New Course Request

Check Appropriate Boxes: Undergraduate credit [ ] Graduate credit [x] Professional credit [ ]

1. School/Division Science
2. Academic Subject Code MATH
3. Course Number 667 (must be cleared with University Enrollment Services)
4. Instructor M. Misiurewicz
5. Course Title Dynamical Systems II
   Recommended Abbreviation (Optional) (Limited to 32 Characters including spaces)
6. First time this course is to be offered (Semester/Year): Spring 2010
7. Credit Hours: Fixed at 3.0 or Variable from ___ to ___
8. Is this course to be graded S-F (only)? Yes [x] No ___
9. Is variable title approval being requested? Yes [ ] No [x]
10. Course description (not to exceed 50 words) for Bulletin publication:
    P: Math 567. Math 667 is a continuation of Math 567, Dynamical Systems I. Students should learn more advanced notions and theorems concerning the theory of dynamical systems and their connections with other branches of mathematics.

11. Lecture Contact Hours: Fixed at 3.0 or Variable from ___ to ___
12. Non-Lecture Contact Hours: Fixed at 0 or Variable from ___ to ___
13. Estimated enrollment: 6, of which 100% percent are expected to be graduate students.
14. Frequency of scheduling: Spring even. Will this course be required for majors? Yes [x] No ___
15. Justification for new course: To offer advanced graduate math courses that reflect the faculty’s areas of expertise.
16. Are the necessary reading materials currently available in the appropriate library? Yes [x] No ___
17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials.
18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant.
19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by:  
Date 3/25/08

Approved by:  
Date 6/25/2008

Dean of Graduate School (when required)  
Date

Dean of Campus Chancellor/Vice-President (when required)  
Date

University Enrollment Services

After School/Division approval, forward the last copy (without attachments) to University Enrollment Services for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.
### Request for Addition, Expiration, or Revision of a Graduate Course

#### Course Information:
- **Department:** Mathematics
- **Effective Session:** Spring 2009
- **Course Number:** 667
- **Long Title:** Dynamical Systems II
- **Credit Range:** Minimum Cr. Hrs: 3.0
- **Variable Credit:** To
- **Pre-Requisites:** Math 567

#### Course Description:
Math 667 is a continuation of Math 567, Dynamical Systems I. Students should learn more advanced notions and theorems concerning the theory of dynamical systems and their connections with other branches of mathematics.

#### Course Attributes:
- **Instructor:** [Check if applicable]
- **Registration Approval Type:** Department [Check if applicable]
- **Remedial:** [Check if applicable]
- **Credit by Examination:** [Check if applicable]
- **Designator Required:** [Check if applicable]
- **Full-time Privilege:** [Check if applicable]

#### Cross-Listed Courses:

#### Affiliated Campuses:
- Calumet
- Fort Wayne
- Indianapolis
- N. Central
- Tech Statewide
- W. Lafayette

#### Approval Signatures:
- Calumet Department Head
- Calumet School Dean
- Calumet Undergrad Curriculum Committee
- Fort Wayne Department Head
- Fort Wayne School Dean
- Fort Wayne Chancellor
- Undergrad Curriculum Committee
- Indianapolis Department Head
- Indianapolis School Dean
- Indianapolis Chancellor
- North Central Department Head
- North Central School Dean
- North Central Chancellor
- West Lafayette Department Head
- West Lafayette College/School Dean
- West Lafayette Registrar
- Graduate Area Committee Convener
- Graduate Dean
- Graduate Council Secretary
- West Lafayette Registrar

#### Office of the Registrar
A. Justification for the Course
   - Explain how this course relates to other courses offered in the department or other departments and how this course fulfills a recognized need. This course allows us to offer advanced graduate courses in an area which reflects our faculty's expertise, and allows our students to obtain a formal introduction to the subject to aid in the transition to research.
   - This course is intended primarily for students Choose one: from within this department

B. Level of the course:
   - Justify request for graduate course level by indicating anticipated enrollments of undergraduate and graduate students.
     Anticipated Undergraduate Student Enrollment: None
     Anticipated Graduate Student Enrollment: 100%

C. Prerequisites: (If none, please explain reasons for absence)
   - MATH 567, with grade of C or higher

D. Course Instructor:
   - Instructor's Name Michal Misiurewicz

E1. Course Outline:
   - (An outline of topics to be covered and an indication of the relative emphasis or time devoted to each topic is necessary. If laboratory or field experience is involved, the nature of this component should be explained as well).

E2. Method of Evaluation or Assessment:
   - The final grade will be determined by a combination of homework, mid-term, and comprehensive final exam. See syllabus for more information.

F. Reading List:
   - A reading list or bibliography should be limited to material the students will be required to read in order to successfully complete the course. It should not be a compilation of general reference material.
Math 667
Dynamical Systems II

Syllabus

Math 667 – Dynamical Systems II (3 cr.)
Instructor: Michal Misiurewicz

The prerequisite for this course is completion of Math 567 with a minimal grade of C. Math 667 is a continuation of Math 567, Dynamical Systems I. Students should learn more advanced notions and theorems of the theory of dynamical systems and their connections with other branches of mathematics.

Text:
Supplemental: Notes by Michal Misiurewicz

Course Objectives/Content:
The following subjects will be covered:
• Topological Dynamics: topological mixing properties, omega-limit sets, distality and proximality.
• Combinatorial Dynamics: types of orbits for interval maps, rotation theory.
• Ergodic Theory: metric entropy, Variational Principle, classification of measure preserving transformations.
• Complex Dynamics: polynomials and rational maps on the Riemann sphere, Julia sets, Mandelbrot set.
• Fractals: Hausdorff dimension, Iterated Function Systems.

Grading:
The final grade will be determined by a combination of homework, mid-term, and comprehensive final exam, as distributed below:
  Homework – 20%
  Mid-term exam – 30%
  Final exam – 50%
The following grading scale will be used:
  90 – 100 A’s
  80 – 89 B’s
  70 – 79 C’s
  60 – 69 D’s
  0 – 59 F

Academic Honesty:
If you are not already familiar with the statement on academic honesty in the IU Student Code of Conduct (Part 3, Section A: Student Misconduct), please take the time to read this statement carefully: http://www.life.iupui.edu/help/docs/Part_3all.html
Cheating on assignments and tests or other academic works is a violation of university policy. Any behavior that is construed as cheating or academic dishonesty will not be tolerated in this course. This includes, but it is not limited to, plagiarism, cheating during exams, acquisition of tests or other academic materials, as well as aiding and abetting others in committing the violation.

**Student Code of Conduct:** The classroom protocol will be guided by the Student Code of Conduct which, among other things, asserts IUPUI's commitment "to maintain[ing] a spirit of civility in a community in which diversity is welcomed. Every student, staff, and faculty member plays a significant role in promoting an environment that is conducive to academic excellence by fostering a climate of civility and mutual respect." Consequently, in our meetings you are expected to treat one another with respect, to express your own ideas honestly, and to listen to others thoughtfully, attentively, and with a spirit of understanding. For the Student Code of Conduct, see: [http://life.iupui.edu/help/code.asp](http://life.iupui.edu/help/code.asp)

**Statement for Students with Disabilities:**
If you need any special accommodations due to a disability, please contact Adaptive Educational Services at (317) 274-3241. The office is located in CA 001E.