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:        Graduate Council Approval Date:

Course Abbreviation: INFS785       Course Number:

Full Course Title: Data Mining for Homeland Security

Abbreviated Course Title (24 characters max.):

Credit hours: 3       Program of Record: MSIS

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

Activity Code (please indicate):   _x_ 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:
Spring 2005
Prerequisites or corequisites: INFS755

Catalog Description (35 words or less) Please use catalog format and attach a copy of the syllabus for new courses:
This course covers analytic techniques that can be used for investigative analysis. Topics include Small World Graphs and as a way to model groups and organizations, Relational Data Mining with emphasis in predictive models, alias discovery techniques, and profiling.
For **MODIFIED or DELETED** courses as appropriate:

Last term offered:  Previous Course Abbreviation:  Previous number:

Description of modification:

**APPROVAL SIGNATURES:**

Submitted by:  email:  

Department/Program:  Date:  

College Committee:  Date:  

Graduate Council Representative:  Date:  

GEORGE MASON UNIVERSITY
Course Coordination Form

Approval from other units:
Please list those units outside of your own who may be affected by this new, modified, or deleted course. Each of these units must approve this change prior to its being submitted to the Graduate Council for approval.

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Graduate Council approval: ___________________________ Date: __________
Graduate Council representative: ___________________ Date: __________
Provost Office representative: _____________________ Date: __________
SAMPLE COURSE SYLLABUS
FOR
INFS785, Data Mining for Homeland Security (3:3:0)

A. COURSE ORGANIZATION AND SCHEDULE

- Introduction: examples of intelligence analysis tasks
- Advanced data mining models
  o Relational Data Mining
  o Probabilistic Relational Models
  o Learning PRMs
  o Link analysis
- Small world graphs and phenomena
  o Small world graphs, definitions
  o Examples of small world graphs in organizations
  o Case studies:
    ▪ Terrorist groups
    ▪ Electrical grid
  o Vulnerability
  o Group discovery algorithms
  o Social network analysis
- Profiling
  o Problems of profiling in data mining
  o The unbalanced classes and the base rate fallacy
  o Techniques for unbalanced classes.
  o Misclassification, error rates and their importance
- Alias detection problem
  o Algorithms
- Cybersecurity
  o Insider threat problem and some solutions
- Projects and presentations

B. READING AND REFERENCE MATERIAL

- Technical papers
- Small Worlds: The Dynamics of Networks between Order and Randomness Duncan Watts. Princeton University Press

C. STUDENT EVALUATION CRITERIA
The grades will be based on homework assignments, projects, and final exam