**FLORIDA ATLANTIC UNIVERSITY**

**Graduate Programs—NEW COURSE PROPOSAL**

**DEPARTMENT:** Complex Systems & Brain Sciences  
**COLLEGE:** CESCOS

**RECOMMENDED COURSE IDENTIFICATION:**

<table>
<thead>
<tr>
<th>PREFIX</th>
<th>COURSE NUMBER</th>
<th>LAB CODE (L or C)</th>
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<tbody>
<tr>
<td>ISC</td>
<td>5453</td>
<td>None</td>
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*(TO OBTAIN A COURSE NUMBER, CONTACT RPOLANSKI@FAU.EDU)*

**COMPLETE COURSE TITLE:** Nonlinear Dynamics in Complex Systems

**CREDITS:** 3

**TEXTBOOK INFORMATION:**


**GRADING (SELECT ONLY ONE GRADING OPTION):**

- Regular X
- Satisfactory/Unsatisfactory

**COURSE DESCRIPTION, NO MORE THAN 3 LINES:**

Introduction to nonlinear dynamical systems in an interdisciplinary setting. The topics covered in this course include one-, two- and three-dimensional ordinary differential equations, bifurcations, one- and two-dimensional maps, iterated function systems, time scale separation and self-organization, and elementary stochastic systems.

**PREREQUISITES**: None

**COREQUISITES**: None

**REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL)**: None

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

**MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE:** Ph.D. in Physics or Mathematics

Faculty contact, email and complete phone number:

Armin Fuchs  
afuchs@fau.edu  
561-297-0125

Departments and/or colleges that might be affected by the new course must be consulted and listed here. Please attach comments from each.

- Mathematical Sciences

**Approved by:**

- Department Chair: 
- College Curriculum Chair: 
- College Dean: 
- UGPC Chair: 
- Graduate College Dean: 

**Date:**

**ATTACHMENT CHECKLIST**

- Syllabus (see guidelines for requirements: http://www.fau.edu/graduate/facultypandstaff/programscommittee/index.php)
- Written consent from all departments affected by new course

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.

FAUnewcourseUG—Revised August 2011
Nonlinear Dynamics in Complex Systems

ISC 5453     Fall 2013

Course:     ISC 5453
Credits:     3

Prerequisites: None

Location: Behavioral Sciences #303

Time: Monday, Wednesday 11:00am-12:20pm

Instructor: Dr. Armin Fuchs

Office: Behavioral Sciences #307

Email/Phone: fuchs@ccs.fau.edu  561-297-0125

Office hours: Monday, Wednesday 12:30-1:30pm and by appointment

Description: Introduction to nonlinear dynamical systems in an interdisciplinary setting. The topics covered in this course include one-, two- and three-dimensional ordinary differential equations, bifurcations, one- and two-dimensional maps, iterated function systems, time scale separation and self-organization, and elementary stochastic systems.

Objectives: Successful completion of this course will enable students to follow the literature on Complex Systems and apply methods of nonlinear dynamics to their own research.

Topics: Ordinary differential equations and phase flow
Linear versus nonlinear
Dynamical systems in one, two and higher dimensions
Stability, potentials and Lyapunov functions
Stationary, periodicity, and non-periodic solutions
Discrete maps
Iterations in space
Time-scale separation, self-organization and synergetics
Stochastic systems

Grading: Midterm exam: 45% (take home exam, about 10 days)
Final exam: 45% (take home exam about 10 days)
Attendance and contributions during class: 10%

Makeup: Late work is not accepted except in extraordinary circumstances.

Disability policy statement

In compliance with the Americans with Disabilities Act (ADA), students who require reasonable accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) -- in Boca Raton, SU 133 (561-297-3880); in Davie, LA 240 (954-236-1222); in Jupiter, SR 110 (561-799-8010); or at the Treasure Coast, CO 117 (772-873-3441) - and follow all OSD procedures.

Code of Academic Integrity 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.
Required:

Bibliography:


Dear Armin,

The mathematics department supports your proposed new graduate course "Introduction to Dynamical Systems and Chaos". The proposed new course does not have substantial overlap with any course in the Department of Mathematical Sciences.

Best regards,

Lee