

Course Change Request

New Course Proposal

Date Submitted: 11/23/20 2:07 pm

Viewing: **FRSC 526 : Molecular Biology Laboratory**

Last edit: 11/23/20 2:07 pm

Changes proposed by: kcarisi

Are you completing this form on someone else's behalf?

Yes

Requestor:

Name	Extension	Email
Mark Wilson	703-993-5071	mwilso47@gmu.edu

Effective Term: Fall 2021

Subject Code: FRSC - Forensic Science

Course Number: 526

Bundled Courses:

Is this course replacing another course? No

Equivalent Courses:

Catalog Title: Molecular Biology Laboratory

Banner Title: Molecular Biology Laboratory

Will section titles vary by semester? No

Credits:

In Workflow

1. **FRSC Representative**
2. **SC Curriculum Committee**
3. SC Associate Dean
4. Assoc Provost-Graduate
5. Registrar-Courses
6. Banner

Approval Path

1. 11/24/20 12:07 am
Kimberly Rule
(kcarisi): Approved for FRSC Representative

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Schedule Type: Laboratory**Hours of Lab or Studio per week:** 3**Repeatable:** May only be taken once for credit (NR)
*GRADUATE ONLY***Default Grade Mode:** Graduate Regular**Recommended Prerequisite(s):**

The successful completion of coursework in topics covering Cell Biology, Statistics, and Genetics

Recommended Corequisite(s):**Required Prerequisite(s) / Corequisite(s) (Updates only):**

FRSC 525*

*May be taken concurrently

Registrar's Office Use Only - Required Prerequisite(s)/Corequisite(s):

And/Or	(Course/Test Code	Min Grade/Score	Academic Level)	Concurrency?

Registration Restrictions (Updates only):**Registrar's Office Use Only - Registration Restrictions:****Field(s) of Study:****Class(es):****Level(s):****Degree(s):****School(s):****Catalog Description:**

This laboratory course will cover basic laboratory methods in molecular biology. The emphasis will be on existing and emerging techniques utilized in forensic DNA laboratories. Techniques will include, extraction, quantitation, STR typing, and SNP microarray genotyping.

Justification:

Justification (What has been proposed?): The Forensic Science Program is proposing a newly created course FRSC 526 Molecular Biology Laboratory course which is a 1 credit laboratory course to complement a newly created lecture course FRSC 525 Molecular Biology.

Justification (Why is this proposal necessary?): The proposed FRSC 526 Molecular Biology Laboratory course is critical for students who intend to pursue employment within the field of Forensic Biology. Forensic DNA Analyst positions within the United States must meet the minimum education requirements as outlined by the Federal Bureau of Investigations (FBI) Quality Assurance Standards (QAS) Standard 5.4.1 which indicates that "employees shall have successfully completed coursework covering the following subject areas: biochemistry, genetics, and molecular biology, statistics and/or population genetics". Therefore, this course will satisfy the national educational standard for employment purposes as a fully dedicated Molecular Biology course incorporating laboratory training. Additionally, this laboratory course will satisfy the educational requirements for the Forensic Science Education Programs Accreditation Commission (FEPAC) standard in the current MS Forensic Biology Concentration as a "graduate-level science course appropriate for specialization".

Does this course cover material which crosses into another department? No

Learning Outcomes:

Students will understand basic laboratory methods within molecular biology.

Students will be able to identify existing and emerging techniques used in forensic DNA laboratories.

Students will be able to complete extraction and quantitation.

Students will be able to conduct and interpret STR typing and SNAP microarray genotyping.

Attach Syllabus

[FRSC 326-526 Molecular Biology Lab Syllabus.pdf](#)

Additional Attachments**Staffing:**

Mark Wilson

Georgia Williams

Kelly Knight

Relationship to Existing Programs:

FRSC 526 Molecular Biology Laboratory will be an elective course for the established Forensic Biology Concentration within the Master of Science in Forensic Science degree.

Relationship to**Existing Courses:**

FRSC 526 Molecular Biology Laboratory will be a fully dedicated Molecular course which will be the laboratory component to complement the proposed FRSC 525 Molecular Biology lecture course. This course will be cross level listed with the proposed undergraduate level FRSC 326 Molecular Biology Laboratory course.

Additional**Comments:****Reviewer****Comments**

Key: 17042



FRSC 326/526 Molecular Biology Laboratory (1 credit)

Instructor: Mark R. Wilson, Ph.D.
Forensic Science Program
George Mason University
Mwilso47@gmu.edu
Exploratory Hall, Rm. 3409

Time	Day	Location	Instructors
TBD			Wilson, M. Williams, G.

Required texts:

All course material will be available on Blackboard.

Undergraduate Pre-requisites and Co-requisites (FRSC 326): Students are required to have completed the following with a minimum grade of a C in: BIOL 213 (Cell Biology), BIOL 214 (Biostatistics) or STAT 250 (Intro to Statistics), and BIOL 311 (Genetics) or equivalent courses. Students are required to have completed with a minimum grade of C or concurrently enrolled in the lecture course FRSC 325.

Graduate Pre-requisites and Co-requisites (FRSC 526): Students are required to have successfully completed coursework in topics covering Cell Biology, Statistics, and Genetics. Students are required to have completed with a minimum grade of B- or concurrently enrolled in the lecture course FRSC 525.

Catalog/Course Description:

This laboratory course will cover basic laboratory methods in molecular biology. The emphasis will be on existing and emerging techniques utilized in forensic DNA laboratories. Techniques will include, extraction, quantitation, STR typing, and SNP microarray genotyping.

Student Responsibilities:

Background subject materials will be presented during lab periods and posted on Blackboard. The majority of time will be dedicated to laboratory procedures. The laboratory schedule is subject to change based on progress. Questions or comments to the instructor during the class meeting are encouraged. Every student must have an active GMU email account.

Eight in class quizzes and/or worksheets will be administered during the semester worth 10 points each. Two lowest/missed score will be dropped at the end of the semester. Lab notebooks will be examined during class sessions and will be expected to be kept up-to-date in the manner discussed for the class. Full attendance is mandatory. Assignments will be rescheduled as necessary due to unavoidable absence or inclement weather, illness, transportation delays, etc. In addition to completing all required laboratory exercises and assignments, graduate students will complete a term paper describing a technique discussed in the course in greater detail.

Undergraduate Grading (FRSC 326):

Laboratory Notebook	+40 points
8 Quizzes/Worksheets	+80 points
<u>2 dropped Quizzes/Worksheets</u>	<u>-20 points</u>
Total	100 points

100	A+	87-89	B+	77-79	C+	60-69	D
95-99	A	83-86	B	73-76	C	0-59	F
90-94	A-	80-82	B-	70-72	C-		

Graduate Grading Expectations (FRSC 526): The expectation for graduate students is that they will do not only more work, but more advanced work. Therefore, graduate student assignments will be evaluated at a more advanced level and graduate students will additionally complete a term paper. Graduate students will submit a ten (10) page term paper with at least ten (10) references further describing a laboratory technique covered in this course. This paper will be worth an additional 50 points, and grades will be adjusted by percentage of the total accordingly.

100	A+	87-89	B+	70-79	C
95-99	A	83-86	B	0-59	F
90-94	A-	80-82	B-		

GMU Add/Drop Deadlines – Check the GMU Website

- Last day to add classes
- Final class drop deadline (no tuition penalty)
- Withdrawal Period (100% tuition liability)
- Selective Withdrawal Period (100% tuition liability)

GMU Honor Code

The Honor Code states that all students “pledge not to cheat, plagiarize, steal, or lie in matters related to academic work.”

All students are expected to maintain the GMU honor code by practicing ethical behavior and submitting original work. To assist with another student’s unethical behavior is also a violation of the honor code. Remember, the honor code protects your hard work and the value of your degree from GMU.

Academic Integrity

GMU is an Honor Code university; please see the University Catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else’s work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

GMU Code of Student Conduct

The University Code of Student Conduct is George Mason University's statement of community values. The Code fosters a safe, secure, and fair learning environment by establishing expectations for behavior, identifying a process for resolving incidents outside the stated expectations and the results of such processes. No student or student organization shall commit an Act of Misconduct in any location. Students and student organizations found responsible under this CSC of committing Acts of Misconduct are subject to sanctions by the University. The Office of Student Conduct has authority over all non-academic disciplinary matters. Please refer to <https://studentconduct.gmu.edu/>

COVID Considerations

All students taking courses with a face-to-face component are required to take Safe Return to Campus Training prior to visiting campus. Training is available in Blackboard (<https://mymason.gmu.edu>). Students are required to follow the university's public health and safety precautions and procedures outlined on the university Safe Return to Campus webpage (www2.gmu.edu/safe-return-plan). Similarly, all students in face to face and hybrid courses must also complete the Mason COVID Health Check daily, seven days a week. The COVID Health Check system uses a color code system, and students will receive either a Green, Yellow, or Red email response. Only students who receive a "green" notification are permitted to attend courses with a face-to-face component. If you suspect that you are sick or have been directed to self-isolate, please quarantine or schedule testing. Faculty are allowed to ask students to show them that you have received a Green email and are thereby permitted to be in class.

Diversity and Inclusion

Students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated.

Sexual Harassment, Sexual Misconduct, and Interpersonal Violence

Notice of mandatory reporting of sexual or interpersonal misconduct: As a faculty member, I am designated as a "Non-Confidential Employee," and must report all disclosures of sexual assault, sexual harassment, interpersonal violence, stalking, sexual exploitation, complicity, and retaliation to Mason's Title IX Coordinator per University Policy 1202. If you wish to speak with someone confidentially, please contact one of Mason's confidential resources, such as Student Support and Advocacy Center (SSAC) at 703-380-1434 or Counseling and Psychological Services (CAPS) at 703-993-2380. You may also seek assistance or support measures from Mason's Title IX Coordinator by calling 703-993-8730, or emailing titleix@gmu.edu.

GMU E-mail Accounts

Students must activate their GMU email accounts to receive important University information, including messages related to this class.

Office of Disability Services

If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS. <http://ods.gmu.edu>

Other Useful Campus Resources

WRITING CENTER: A114 Robinson Hall; (703) 993-1200; <http://writingcenter.gmu.edu>

University policy states that all sound emitting devices shall be turned off during class unless otherwise authorized by the Professor.

Lab Topics and Schedule

Week 1 Lab safety and introduction

Week 2 Pipetting exercise and dilutions

Week 3 Genomic DNA Extraction I – PCIA and Qiagen EZ-1

Week 4 DNA Extraction II – Restriction Digestion, partial digestions of dilutions using Restriction Endonuclease, Agarose Gel Electrophoresis

Week 5 DNA Quantitation I – UV/vis spectrometry and qPCR using the QuantStudio™

Week 6 Quantitation II – UV/vis spectrometry, qPCR and Agilent Bioanalyzer2100™ comparisons

Week 7 STR Typing I – commercial STR kit amplification and CE

Week 8 STR Typing II – Data Interpretation

Week 9 Sample prep for Next Generation DNA Sequencing (NGS). Library preparation and quantitation

Week 10 NGS library QC using Agilent Bioanalyzer2100™

Week 11 NGS instrument run and QC checks

Week 12 NGS data interpretation

Week 13 Sample prep for SNP microarrays – including dilutions

Week 14 SNP microarray instrument loading. Graduate Term Paper Due

Week 15 SNP microarray data analysis and interpretation