



Course Approval Form

For approval of new courses and deletions or modifications to an existing course.

registrar.gmu.edu/facultystaff/curriculum

Action Requested:

Create new course Inactivate existing course

Modify existing course (check all that apply)

Title Credits Repeat Status Grade Type

Prereq/coreq Schedule Type Restrictions

Other: _____

Course Level:

Undergraduate

Graduate

College/School: Department:

Submitted by: Ext: Email:

Subject Code: Number: Effective Term: Fall
 Spring Year
 Summer

(Do not list multiple codes or numbers. Each course proposal must have a separate form.)

Title: Current

Banner (30 characters max including spaces)

New

Credits: 3 Fixed or
 Variable to

Repeat Status: Not Repeatable (NR)
 Repeatable within degree (RD) Maximum credits allowed:
 Repeatable within term (RT)

Grade Mode: Regular (A, B, C, etc.)
 Satisfactory/No Credit
 Special (A, B, C, etc. +IP)

Schedule Type: 3 Lecture (LEC)
 Lab (LAB)
 Recitation (RCT)
 Internship (INT)

Independent Study (IND)
 Seminar (SEM)
 Studio (STU)

Prerequisite(s):

Corequisite(s):

Instructional Mode:

100% face-to-face

Hybrid: ≤ 50% electronically delivered

100% electronically delivered

Restrictions Enforced by System: Major, College, Degree, Program, etc. Include Code.

Are there equivalent course(s)?

Yes No

If yes, please list

Catalog Copy for NEW Courses Only (Consult University Catalog for models)

Description (No more than 60 words, use verb phrases and present tense)	Notes (List additional information for the course)
Historical development of DNA profiling methods, current DNA typing techniques and the ongoing development of new forensic DNA typing methods. Emphasis will be placed on various analytical techniques used in the analysis of forensic evidence.	
Indicate number of contact hours: _____	Hours of Lecture or Seminar per week: <input type="text" value="3"/> Hours of Lab or Studio: <input type="text"/>
When Offered: (check all that apply) <input type="checkbox"/> Fall <input type="checkbox"/> Summer <input checked="" type="checkbox"/> Spring	

Approval Signatures

Department Approval _____ Date _____ College/School Approval _____ Date _____

If this course includes subject matter currently dealt with by any other units, the originating department must circulate this proposal for review by those units and obtain the necessary signatures prior to submission. Failure to do so will delay action on this proposal.

Unit Name	Unit Approval Name	Unit Approver's Signature	Date

For Graduate Courses Only

Graduate Council Member _____ Provost Office _____ Graduate Council Approval Date _____

For Registrar Office's Use Only: Banner _____ Catalog _____

Course Proposal Submitted to the Curriculum Committee of the College of Science

1. COURSE NUMBER AND TITLE:
BIOL 487
DNA Analysis of Biological Evidence

Course Prerequisites:
BIOL 311 or permission of instructor

Catalog Description:

Historical development of DNA profiling methods, current DNA typing techniques and the ongoing development of new forensic DNA typing methods. Emphasis will be placed on various analytical techniques used in the analysis of forensic evidence.

2. COURSE JUSTIFICATION:

COURSE GOALS and OBJECTIVES

The objective of this course is to provide the graduate and undergraduate student with a thorough understanding of the principles and methodologies used in forensic DNA analysis. The practical applications of restriction fragment length polymorphism (RFLP) analysis, coupled with the use of polymerase chain reaction (PCR)-based tests (the variable number tandem repeats [VNTR] locus D1S80; HLADQA1 and Polymarker [PM] analyses; short tandem repeat [STR]), are emphasized in selected topics and criminal case studies. Emphasis will be placed on the advantages and limitations of various DNA techniques used in the analysis of forensic evidence. Other topics covered will include forensic DNA and paternity-related issues from both a scientific and a legal perspective with supportive case studies

- Demonstrate knowledge of proper evidence sample collection storage and processing
- Demonstrate and understand chain of custody issues
- Demonstrate an understanding of the various techniques that have been used for forensic DNA analysis
- Learn various extraction methods from both known and evidence samples, quantification of human-specific DNA, and amplification of DNA using numerous loci
- Analyze PCR and non-PCR generated data by gel and capillary electrophoresis
- Demonstrate and analysis mitochondrial DNA (mtDNA) typing using sequence analysis
- Calculate probabilities of generated profiles (Combined Random Match Probabilities and Likelihood Ratios)
- Analyze data for anomalies
- Demonstrate an understanding of quality assurance/quality control and lab certification issues
- Demonstrate an understanding of the factors affecting the admissibility of DNA typing evidence
- Demonstrate and understand the effective presentation of DNA evidence in a courtroom setting through the use of a mock trial.

Course Necessity:
There is no undergraduate course on this topic

Course Relationship to Existing Programs:

Will be of interest to students in biology, environmental science, and forensics

Course Relationship to Existing Courses:

This is an undergraduate version of BIOL 509

3. APPROVAL HISTORY: None

4. SCHEDULING AND PROPOSED INSTRUCTORS:

Semester of Initial Offering:

Spring 2013

Proposed Instructors:

Dr. Thomas McClintock

5. TENTATIVE SYLLABUS: See attached.

DNA ANALYSIS of BIOLOGICAL EVIDENCE

BIOL 487 (3 Credits)

Instructor: Dr. McClintock

Spring Semester, 2013

Office Phone: (703) 993-1050

EMAIL: Jmclin1@gmu.edu

Text: N. Rudin & K. Inman, 2002. An Introduction to Forensic DNA Analysis, (2nd ed.), CRC Press

Supplement: J. Thomas McClintock, 2008. Forensic DNA Analysis: A Laboratory Manual, (1st ed.), CRC Press

DATE	TOPIC	CHAPTER
Week 1	Introduction: Objective and Goals Analysis of DNA: The Genetic Material Physical Characteristics: Nuclear DNA-Chromosomes, Genes, and Alleles Organelle DNA-Plasmid DNA and Mitochondrial DNA Chemical Structure	1, pp. 7-11 4, pp. 33-39 Handouts
Week 2 21-31	Overview of DNA Typing Procedures and Applications in Forensics Historical Considerations: Blood Typing versus DNA Typing	3, pp.
Week 3	Laboratory Organization/Handling of Specimens Forensic DNA Testing Technologies/Methodologies; Isolation of DNA Restriction Fragment Length Polymorphism (RFLP) Analysis	2, pp. 13-19 6, pp. 65-71 6, pp. 71-76
Week 4	EXAM I	
Week 5	Forensic DNA Typing Technologies/Methodologies (con't) Polymerase Chain Reaction (PCR)-Based Methods a. HLA-DQA1 and Polymarker Typing	5, pp. 42-49 6, pp. 76-79 Handouts
Week 6	a. Amplified Fragment Length Polymorphism (AFLP) Analysis b. D1S80 Typing c. Short Tandem Repeats (STR) Typing	Handouts 5, pp. 49-50 5, pp. 50-52 6, pp. 83-87
Week 7	a. Amelogenin (Sex Determination) Typing b. Mitochondrial DNA Analysis	5, pp. 52-53 5, pp. 56-60
Week 8	Spring Break	
Week 9	EXAM II	
Week 10	Methodological Problems and Issues: RFLP versus PCR-Based Methods System-Specific Interpretational Issues	Handouts, pp. 105-127
Week 11	Databases and Statistical Analysis Microarray Methods and Analysis	8, pp. 139-156 Handouts

Week 12 Forensic Case Studies and Report Summaries
 Legal and Ethical Issues for Consideration

Week 13 Mock Trial (Presentation by the Prosecution)

Week 14 Mock Trial (Presentation by the Defense)

Week 15 **FINAL EXAM**
