

Term Information

Effective Term Autumn 2016
Previous Value Summer 2012

Course Change Information

What change is being proposed? (If more than one, what changes are being proposed?)

- * Course number is decimalized
- * Quarter course references in prerequisites removed
- * Minor adjustments to prerequisites

What is the rationale for the proposed change(s)?

Mathematics proposes to split all mathematics 7000-level courses into a .01 and .02 section. For a given course both sections will be taught in the same lecture but with different

expectations. The .01 section, for a given course, is open to pre-candidacy math students and non-math students, letter graded, and based on the same expectations as the original course.

The .02 section is open only to post-candidacy math students, S/U graded, and assessment

will in the form of oral presentations or more scientifically oriented write-ups rather than routine homework and exams as in the .01 section. This will allow post-candidacy students to receive supplementary training without diverting too much time from their dissertations. Given our current population of students and the post-candidacy arrangements the references to quarter courses have become obsolete and also confusing to newer students.

What are the programmatic implications of the proposed change(s)?

(e.g. program requirements to be added or removed, changes to be made in available resources, effect on other programs that use the course)?

The proposal does no impact pre-candidacy requirements and is resource neutral.

Is approval of the request contingent upon the approval of other course or curricular program request? Yes

Please identify the pending request and explain its relationship to the proposed changes(s) for this course (e.g. cross listed courses, new or revised program)

Contingent on approval of 7221.02 new course request. See explanations above.

Is this a request to withdraw the course? No

General Information

Course Bulletin Listing/Subject Area	Mathematics
Fiscal Unit/Academic Org	Mathematics - D0671
College/Academic Group	Arts and Sciences
Level/Career	Graduate
Course Number/Catalog	7221.01
<i>Previous Value</i>	<i>7221</i>
Course Title	Ergodic Theory I
Transcript Abbreviation	Ergodic Theory 1
Course Description	Measure preserving transformations; isomorphism, conjugacy, spectral isomorphism; measure preserving systems with discrete spectrum; hierarchy of mixing properties; invariant measures for continuous transformations; topological and symbolic dynamics.
Semester Credit Hours/Units	Fixed: 3

Offering Information

Length Of Course	14 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Lecture
Grade Roster Component	Lecture
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	Math 6211.
Previous Value	6212 (752) .
Exclusions	Not open to students with credit for 7221.02
Previous Value	Not open to students with credit for 931.

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code	27.0103
Subsidy Level	Doctoral Course
Intended Rank	Doctoral

Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Students will acquire the theoretical understanding and problem solving skills in ergodic theory that will enable them to use techniques in this field in conducting mathematical research in related areas.

[Previous Value](#)

COURSE CHANGE REQUEST
7221.01 - Status: PENDING

Last Updated: Vankeerbergen, Bernadette
Chantal
12/08/2015

Content Topic List

- Measure preserving transformations
- Isomorphism, conjugacy and spectral isomorphism
- The hierarchy of mixing properties
- Invariant measures for continuous transformations
- Topological dynamics
- Symbolic dynamics

Attachments

- MATH_7221.01_Syllabus.pdf: 7221.01 Syllabus
(Syllabus. Owner: Kerler, Thomas)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Kerler, Thomas	12/01/2015 02:01 PM	Submitted for Approval
Approved	Husen, William J	12/01/2015 02:02 PM	Unit Approval
Approved	Haddad, Deborah Moore	12/01/2015 02:56 PM	College Approval
Pending Approval	Nolen, Dawn Vankeerbergen, Bernadette Chantal Hanlin, Deborah Kay Jenkins, Mary Ellen Bigler Hogle, Danielle Nicole	12/01/2015 02:56 PM	ASCCAO Approval

Ergodic Theory 1

Instructor and Class Information

Lecturer:	Course Num.:
Office:	Lecture Room:
Phone:	Lecture Times:
Email:	Office Hours:

About Course Goals

FORMAT

The course will meet three times a week for 55 minutes each meeting. Instruction will be mainly by lecture delivered by the instructor. It may also include occasional in-class discussions as well as short student presentations, particularly, by post-candidacy students.

DESCRIPTION & GOALS

This course sequence is aimed at providing students with a solid working knowledge in the basic concepts, important techniques and examples in Ergodic Theory, and constitutes a natural continuation of the Math 6211-6212 sequences in Real Analysis. The course should be of interest to all students with research interests in various flavors of ergodic theory and dynamical systems, and its applications to study problems in Combinatorics, Number theory, Homegeneous Dynamics, Differential equations, Probability theory etc.

PREREQUISITES

Math 6211 (or equivalent strong background in Real Analysis)

Textbook

MAIN REFERENCE

Peter Walters, "*An Introduction to Ergodic theory*". Graduate Texts in Mathematics **79**, Springer 2000, ISBN-13: 978-0387951522.

ADDITIONAL REFERENCES

Karl E. Petersen, "*Ergodic Theory*". Cambridge Studies in Advanced Mathematics **2**, Cambridge University Press 1990, ISBN-13: 978-0521389976.

M. Einsiedler and T. Ward: "*Ergodic theory: with a view towards Number Theory*". Graduate Texts in Mathematics **259**, Springer 2010, ISBN-13: 978-0857290205.

Assessments

HOMEWORK ASSIGNMENTS

There will be approximately 6 homework assignment sheets, which will typically contain several fully described problems as well as a list of numbers of textbook problems. Due dates of assignments will announced and set typically a week after the assignments are published

FINAL PROJECT

The final project is a more extensive written assignment that will draw on techniques acquired throughout the semester. It will be published about two weeks before the end of classes and will be due at the beginning of finals week.

CLASS PARTICIPATION AND ATTENDANCE

Although attendance is not regularly monitored frequent absences are likely to be noted and may factor into the grade in borderline cases.

Grading

COURSE SCORE

A course score will be computed from the above assessments. Homework assignments will count 70% towards the grade and the final project 30%.

LETTER GRADES

Letter grades will be determined based on the course score. The approximate minimum scores for letter grades are 80% for an "A", 73% for an "A-", 67% for a "B+", 55% for a "B-", and 40% for a "C-". The exact cut-off scores may vary depending on the difficulty of assignments.

Weekly Schedule

Week 1	Review of σ -algebras, measure theory, function spaces, Spectral theorem etc.
Week 2	Measure preserving transformations, Recurrence, Variety of examples
Week 3	Basic constructions, Ergodicity criteria, Verification techniques in examples
Week 4	The Ergodic theorems –Maximal ergodic theorem, Pointwise ergodic theorem, Mean Ergodic Theorem
Week 5	Applications of ergodic theorems and examples
Week 6	Mixing and weak mixing criteria, Verification techniques, and Examples
Week 7	Isomorphism, conjugacy, spectral isomorphism, discrete spectrum
Week 8	Basics of Entropy theory
Week 9	Methods of calculating entropy and examples
Week 10	Topological Dynamics
Week 11	Invariant measures for Continuous transformations
Week 12	Topological Entropy and Information, Calculation of topological entropy
Week 13	The variational principle, Entropy of affine transformation,
Week 14	Miscellaneous topics

General Policies

ACADEMIC MISCONDUCT

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed;

illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct (http://studentaffairs.osu.edu/info_for_students/csc.asp).”

DISABILITY SERVICES

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; <http://www.ods.ohio-state.edu/>.