FLORIDA ATLANTIC UNIVERSITY™

Graduate Programs—NEW COURSE PROPOSAL[1]

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

DEPARTMENT: MATHEMATICAL SCIENCES

COLLEGE: SCIENCE

RECOMMENDED COURSE IDENTIFICATION:

PREFIX MHF **COURSE NUMBER** 6306 **LAB CODE** (L or C) _____

(TO OBTAIN A COURSE NUMBER, CONTACT RSHIMAN@FAU.EDU)

COMPLETE COURSE TITLE: MATHEMATICAL LOGIC

EFFECTIVE DATE
(first term course will be offered)

CREDITS: 3

TEXTBOOK INFORMATION:
Fundamentals of Mathematical Logic, P. Hinman, A. K. Peters, 2005

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

COURSE DESCRIPTION, NO MORE THAN THREE LINES:

To introduce students to mathematical logic, as currently practiced, and other topics in the foundations of mathematics.

PREREQUISITES *:	**COREQUISITES*:**	**REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL)*:**
Analysis (MAA 5228) and Algebra (MAS 5311) or permission of the instructor.	NONE	

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

MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE:
PH.D. IN MATHEMATICS

Faculty contact, email and complete phone number:	Please consult and list departments that might be affected by the new course and attach comments.[3]
Robert Lubarsky rlubarsk@fau.edu 297-3341	Computer Science Philosophy

Approved by:	*Date:*
Department Chair: Rae Klinger	4/9/13
College Curriculum Chair:	4/25/13
College Dean:	4/25/13
UGPC Chair: Deborah Lee	9-11-13
Graduate College Dean: Barry Rosen	9-12-13
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 so that materials may be viewed on the UGPC website prior to the meeting.

Mathematical Logic
MHF 6306

CREDITS: 3
PRE-REQS: Analysis (MAA 5228) and Algebra (MAS 5311) or permission of the instructor.
TERM: Fall or Spring, 20XX
TIME & ROOM:
INSTRUCTOR: Robert S. Lubarsky
OFFICE: SE 206
OFC HOURS: TBA
TELEPHONE: (561) 297-3341 (ofc), (954) 396-3208 (home)
EMAIL: rlubarsk@fau.edu

DESCRIPTION: To introduce students to mathematical logic, as currently practiced, and other topics in the foundations of mathematics

OBJECTIVES: The students should understand the following:

- formal language
- proof
- model
- decision procedure
- Soundness and Completeness Theorems
- Compactness Theorem
- Gödel's Incompleteness Theorems.

EVALUATION: There will be graded homework assignments accounting for 40% of the student's cumulative performance, a midterm exam accounting for 30% of the student's cumulative performance, and a final exam that accounts for 30% of the cumulative performance. The overall grade in the course is derived from the cumulative performance according to the following table.

>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

MAKE-UP EXAMS: If a student cannot attend an exam or hand in a homework project on time due to circumstances beyond their control then the instructor may assign appropriate make-up work. Students will not be penalized for absences due to participation in University-approved activities, including athletic or scholastics teams, musical and theatrical performances, and debate activities. These students will be allowed to make up missed work without any reduction in the student's final course grade. Reasonable accommodation will also be made for students participating in a religious observance. Also, note that grades of Incomplete ("I") are reserved for students who are passing a course but have not completed all the required work because of exceptional circumstances. A grade of "I" 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 must 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.

ATTENDANCE: Students are expected to attend all classes, except for the reasons mentioned in the make-up exams section. More than five unexcused absences will result in a deduction of at least 10 points from the overall average of the exams grade. Non-attendance, whether excused or not, does not diminish students' responsibility for keeping up with the class and receiving any materials handed out in class.

CLASSROOM ETIQUETTE: University policy on the use of electronic devices states: "In order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular telephones and pagers, are to be disabled in class sessions."

SPECIAL ACCOMMODATIONS: 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 the Office for Students with Disabilities (OSD) located in Boca Raton in SU 133 (561-297-3880) and follow all OSD procedures.

HONOR CODE POLICY STATEMENT: Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty 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.

SAMPLE TEXT: Fundamentals of Mathematical Logic, P. Hinman, A. K. Peters, 2005.
SUPPLEMENTARY READINGS: Gödel's Proof, E. Nagel and J. Newman, NYU Press, 2001.
Logic for Applications, A. Nerode and R. Shore, 2nd Ed, Springer Verlag, NY, 1997.
Introduction to Mathematical Logic, Elliott Mendelson, Chapman and Hall/CRC

OUTLINE: Propositional logic: syntax, semantics, soundness and completeness, model constructions
Predicate logic: syntax, semantics, and soundness and completeness, examples
Gödel's Incompleteness Theorems
Modal and constructive (intuitionistic) logic

Sample Weekly Schedule

Week	Topic
1	Introduction; propositional logic – syntax, basic properties of the standard connectives. Read 1.1, do #1-5.
2	Propositional logic – semantics, theories, compactness. Read 1.3-4, do 1.3 #1-4, 1.4 #2-6.
3	Propositional logic – soundness and completeness, decidability and enumerability, ultraproducts. Read 1.5-6, do 1.5 #1,3,5,8, 1.6 #2-5.
4	Predicate logic – syntax, semantics. Read 2.1-2, do 2.1 #1-4, 2.2 #2,4,6,7.
5	Predicate logic – substructures, elementary equivalence, Levy hierarchy, chains. Read 2.3-4, do 2.3 #2-5, 2.4 #1,4,5,8.
6	Predicate logic – theories, examples (equality, dense linear order, arithmetic), Löwenheim-Skolem; first exam. Read 2.5-6, do 2.5 #3,4,6,7, 2.6 #1-3.
7	Gödel's Completeness Theorem – historical and philosophical background, proof, consequences and extensions. Read 3.1-2, do 3.1 #2-4,6,7, 3.2 #1-4.
8	Higher-order and infinitary logic – applications, syntax, semantics. Read 3.4-7, do 3.4 #1,2, 3.5 #2-4, 3.6 #1, 3.7 #2.

9	Gödel's Incompleteness Theorems – computability, enumerability, definability, representability. Read 4.1, 4.5, 4.6, do 4.5 #1-3, 4.6 #1-4.
10	Constructive logic – historical and philosophical background, semantics. Read 5.1, do #1-7.
11	Constructive logic – proofs, soundness and completeness, decidability. Read 5.2-3, do 5.2 #2,3,5, 5.3 #1,4,6.
12	Constructive mathematics – foundations, analysis, algebra; second exam. Read 5.4, do #1-3.
13	Overflow buffer for what doesn't happen by the schedule above; other topics as below
14	Sample extra topics, many of which are likely to be mentioned earlier in the semester: the halting problem, non-standard models of arithmetic, ordinal analysis of theories, set theory, decidable theories, lambda calculus, model theory