FLORIDA ATLANTIC UNIVERSITY™

Graduate Programs—NEW COURSE PROPOSAL[1]

UGPC APPROVAL _____
UFS APPROVAL _____
SCNS SUBMITTAL _____
CONFIRMED _____
BANNER POSTED _____
CATALOG _____

DEPARTMENT MATHEMATICAL SCIENCES

COLLEGE CHARLES E. SCHMIDT COLLEGE OF SCIENCE

RECOMMENDED COURSE IDENTIFICATION (*TO OBTAIN A COURSE NUMBER, CONTACT NMALDONADO@FAU.EDU*)

PREFIX ___MAS_____ COURSE NUMBER __6311_____ LAB CODE (L or C) _____

COMPLETE COURSE TITLE: COMMUTATIVE ALGEBRA

EFFECTIVE DATE
(first term course will be offered)
__FALL 2017_____

CREDITS[2]
3

TEXTBOOK INFORMATION
INTRODUCTION TO COMMUTATIVE ALGEBRA, BY M. F. ATIYAH AND I. G. MACDONALD, WESTVIEW PRESS (1994).

GRADING (*SELECT ONLY ONE GRADING OPTION*): REGULAR __X___ SATISFACTORY/UNSATISFACTORY _____

COURSE DESCRIPTION, NO MORE THAN THREE LINES:
AN INTRODUCTION TO COMMUTATIVE RINGS. TOPICS INCLUDE IDEALS, MODULES, RINGS AND MODULES OF FRACTIONS, INTEGRAL DEPENDENCE AND VALUATIONS, AND CHAIN CONDITIONS (NOETHERIAN AND ARTINIAN RINGS).

PREREQUISITES*	COREQUISITES*	REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL)*
MAS 5311 AND MAS 5312 WITH A GRADE OF "C" OR HIGHER		MUST BE ENROLLED IN THE GRADUATE LEVEL

* *PREREQUISITES, COREQUISITES AND REGISTRATION CONTROLS WILL BE ENFORCED FOR ALL COURSE SECTIONS.*

MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE:
MEMBER OF THE GRADUATE FACULTY OF FAU AND HAS A TERMINAL DEGREE IN THE SUBJECT AREA (OR A CLOSELY RELATED FIELD).

Faculty contact, email and complete phone number:	Please consult and list departments that might be affected by the new course and attach comments.[3]
Yuan Wang, ywang@fau.edu, 561-297-3317	

Approved by:	*Date:*
Department Chair: L. Stout	8/25/16
College Curriculum Chair: [signature]	10/21/16
College Dean: Dr. Charles Roberts	10/21/2016
UGPC Chair:	
Graduate College Dean:	
UFS President:	
Provost:	

1. **Syllabus** must be attached; see guidelines for requirements: *www.fau.edu/provost/files/course syllabus.2011.pdf*
2. Review **Provost Memorandum: Definition of a Credit Hour** *www.fau.edu/provost/files/Definition Credit_Hour_Memo_2012.pdf*
3. **Consent** from affected departments (attach if necessary)

Email this form and syllabus to *UGPC@fau.edu* **one week before** the University Graduate Programs Committee meeting.

Syllabus

1. COURSE TITLE	COURSE NUMBER	CREDIT HOURS
Commutative Algebra	MAS 6311	3

2. COURSE PREREQUISITES
MAS 5311 and MAS 5312 (Introductory Abstract Algebra 1 and 2) with a grade of "C" or higher

3. COURSE LOGISTICS

a. Fall 2017.
b. Taught in lecture-discussion style in-person (not online).
c. Course location is specified in the FAU course schedule.

4. INSTRUCTOR CONTACT INFORMATION
Lee Klingler, Office SE 228
Phone: (561) 297-3257, fax (561) 297-2436
E-mail address: klingler@fau.edu
Office hours: TBA

5. TA CONTACT INFORMATION
N/A

6. COURSE DESCRIPTION
An introduction to commutative rings. Topics include rings, ideals, modules, rings and modules of fractions, integral dependence and valuations, and chain conditions (Noetherian and Artinian rings).

7. COURSE OBJECTIVES

This course is a steppingstone for other courses; the topics students learn in this course are part of the standard tool kit of all mathematicians specializing in any of the many areas of abstract algebra. Upon successful completion of the course, students will have learned the basics of commutative algebra and be prepared to take advanced courses in abstract algebra and algebraic geometry.

8. COURSE EVALUATION METHOD
There will be three homework projects $\{H_1, H_2, H_3\}$, each having a maximum score of 20 points. Homework project H_1 will be assigned in the 3rd week of classes, homework project H_2 will be assigned in the 7th week of classes, and homework project H_2 will be assigned in the 11th week of classes. The exact assignment due date will be specified on each assignment. Graded homework projects will be returned in class or can be picked up during office hours in the instructor's office.
In addition, there is a cumulative final exam, which is scheduled in accordance with FAU's final exam schedule. The maximum score for the final exam is 40 points.

9. COURSE GRADING SCALE
Your overall grade in the course is derived from your cumulative performance as follows:
1) The points from the items H_1, H_2, H_3 and the final exam are added, yielding a final number of points $0 \le P \le 100$.
2) Your grade is derived from P according to the following table.

Value of P	Grade
>94	*A*
>90 – 94	*A-*
>87 – 90	*B+*
>83 – 87	*B*
>80 – 83	*B-*

>75 – 80	*C+*
>65 – 75	*C*
>60 – 65	*C-*
>57 – 60	*D+*
>53 – 57	*D*
>50 – 53	*D-*
<50	*F*

10. POLICY ON MAKEUP TESTS, LATE WORK, AND INCOMPLETES

If you cannot complete an assignment in due time to a relevant and documented reason, you can make up the respective assignment. Extra credit work is not possible.

A grade of *I* (incomplete) will only be given under certain conditions and in accordance with the academic policies and regulations put forward in FAU's University Catalog. The student has to show exceptional circumstances why requirements cannot be met. A request for an incomplete grade has to be made in writing with supporting documentation, where appropriate.

11. SPECIAL COURSE REQUIREMENTS

N/A

12. CLASSROOM ETIQUETTE POLICY

N/A

13. DISABILITY POLICY STATEMENT

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) located in Boca Raton - SU 133 (561-297-3880), in Davie - MOD I (954-236-1222), in Jupiter - SR 117 (561-799-8585), or at the Treasure Coast - CO 128 (772-873-3305), and follow all OSD procedures.

14. CODE OF ACADEMIC INTEGRITY POLICY STATEMENT

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty, including cheating and plagiarism, is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001 at http://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf .

15. REQUIRED TEXTS/READINGS

A standard textbook for the course is *Introduction to Commutative Algebra,* by M. F. Atiyah and I.G. MacDonald, Westview Press (1994).

16. SUPPLEMENTARY READINGS

The following references can supplement the material covered in class.

- *Commutative Ring Theory,* by Hideyuki Matsumura, Cambridge University Press (1986).
- *Commutative Algebra with a View toward Algebraic Geometry,* by David Eisenbud, Springer-Verlag (1995).

17. COURSE TOPICAL OUTLINE

The following topics are to be covered. The exact duration per topic will vary in dependence on prior experience of the class participants, but a typical duration per topic is three weeks.

1) Rings and ideals: homomorphisms, quotient rings, prime and maximal ideals, radicals, operations on ideals, extension and contraction.
2) Modules: homomorphisms, submodules and quotient modules, operations on modules, exact sequences, tensor products, restriction and extension of scalars, exactness properties of tensor products.

3) Rings and modules of fractions: local properties, extended and contracted ideals in rings of fractions.
4) Integral dependence and valuations: going-up, integrally closed domains, going down, valuation rings.
5) Chain conditions: Noetherian rings, Artinian rings.

18. WEEKLY SCHEDULE

Week #1: Read Chapter 1 of the textbook.
Week #2: Turn in Exercises #2, 3, 5, pages 10-11 of the textbook.
Week #3: Turn in Exercises #6, 7, 9, 10, 11, 12, page 11 of the textbook.
Week #4: Turn in Exercises #14, 15, 16, page 12 of the textbook.
Week #5: Read Chapter 2 of the textbook.
Week #6: Turn in Exercises #6, 7, 9, 10, 11, page 32 of the textbook.
Week #7: Turn in Exercises #4, 5, 8, 12, 13, pages 31-32 of the textbook.
Week #8: Read Chapter 3 of the textbook.
Week #9: Turn in Exercises #1, 4, 6, 7, 8, pages 43-44 of the textbook.
Week #10: Turn in Exercises #5, 9, 12, 13, 17, pages 44-46 of the textbook.
Week #11: Read Chapter 5 of the textbook.
Week #12: Turn in Exercises #3, 4, 5, 6, 7, page 67 of the textbook.
Week #13: Turn in Exercises #27, 28, 29, 30, 31, page 72 of the textbook.
Week #14: Read Chapters 6, 7, and 8 of the textbook.
Week #15: Turn in Exercises #1, 2, 3, 4, 6, pages 78-79 of the textbook.