George Mason University  
Graduate Course Approval/Inventory Form  

Please complete this form and attach a copy of the syllabus for new courses. Forward it as an email attachment to the Secretary of the Graduate Council. A printed copy of the form with signatures should be brought to the Graduate Council Meeting. Complete the Coordinator Form on page 2, if changes in this course will affect other units.

Please indicate:  ___X___ NEW  ____ MODIFY  ____ DELETE

Local Unit: CSS  
Graduate Council Approval Date:

Course Abbreviation: CSS  
Number: 625

Full Course Title: COMPLEXITY THEORY IN THE SOCIAL SCIENCES

Abbreviated Course Title (24 characters max.): COMPLEXITY THEORY SOC SCI

Credit hours: 3:3:0  
Program of Record: CSS

Repeatable for Credit?  
___ D=Yes, not within same term  Up to ___ hours  
___ T=Yes, within the same term  Up to ___ hours  
___ N=Cannot be repeated for credit

Activity Code (please indicate):  ___ Lecture (LEC)  ___ Lab (LAB)  ___ Recitation (RCT)  
___ Studio (STU)  ___ Internship (INT)  ___ Independent Study (IND)  ___ Seminar (SEM)

Catalog Credit Format  3:3:0  
Course Level: GF(500-600)  ___  GA(700+)  ___

Maximum Enrollment: 20  
For NEW courses, first term to be offered: Fall 2005

Prerequisites: CSS 600 Previously or simultaneously

Catalog Description (35 words or less)  Please use catalog format and attach a copy of the syllabus for new courses: Examines social phenomena like language, terrorism, the internet, warfare, and wealth, that is based on power laws and far-from-equilibrium nonlinear dynamics. Emphasis on data analysis, modeling and interpreting complexity-theoretic dynamics.

For MODIFIED or DELETED courses as appropriate:

Last term offered:  
Previous Course Abbreviation:  
Previous number:

Description of modification:

APPROVAL SIGNATURES:
Submitted by:  __Prof. Claudio Cioffi-Revilla__ email: _ccioffi@gmu.edu

Department/Program:  _Center for Social Complexity_ Date: ____2/3/2004____

College Committee:  ___________________________ Date: __________________

Graduate Council Representative: __________________________ Date: __________________
Course Name and Number: CSS 625 Complexity Theory in the Social Sciences

Catalog Description: Examines social phenomena like language, terrorism, the internet, warfare, and wealth, that is based on power laws. Emphasis on data analysis and complexity-theoretic dynamics. Prerequisite or co-requisite: CSS 600 Introduction to Computational Social Science. This course satisfies one of the core requirements in the computational social science Ph.D. program.

Syllabus

Week 1: Introduction. Basic concepts in complexity theory.

Week 2: Power laws and related models.

Week 3: Statistical analysis of power laws. Empirical estimation and testing.

Week 4: Power laws in the social sciences I

Week 5: Power laws in the social sciences II

Week 6: Mathematical models of social complexity I

Week 7: Mathematical models of social complexity II

Week 8: Computational models and generative power laws

Week 9: First student presentations

Week 10: Violations of power laws and diagnostics: bending and limited range

Week 11: Theory of the potential and social complexity

Week 12: Early warning indicators and criticality in complex social systems

Week 13: Presentation and discussion of student projects (I)

Week 14: Presentation and discussion of student projects (II)


Other required readings: Selected readings from the course bibliography.