

ACADEMIC INTEGRITY

Academic integrity, with its embodied values, is seen as a foundation of Dalhousie University. It is the responsibility of all students to be familiar with behaviours and practices associated with academic integrity. Instructors are required to forward any suspected cases of plagiarism or other forms of academic cheating to the Academic Integrity Officer for their Faculty.

The Academic Integrity website (http://academicintegrity.dal.ca) provides students and faculty with information on plagiarism and other forms of academic dishonesty, and has resources to help students succeed honestly. The full text of Dalhousie's **Policy on Intellectual Honesty** and **Faculty Discipline Procedures** is available here:

http://www.dal.ca/dept/university_secretariat/academic-integrity/academic-policies.html

STUDENT CODE OF CONDUCT

Dalhousie University has a student code of conduct, and it is expected that students will adhere to the code during their participation in lectures and other activities associated with this course. In general:

"The University treats students as adults free to organize their own personal lives, behaviour and associations subject only to the law, and to University regulations that are necessary to protect
- the integrity and proper functioning of the academic and non – academic programs and activities of the University or its faculties, schools or departments;
- the peaceful and safe enjoyment of University facilities by other members of the University and the public;
- the freedom of members of the University to participate reasonably in the programs of the University and in activities on the University's premises;
- the property of the University or its members."

The full text of the code can be found here:
http://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

DALHOUSIE UNIVERSITY

SERVICES AVAILABLE TO STUDENTS

The following campus services are available to help students develop skills in library research, scientific writing, and effective study habits. The services are available to all Dalhousie students and, unless noted otherwise, are <u>free</u>.

Service	Support Provided	Location	Contact
General Academic Advising	Help with - understanding degree requirements and academic regulations - choosing your major - achieving your educational or career goals - dealing with academic or other difficulties	**Killam Library Ground floor** Rm G28 ***Bissett Centre for Academic Success***	In person: Killam Library Rm G28 By appointment: - e-mail: advising@dal.ca - Phone: (902) 494-3077 - Book online through MyDal
Dalhousie Libraries	Help to find books and articles for assignments Help with citing sources in the text of your paper and preparation of bibliography	**Killam Library Ground floor** Librarian offices	In person: Service Point (Ground floor) By appointment: Identify your subject librarian (URL below) and contact by email or phone to arrange a time: http://dal.beta.libguides.com/sb.php?subject_id=34328
Studying for Success (SFS)	Help to develop essential study skills through small group workshops or one-on-one coaching sessions Match to a tutor for help in course-specific content (for a reasonable fee)	**Killam Library 3rd floor** Coordinator Rm 3104 Study Coaches Rm 3103	To make an appointment: - Visit main office (Killam Library main floor, Rm G28) - Call (902) 494-3077 - email Coordinator at: sfs@dal.ca or - Simply drop in to see us during posted office hours **All information can be found on our website: www.dal.ca/sfs**
Writing Centre	Meet with coach/tutor to discuss writing assignments (e.g., lab report, research paper, thesis, poster) - Learn to integrate source material into your own work appropriately - Learn about disciplinary writing from a peer or staff member in your field	**Killam Library Ground floor** Learning Commons & Rm G25	To make an appointment: - Visit the Centre (Rm G25) and book an appointment - Call (902) 494-1963 - email writingcentre@dal.ca - Book online through MyDal We are open six days a week **See our website: writingcentre.dal.ca**