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: _____ NEW  _____ MODIFY  _____ DELETE

Local Unit:  CS  Graduate Council Approval Date:  

Course Abbreviation:  Biometrics  Course Number:  CS 667 / IT 667

Full Course Title:  Biometrics

Abbreviated Course Title (24 characters max.):  Biometrics

Credit hours:  3  Program of Record:  CS

Repeateable 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):  __x_ Lecture (LEC)  ___ Lab (LAB)  ___ Recitation (RCT)
   ___ Studio (STU)  ___ Internship (INT)  ___ Independent Study (IND)  ___ Seminar

(CSEM)

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

Maximum Enrollment:  30  For NEW courses, first term to be offered:
Prerequisites or corequisites:  CS 580 or permission of the instructor

Catalog Description (35 words or less)  Please use catalog format and attach a copy of the syllabus for new courses:

667 / IT 667  Biometrics (3:3:0) Basic principles and methods for automatic authentication of individuals. Technologies include face, fingerprint and iris recognition, and speaker verification. Additional topics cover multimodal biometrics, system design, performance evaluation, and privacy issues. Term project required.

For MODIFIED or DELETED courses as appropriate:
Last term offered:  Previous Course Abbreviation:  Previous number:

Description of modification:

APPROVAL SIGNATURES:
Submitted by:  ___Harry Wechsler___  email: wechsler@gmu.edu

Department/Program:  Computer Science  Date:  January 28, 2004

College Committee:  ________________________________  Date:  __________________

Graduate Council Representative:  ________________________________  Date:  __________________
 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: ____________
I. CATALOG DESCRIPTION

A. CS 667 / IT 667 – Biometrics (3:3:0)

B. Prerequisites: CS580 or permission of the instructor

C. Catalog Description:

667 / IT 667 Biometrics (3:3:0) Basic principles and methods for automatic authentication of individuals. Technologies include face, fingerprint and iris recognition, and speaker verification. Additional topics cover multimodal biometrics, system design, performance evaluation, and privacy issues. Term project required.

II. JUSTIFICATION

A. Course objectives: The objective of this course is to teach graduate CS students about biometrics, the science of automatic authentication of personal identity. Biometrics is a field of growing importance to homeland security and electronic commerce. The course is comprehensive in range of topics covered and it focuses on major technologies, multimodal biometrics, system design and implementation, comparative performance evaluation, and privacy issues. Students are exposed to the above topics via lectures and appropriate reading assignments, including recent journal and conference papers. Students are expected to complete a term project and to make an in depth presentation on a topic related to biometrics.

B. Course necessity: Biometrics, the science of recovering or verifying a person's identity, measures the physical or behavioral characteristics that make people unique—including fingerprints, an eye's retina or iris, face, hand geometry, signature and voice—and uses those measurements for personal authentication. Biometrics is related to the science of forensics, which uses and interprets physical evidence for legal purposes. The importance of biometrics lies in the fact that traditional means of identification and verification are often unreliable or cumbersome: Passwords are difficult to remember and easy to steal. Keys, driver's licenses, and passports can be lost or forged. The human body and its behavior, on the other hand, can't be forgotten, stolen, forged, or misplaced. Practical uses for biometrics are wide spread and include maintaining the security for both physical and cyber space. In particular, biometrics aids in controlling access to an office, computer network or an ATM, smart cards, wireless communication; confirming the identity of buyers and sellers to make electronic commerce safe and reliable; confirming student identity for distant learning; and safeguarding electronic records related to health care services.

Emerging trends in biometrics employ additional physical characteristics, beyond human external appearance, e.g., the way people look, which are related to behavioral appearance, e.g., the way people act. Human behavior, like gait and running—subject of interest for recent W5+ (who, where, when, what, why, and HOW) image understanding systems, are closely related to Human-Computer Intelligent Interaction (HCII). The scope for biometrics is multi- and inter-disciplinary as it draws from several fields, ranging from signal and image processing, computer vision and pattern recognition, speech processing, machine learning, to cognitive and neurosciences.

C. Course relationship to Graduate Program: This course follows an introductory CS580 - Artificial Intelligence course, is complementary to other CS offerings related to data analysis, and leads to CS 777 – Human-Computer Interaction (HCI). There is no other course offered for our graduate students which teaches those topics at this level.

III. APPROVAL HISTORY

A. Approved by Computer Science Graduate Committee on January 21, 2004
B. Approved by Department of Computer Science on January 28, 2004
C. Approved by IT&E Graduate Studies Committee on January xx, 2004
D. Approved by the IT&E Dean on

IV. SCHEDULING and PROPOSED INSTRUCTORS

Time of Initial Offering: Fall 2004
Proposed Instructor: Harry Wechsler

V. COURSE OUTLINE

1. Introduction
2. Technologies: Face, Fingerprints, Hand Geometry, Iris, and Speech
3. Emerging Technologies
4. Multimodal Biometrics
5. System Design and Evaluation
7. Privacy Issues

Reference Sources