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:  Department of Geography, CAS  Graduate Council Approval Date:  19 May 2004

Course Abbreviation:  GEOG  Course Number:  644

Full Course Title:  Fundamentals and Interpretation of Imaging Radar

Abbreviated Course Title (24 characters max.):  Radar Remote Sensing

Credit hours:  3  Program of Record:  Geog MS

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 : 0 : 0  Course Level:  GF(500-600)  ___ GA(700+)  _ X__

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

Prerequisites or corequisites:
Geog 579 or EOS 753 or other basic course in remote sensing

Catalog Description (35 words or less)  Please use catalog format and attach a copy of the syllabus for new courses. Provides an understanding of the components, functionality and use of radar remote sensing for the acquisition of spatial information. The course concentrates on operational systems. Part of the course will be hands-on assignments.

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: __________
Geography 712, Fundamentals and Interpretation of Imaging Radar Syllabi

Course Objectives: Geography 712 provides an understanding of the components, functionality and use of radar remote sensing for the collection and analysis of spatial information. The course will concentrate on operational/available systems and primarily spaceborne platforms. Much of the learning experience is out-of-class, hands-on assignments as well as extensive examination of imagery in class.

Prerequisite: Geography prerequisite of a course in remote sensing, Geog 579 or EOS 753 or an equivalent course in remote sensing.

Syllabi

Week 1  Introductions, Remote Sensing Considerations, Electromagnetic Spectrum

Week 2  Radar Fundamentals, Vocabulary, Side Looking Airborne Radar, Radar Equation

Week 3  Energy Flow Profile for Radar, Surface Interactions, Slant Range and Ground Range

Week 4  Synthetic Aperature Radar, SAR Model, Radar Geometry

Week 5  Visual Interpretation Considerations, Foreshortening, Layover, SAR Digital Processing, Speckle Reduction

Week 6  Radargrammetry, Imaging Radar Interferometry

Week 7  Review of airborne and spaceborne radar systems, Sensor Fusion

Week 8  Agricultural and Forestry Applications with Radar

Week 9  Mapping Soil Moisture Distribution and Hydrologic Studies

Week 10  Radar Geology and Geomorphology

Week 11  Oceanography, Snow and Ice

Week 12  Land Use and Land Cover Mapping, Urban Features, Archaeology

Week 13  Student Research Presentations

Week 14  Student Research Presentations

**Recommended/Reference Texts:**

**Grading Procedure:** Course grade will be equally based on letter grades from: 1) midterm exam, 2) comprehensive final exam, 3) assignments, and 4) term paper. Letter grades for the examinations are based on a class/exam specific instructor determined curve (Predetermined percentile levels are not used). Exercises will be on various aspects of radar image processing and extraction of spatial information for radar both with automated techniques and visual analysis. Various spaceborne and airborne radar data sets will be examined, primarily by use of the ERDAS Imagine image processing software. Failure to satisfactorily complete all assignments will result in a course grade of F. Students will be required to present in class a summary of their term paper.

**Assignment Policy:** The assignments are an integral aspect of this course providing a significant component of the material you will be expected to understand. Because of the importance of these assignments, some policies concerning their completion are necessary. These policies include:

1. Assignments are due at the beginning of the class as scheduled.

2. All late assignments, unless a valid excuse is accepted, will be penalized on a geometrically progressing basis.

3. Assignments not completed or inadequately completed are sufficient reason to receive a failing or incomplete course grade.

**Honor Code:** Students are expected to review and abide by the GMU Honor Code.