FAIRMONT STATE UNIVERSITY FACULTY SENATE

Ad-Hoc Committee to Revise the Faculty Handbook

Roster of Faculty Representatives

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Todd Clark - Faculty Senate

Gina Fantasia - Business

Galen Hansen - Natural Sciences

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FAIRMONT STATE UNIVERSITY™

Office of the Provost and Vice President for Academic Affairs
1201 Locust Avenue • Fairmont, West Virginia 26554
Phone: (304) 367-4101 • Fax: (304) 367-4902
Richard.Harvey@fairmontstate.edu • fairmontstate.edu

MEMORANDUM

TO: Faculty Senate

FROM: Dr. Richard Harvey

DATE: January 9, 2019

SUBJECT: Curriculum Proposal #18-19-4
Science and Technology/Natural Science/Forensic Science

I recommend approval of the attached Curriculum Proposal 18-19-4. The B.S. in Forensic Science is growing and going towards accreditation from the American Academy of Forensic Science, we believe it is time to add a 22/23-hour **Forensic Investigative Science minor**. Students would be able to adopt courses already available in the Forensic Science program and Criminal Justice program.

cc: Susan Ross
Steve Roof
Mark Flood
Kristy Henson
Laura Ransom
Cheri Gonzalez
Lori Schoonmaker

CURRICULUM PROPOSAL (Submit one hard copy and an electronic copy to the Associate Provost by the second Tuesday of the month.)

Proposal Number:	18-19-04
School/Department/Program:	Science and Technology/Natural Science/Forensic Science
Preparer/Contact Person:	Mark Flood & Kristy Henson
Telephone Extension:	x4309 &
Date Originally Submitted:	
Revision (Indicate date and label it Revision #1, #2, etc.):	
Implementation Date Requested:	Fall 2019

I. **PROPOSAL**. Write a brief abstract, not exceeding 100 words, which describes the overall content of the proposal.

The B.S. in Forensic Science is growing and going towards accreditation from the American Academy of Forensic Science, we believe it is time to add a 22/23-hour **Forensic Investigative Science minor**. Students would be able to adopt courses already available in the Forensic Science program and Criminal Justice program.

II. **DESCRIPTION OF THE PROPOSAL**. Provide a response for each letter, A-H, and for each Roman Numeral II–V. If any section does not apply to your proposal, reply N/A.

A. Deletion of course(s) or credit(s) from program(s)

1. N/A

Total hours deleted. 0

B. Addition of course(s) or credit(s) from program(s)

1. Minor in Forensic Investigative Science

CRIM 1100 Introduction to Criminal Justice (3)
CRIM 2226 Crime Scene Investigation (3)
CHEM 1101 General Chemistry I (4) or CHEM 1105 Chemical Principles (5)
BIOL 1106 Biological Principles II (4)
FORS 2201 Introduction to Forensic Science (4)
FORS 3200 Forensic Biology (4)

Total hours added. 22-23

C. Provision for interchangeable use of course(s) with program(s)

N/A.

D. Revision of course content. Include, as an appendix, a revised course description, written in complete sentences, suitable for use in the university catalog.

N/A

B.

E. Other changes to existing courses such as changes to title, course number, and elective or required status.

N/A

F. Creation of new course(s). For each new course

N/A

1. Include, as an appendix, a course description, written in complete sentences, suitable for use in the college catalog.

Appendix A contains the catalog course descriptions for the proposed minor.

2. Include, as an appendix, a detailed course outline consisting of at least two levels.

N/A

3. In order to meet the requirements as outlined in Goal One of the Strategic Plan, please include Outcome Competencies and Methods of Assessment as an appendix. Examples are available upon request from the Chair of the Curriculum Committee.

Appendix C also contains the Outcome Competencies and Methods of Assessment for the proposed new course.

G. Attach an itemized summary of the present program(s) affected, if any, and of the proposed change(s).

1. Describe how this proposal affects the hours needed to complete this program. Specifically, what is the net gain or loss in hours? Use the format for Current and Proposed Programs in Appendix A.

2. Include proof that this proposal meets the degree definition policy (Board of Governor's Policy #52) as part of the Proposed Program in Appendix A.

3. Exceptions to the degree definition policy: As per policy #52, programs seeking exceptions to any of the maximum credit hour limits must submit formal requests to the Board of Governors for approval. Explain the rationale for the exception by documenting the existence of one or more of the criteria in paragraph 4.2.

RATIONALE FOR THE PROPOSAL.

A. **Quantitative Assessment**: Indicate the types of assessment data, i.e., surveys, interviews, capstone courses, projects, licensure exams, nationally-normed tests, locally developed measurements, accreditation reports, etc., that were collected and analyzed to determine that curricular changes were warranted. Quantitative data is preferred.

The Forensic Science program is growing. We currently have 70 declared majors and 5-7 recruit visits a semester. With graduation numbers of typically 1-5 students per academic year, our program needs to continue to work on recruitment and retention. Several of our Forensic Science majors transfer into Chemistry or Criminal Justice majors here on campus. As the Forensic Science program grows, a minor will entice those students obtaining degrees such as Criminal Justice, Biology, and Chemistry to obtain this minor. The Criminal Justice program requires all students declare a minor. Forensic Science and Criminal Justice are intertwined careers, as criminal justice graduates usually enter into law enforcement and forensic science graduates enter into laboratory environments processing evidence collected by law enforcement. As criminal justice houses 300 majors, it is fair to say some of these students will be interested in pursuing a forensics minor as the topics overlap. This minor would increase forensic science student enrollment and assist in retention of students who chose to change majors later on in their college career.

The addition of this minor allows us to compete with WVU, as they are currently the only institution in the state that offers a forensic investigative science minor. We know of at least 2 students who have transferred to WVU because we did not offer this type of minor on our campus.

B. **Qualitative Assessment**: Based upon the assessment data above, indicate why a curricular change is justified. Indicate the expected results of the change. Be sure to include an estimate of the increased cost, or reduction in cost of implementation. FOR EXAMPLE: Will new faculty, facilities, equipment, or library materials be required?

This minor will increase the amount of students in the Forensic Science program's sophomore level courses (FORS 2201 and FORS 3200) by 5-10 students per year. That will help solidify our program's course offerings of higher level specialization courses if we could also convince half of those students to also take an upper level forensics elective. It will also increase student retention if/when a student changes their major from Forensic Science, as they are still able to obtain a minor in Forensic Investigative Science. It is important to continue to attract new Forensic Science students and to offer students options that will improve their marketability. New facilities, faculty and equipment will not be needed to implement this new Forensic Investigative Science minor.

III. Should this proposal affect any course or program in another school, a memo must be sent to the Dean of each school impacted and a copy of the memo(s) must be included with this proposal. In addition, the Deans of the affected schools must sign below to indicate their notification of this proposal.

By signing here, you are indicating your college's/school's notification of this proposal.

College/School	Dean	Signature
Sci Tech	Steven Root	Steven Root
Social Science	Jeff Snowside	

IV. Should this proposal affect any course to be added or deleted from the general studies requirements, a memo from the chair of the General Studies Committee indicating approval of the change must be included with this proposal.

V. ADDITIONAL COMMENTS.

APPENDIX A

Minor in Forensic Investigative Science
Proposed Program

Required Minor Courses		**HRS**	
BIOL 1106	Biological Principles II	4	
CHEM 1101	General Chemistry I	4	
or			
CHEM 1105	Chemical Principles	5	
CRIM 1100	Intro to Criminal Justice	3	
CRIM 2226	Crime Scene Investigation	3	
FORS 2201	Introduction to Forensic Science	4	
FORS 3200	Forensic Biology	4	
TOTAL Required Courses			22-23

TOTAL HOURS FOR MINOR	**22-23**

APPENDIX B

Minor in Forensic Science
Proposed schedule

Fall	**Spring**
CHEM 1101- General Chemistry 1 – (4hrs) /or/ **CHEM 1105** – Chemical Principles - (5hrs)	**BIOL 1106** – Biological Principles II – (4hrs)
CRIM 1100 – Introduction to Criminal Justice – (3hrs)	**CRIM 2226 –** Crime Scene Investigation – (3hrs)

Fall	**Spring**
FORS 2201 – Introduction to Forensic Science – (4hrs)	**FORS 3200** – Forensic Biology - (4hrs)

APPENDIX C

Minor in Forensic Investigative Science
Program Outcomes and Assessments

Outcomes for the minor in Forensic Investigative Science:
Students who complete this program will:

- **Develop a basic fundamental knowledge of the natural sciences, including, scientific inquiry, cell theory, and basic chemistry of life.**
    - Courses mapped to outcome: BIOL 1106 and CHEM 1101/CHEM 1105

This will be assessed by quizzes and exams in FORS 2201 and FORS 3200 that incorporate underlying information from these courses, students earning a 70% or higher deemed as success.

- **Apply crime scene processing, collecting, and analyzing skills, from the viewpoint of field collection and lab analysis.**
    - Courses mapped to outcome: CRIM 2226, FORS 2201, FORS 3200

This will be assessed by graded assignments and lab activities with students earning a 70% or higher deemed as success.

- **Develop a basic fundamental knowledge of forensic science and how it relates to the natural sciences.**
    - Courses mapped to outcome: FORS 2201, FORS 3200

This will be assessed by exams, assignments, and quizzes with students earning a 70% or higher deemed as success.

- **Apply scientific inquiry to forensic science.**
    - Courses mapped to this outcome: FORS 2201, FORS 3200

This will be assessed by in class research projects with students earning a 70% or higher deemed as success.

FM

Flood, Mark

Thu 8/9, 4:15 PM

Shields, Deanna; Smallridge, Joshua; Roof, Steven; Hemler, Debra; Henson, Kristy

Reply all

Deleted Items

[redacted]

Kristy Henson is a new faculty member in Forensic Science and we are now looking to expand our course offerings and improve our program. We would like to possibly discuss offering a new Forensic Investigative Science minor.

A rough idea would be that students take:
Intro to CJ (3 credits)
CSI (3) or perhaps Criminalistics (3)
Chem 1101 (4) (basic chem course)
BIOL 1106 (4) (basic cell biology course)
Intro to Forensic Science (4)
Forensic Biology (4)
Forensic specialization elective (4 hours)
That would mean the minor would 26 hours. What are your thoughts on this?? Please reply to all so that everyone gets to see and reflect on the responses.
Mark

Mark Flood, PhD
Professor of Biology and Forensic Science
Coordinator of Forensic Science Program
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#SoarFalcons

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Richard.Harvey@fairmontstate.edu • fairmontstate.edu

MEMORANDUM

TO: Faculty Senate

FROM: Dr. Richard Harvey

DATE: January 9, 2019

SUBJECT: Curriculum Proposal #18-19-2
Science and Technology/BCG/Forensic Science

I recommend approval of the attached Curriculum Proposal 18-19-2. The Forensic Science curriculum is being revised to include new forensic focused specialization courses (Human Osteology FORS 3301, Forensic Anthropology FORS 3305, Forensic Toxicology FORS 3310, Forensic Taphonomy FORS 3225, and Fingerprint Analysis FORS 3215). These courses will give students forensic specific specialization electives. These courses will allow us to grow our Forensic Science Program and to give our students more relevant forensic science electives. See Appendix D.

cc: Susan Ross
Steve Roof
Mark Flood
Kristy Henson
Laura Ransom
Cheri Gonzalez
Lori Schoonmaker

CURRICULUM PROPOSAL (Submit one hard copy and an electronic copy to the Associate Provost by the second Tuesday of the month.)

Proposal Number:	18-19-2
School/Department/Program:	Science and Technology/BCG/Forensic Science
Preparer/Contact Person:	Mark Flood & Kristy Henson
Telephone Extension:	x4309 / x4877
Date Originally Submitted:	Oct. 2018
Revision (Indicate date and label it Revision #1, #2, etc.):	
Implementation Date Requested:	Fall 2019

I. **PROPOSAL**. Write a brief abstract, not exceeding 100 words, which describes the overall content of the proposal.

The Forensic Science curriculum is being revised to include new forensic focused specialization courses (Human Osteology FORS 3301, Forensic Anthropology FORS 3305, Forensic Toxicology FORS 3310, Forensic Taphonomy FORS 3225, and Fingerprint Analysis FORS 3215). These courses will give students forensic specific specialization electives. These courses will allow us to grow our Forensic Science Program and to give our students more relevant forensic science electives. See Appendix D.

II. **DESCRIPTION OF THE PROPOSAL**. Provide a response for each letter, A-H, and for each Roman Numeral II–V. If any section does not apply to your proposal, reply N/A.

A. Deletion of course(s) or credit(s) from program(s)

1. B.S. Forensic Science deletions from requirements:

Remove elective options:	Any BIOL above 3000		
	BIOL 2224	Microbiology	4
	BIOL 4420	Developmental Biology	4

Total hours deleted. 0

B. Addition of course(s) or credit(s) from program(s)

1. B.S. Forensic Science additions: these will all be options for specialization elective category

FORS 3301 Human Osteology	(4)
FORS 3305 Forensic Anthropology	(4)
FORS 3310 Forensic Toxicology	(4)
FORS 3225 Forensic Taphonomy	(2)
FORS 3215 Fingerprint Analysis	(2)

Total hours added. 0

C. Provision for interchangeable use of course(s) with program(s)

Not applicable.

D. Revision of course content. Include, as an appendix, a revised course description, written in complete sentences, suitable for use in the university catalog.

Revised catalog course descriptions for all the courses shown in the table in Appendix B and course outline is included in Appendix C. **FORS 2225 Trace Evidence and Microscopy**.

E. Other changes to existing courses such as changes to title, course number, and elective or required status.

Name change: FORS 2225 Forensic Microscopy and Spectroscopy (3) to **FORS 2225 Trace Evidence and Microscopy**. See Appendix C #1.

F. Creation of new course(s). For each new course

1. Designate the course number, title, units of credit, prerequisites (if any), ownership (FSU, PC&TC, or shared) and specify its status as an elective or required course. If you are creating a shared course, attach a memo from the Deans of the affected Schools explaining the rationale for the course being shared.

Number	Course Title	Credits	Prerequisites	Ownership	Status
FORS 3301	Human Osteology	4	BIOL 1106 with a C or higher	FSU	Elective
FORS 3305	Forensic Anthropology	4	FORS 3200 with a C or higher	FSU	Elective
FORS 3310	Forensic Toxicology	4	FORS 3200 with a C or higher	FSU	Elective
FORS 3225	Forensic Taphonomy	2	FORS 3200 with a C or higher	FSU	Elective
FORS 3215	Fingerprint Analysis	2	FORS 3200 with a C or higher	FSU	Elective

2. Include, as an appendix, a course description, written in complete sentences, suitable for use in the college catalog.

Appendix B contains the catalog course descriptions for the proposed new courses.

3. Include, as an appendix, a detailed course outline consisting of at least two levels.

Appendix C #2-6 contains the two-level course outlines for the proposed new courses.

4. In order to meet the requirements as outlined in Goal One of the Strategic Plan, please include Outcome Competencies and Methods of Assessment as an appendix. Examples are available upon request from the Chair of the Curriculum Committee.

Appendix C also contains the Outcome Competencies and Methods of Assessment for the proposed new courses.

G. Attach an itemized summary of the present program(s) affected, if any, and of the proposed change(s).

1. Describe how this proposal affects the hours needed to complete this program. Specifically, what is the net gain or loss in hours? Use the format for Current and Proposed Programs in Appendix A.

2. Include proof that this proposal meets the degree definition policy (Board of Governor's Policy #52) as part of the Proposed Program in Appendix A.

3. Exceptions to the degree definition policy: As per policy #52, programs seeking exceptions to any of the maximum credit hour limits must submit formal requests to the Board of Governors for approval. Explain the rationale for the exception by documenting the existence of one or more of the criteria in paragraph 4.2.

RATIONALE FOR THE PROPOSAL.

A. **Quantitative Assessment**: Indicate the types of assessment data, i.e., surveys, interviews, capstone courses, projects, licensure exams, nationally-normed tests, locally developed measurements, accreditation reports, etc., that were collected and analyzed to determine that curricular changes were warranted. Quantitative data is preferred.

- The Forensic Science Program is making elective revisions based on course offerings at similar institutions, along with alumni feedback, and feedback of the Forensic Science program review. In order to compete with similar institutions we need to offer more direct forensic science courses, replacing biology and chemistry electives.

- There are currently 70 forensic science majors and each student is required to take a minimum of 8 specialization, elective hours. We hope to grow the major and reach 150 total majors in the next 3-5 years.

B. **Qualitative Assessment**: Based upon the assessment data above, indicate why a curricular change is justified. Indicate the expected results of the change. Be sure to include an estimate of the increased cost, or reduction in cost of implementation. FOR EXAMPLE: Will new faculty, facilities, equipment, or library materials be required?

- According to the past AAFS visit, we were lacking in forensic science specialized courses and full-time faculty members. When comparing to other accredited institutions we lack heavily in specialized forensic science courses. Four out of five of these courses are extremely cheap to run and can incorporate materials already present in the forensic science laboratory.

- Forensic Toxicology is the only course that will require additional purchases. The instrument that will be used in this course was purchased last year on an Instrumentation Grant which this department co-authored. Monetary needs to successfully run this course would include: lab supplies (reagents, chemicals, kits). Other monetary needs would go towards the chemistry faculty member assisting in developing laboratory methods. This could be met with release time.

- As the program grows, the forensic science budget should grow accordingly.

- The new courses will be offered every-other year until the program grows and demand increases. These courses will fit into the 12-hour faculty load with no faculty overload.

Example of when the course would be offered:

Courses	Offered
Human Osteology	Fall 2018, Fall 2020, etc.
Forensic Anthropology	Spring 2019, Spring 2021, etc.
Forensic Toxicology	Fall 2019, Fall 2021, etc.
Forensic Taphonomy	2nd 8 weeks - Spring 2020, Spring 2022, etc.
Fingerprint Analysis	1st 8 weeks - Spring 2020, Spring 2022, etc.

III.

Should this proposal affect any course or program in another school, a memo must be sent to the Dean of each school impacted and a copy of the memo(s) must be included with this proposal. In addition, the Deans of the affected schools must sign below to indicate their notification of this proposal.

By signing here, you are indicating your college's/school's notification of this proposal.

College/School	Dean	Signature
Science & Technology	Steven Rost	Steven Rost

IV. Should this proposal affect any course to be added or deleted from the general studies requirements, a memo from the chair of the General Studies Committee indicating approval of the change must be included with this proposal.

No.

V. ADDITIONAL COMMENTS.

APPENDIX A

B.S. Degree in Forensic Science
Current Program

Required Major Courses		**HRS**
BIOL 1106	Biological Principles II	4
BIOL 3360	Biochemistry	4
BIOL 3380	Genetics	4
BIOL 3390	Molecular Biotechnology	4
CHEM 1105	Chemical Principles I	5
CHEM 2200	Foundational Biochemistry	4
CHEM 2201	Organic Chemistry I	4
CHEM 2202	Organic Chemistry II	4
CHEM 2205	Analytical Chemistry	4
CHEM 3315	Instrumental Analysis	4
FORS 2201	Introduction to Forensic Science	4
FORS 2225	Microscopy and Spectrometry	3
FORS 3200	Forensic Biology	4
FORS 3385	Research in Forensic Science	3
FORS 4401	Capstone Seminar in Forensic Science	3
FORS 4411	Forensic Science Internship	2
MATH 1113	Applied Statistics	3
TOTAL Required Major Courses		63
Specialization Electives - 8 hours		
BIOL 2224	Microbiology	4
BIOL 4420	Developmental Biology	4
CHEM 3301	Physical Chemistry I	4
CHEM 3304	Inorganic Chemistry	4
CHEM 4404	Synthetic Methods and Materials	4
CHEM 4412	Physical Chemistry II	4
		8
TOTAL HOURS FOR MAJOR		**72**

Required and Recommended General Studies Courses	
Attribute IA – Critical Analysis	3
ENGL 1102 (required)	
Attribute IB – Quantitative Literacy	4
MATH 1585 or 2501 (required)	
Attribute IC – Written Communication	3
ENGL 1101 (required)	
Attribute ID – Teamwork	3
CRIM 2295 (required)	
Attribute IE – Information Literacy	IA
ENGL 1102 (required)	
Attribute IF – Technology Literacy	3
TECH 1100	

Attribute IG – Oral Communication		3
	COMM 2200	
Attribute III - Citizenship		3
	POLI 1103	
Attribute IV - Ethics		ID
	CRIM 2295 (required)	
Attribute V - Health		3
	CRIM 2212	
Attribute VI - Interdisciplinary		III
	POLI 1103	
Attribute VIIA - Arts		3
	INTR 1120	
Attribute VIIB - Humanities		VIIA
	INTR 1120	
Attribute VIIC – Social Sciences		V
	CRIM 2212	
Attribute VIID - Natural Science		4-5
	PHYS 1101 or 1105 (required)	
Attribute VIII – Cultural Awareness		3
	Any course in VIII	
Additional General Studies hours		4-5
	PHYS 1102 and 1106 (required)	
Writing Intensive	BIOL 3390	X
TOTAL GENERAL STUDIES HOURS		**39-41**
TOTAL FREE ELECTIVES		**7-9**
TOTAL HOURS		**120**

Required Major Courses		HRS
BIOL 1106	Biological Principles II	4
BIOL 3360	Biochemistry	4
BIOL 3380	Genetics	4
BIOL 3390	Molecular Biotechnology	4
CHEM 1105	Chemical Principles I	5
CHEM 2200	Foundational Biochemistry	4
CHEM 2201	Organic Chemistry I	4
CHEM 2202	Organic Chemistry II	4
CHEM 2205	Analytical Chemistry	4
CHEM 3315	Instrumental Analysis	4
FORS 2201	Introduction to Forensic Science	4
FORS 2225	Trace Evidence and Microscopy	3
FORS 3200	Forensic Biology	4
FORS 3385	Research in Forensic Science	3
FORS 4401	Capstone Seminar in Forensic Science	3
FORS 4411	Forensic Science Internship	2
MATH 1113	Applied Statistics	3
TOTAL Required Major Courses		63
Specialization Electives - 8 hours		
CHEM 3301	Physical Chemistry I	4
CHEM 3304	Inorganic Chemistry	4
CHEM 4404	Synthetic Methods and Materials	4
CHEM 4412	Physical Chemistry II	4
FORS 3301	Human Osteology	4
FORS 3305	Forensic Anthropology	4
FORS 3310	Forensic Toxicology	4
FORS 3225	Forensic Taphonomy	2
FORS 3215	Fingerprint Analysis	2
		8
TOTAL HOURS FOR MAJOR		**71**

Required and Recommended General Studies Courses	
Attribute IA – Critical Analysis	3
ENGL 1102 (required)	
Attribute IB – Quantitative Literacy	4
MATH 1585 or 2501 (required)	
Attribute IC – Written Communication	3
ENGL 1101 (required)	
Attribute ID – Teamwork	3
CRIM 2295 (required)	
Attribute IE – Information Literacy	IA
ENGL 1102 (required)	
Attribute IF – Technology Literacy	3
TECH 1100	
Attribute IG – Oral Communication	3

	COMM 2200	
Attribute III - Citizenship		3
	POLI 1103	
Attribute IV - Ethics		ID
	CRIM 2295 (required)	
Attribute V - Health		3
	CRIM 2212	
Attribute VI - Interdisciplinary		III
	POLI 1103	
Attribute VIIA - Arts		3
	Any course in VIII	
Attribute VIIB - Humanities		3
	History or Literature that also counts for attribute VIII	
Attribute VIIC – Social Sciences		V
	CRIM 2212	
Attribute VIID - Natural Science		4-5
	PHYS 1101 or 1105 (required)	
Attribute VIII – Cultural Awareness		VIIB
	History or Literature that also counts for attribute VIIB	
Additional General Studies hours		4-5
	PHYS 1102 and 1106 (required)	
Writing Intensive	BIOL 3390	X
TOTAL GENERAL STUDIES HOURS		**39-41**
TOTAL FREE ELECTIVES		**8-10**
TOTAL HOURS		**120**

Appendix B. Course Descriptions for Existing and Revised/New Courses

Old Catalog Course Description	New Catalog Course Description
	FORS 3301 Human Osteology. 4 hours. This course introduces methods and concepts used to analyze human skeletal remains in forensic and archaeological contexts. Osteology is a hands-on course providing a basis for advanced studies such as: comparative anatomy, forensic anthropology, bioarchaeology, paleoanthropology, and gross anatomy. Students will learn standard osteological analyses using real human remains. The course will consist of hands-on lectures and mostly independent laboratory activities. In this course students will learn: 1) how to identify whole and fragmentary human skeletal remains, 2) how to distinguish between human and non-human bone, and 3) how to estimate age, sex, ancestry, and stature of an individual. PR: BIOL 1106 with a C or higher
	FORS 3305 Forensic Anthropology. 4 hours. This course provides a broad overview of the sub-discipline forensic anthropology. Forensic anthropology applies human osteology to a legal setting. In this course students will build on previously learned human osteology by applying it to scenarios such as, mass disasters, human rights, and trauma. Students will learn how to differentiate between comingled remains and fragmentary remains. This course will also give a brief overview of human decomposition as it leads to skeletal identification and time since death. This course will consist of hands-on laboratory activities. PR: FORS 3200 with a C or higher.
	FORS 3225 Forensic Taphonomy 2 hours. This course looks into human taphonomy with an emphasis on forensics. We will focus on the process of decomposition, burial, and re-exposure of individuals. This course will look at how taphonomy alters evidence during forensic investigations. This is an 8 week course. FORS 3200 with a C or higher.
FORS 2225 Forensic Microscopy & Spectroscopy. 3 hrs. This course is an introduction to the microscopy and spectroscopic techniques employed by forensic scientists to analyze trace evidence including hairs, fibers, paint chips, glass fragments, etc. The course will consist of two hours of classroom instruction and two hours of laboratory each week. PR: CHEM 2200 and MATH 1115 or higher. Spring semester of even years.	FORS 2225 Trace Evidence and Microscopy. 3 hours This course is designed to teach students how to properly evaluate and compare impression evidence, and apply forensic microscopy of unknown materials. Students will analyze various hair, fibers, glass, paint, and soil using microanalysis. This course is hands-on providing extensive experience with microanalysis. PR: CHEM 2200 and MATH 1540 or higher. Spring semester of even years.
	FORS 3310 Forensic Toxicology. 4 hours. This course focuses on aspects of drug chemistry with an emphasis in forensics. Students will learn standard analytical testing techniques. This course will also focus on how forensic toxicology relates to pharmacokinetics and metabolism, drug abuse, postmortem toxicology, and driving under the influence of alcohol and drugs. We will address mechanisms of drugs and toxins with their physiological and pathological consequences. PR: CHEM 2200, FORS 3200 with a C or higher.

	FORS 3215 Fingerprint Analysis. 2 hours. Fingerprints play a large role in forensic science. In this course we explore different techniques and methods to capture and analyze fingerprints. Students will learn advanced techniques in latent fingerprints, lifting fingerprints, and preparation of fingerprints in a forensic setting. We will also discuss factors that may affect fingerprint analysis. PR: FORS 3200 with a C or better or permission.

Appendix C. Course Descriptions, Outlines and Outcomes for New and Revised Courses

1. FORS 2225 Trace Evidence and Microscopy

I. Microscope maintenance
II. Stereomicroscope
    a. Familiarization with the stereomicroscope
III. Compound light microscope
    a. Familiarization with the compound light microscope
    b. Measurements using the ocular micrometer
    c. Microscopic mounting techniques
    d. Determining refractive index
IV. Polarized light microscope
    a. Familiarization with the polarized light microscope
    b. Determining refractive index of anisotropic materials
    c. Determining birefringence and sign of elongation
V. Fluorescence microscope
    a. Familiarization with the fluorescence microscope
VI. Phase contrast microscope
    a. Familiarization with phase contrast microscope
VII. Physical match examinations
VIII. Construction examinations of evidence
IX. Lamp filament examination
X. Fingerprint examinations and comparison
XI. Took mark examination
XII. Firearm examination
    a. Firearms
    b. Gunshot residue
XIII. Shoe and tire print/impression examination
XIV. Botanical examinations
XV. Paint examinations
XVI. Hair examinations
    a. Hair
    b. Animal hair
    c. Determination of racial and somatic origin characteristics of human hair
    d. Human hair examinations and comparisons
    e. Evaluation of human hair for DNA
XVII. Glass examination
    a. Glass
    b. Glass breakage determinations
XVIII. Fiber examination
    a. Textile fibers
    b. Natural fibers
    c. Man-made fiber
    d. Fiber comparison
XIX. Soil examination
    a. Soil
    b. Identification of minerals in soil
XX. Microchemical testing – inorganic ions
XXI. Microscopic analysis of controlled substances
XXII. Semen examinations

Outcome Competencies and Methods of Assessment

LEARNING outcomes for Trace Evidence and Microscopy

1. Demonstrate basic microscope maintenance and proper use techniques.
2. Discuss types of objects and demonstrate proper examinations.
3. Demonstrate successful analysis of trace materials.
4. Differentiate between trace materials (fingerprint, tool, firearm, shoe, tire, botanical, paint, hair, glass, fiber, and soil).
5. Defend trace analysis and matching materials in a court room setting.

Assessment for lecture/discussion/lab LEARNING outcomes

Learning outcomes will be assessed by standard exam and quiz questions that are multiple choice or matching or essay format. Other objectives will be tested by lab practicals. 1.1 Broad Knowledge and 2.1 Graduate Competitiveness.

1. FORS 3301 Human Osteology

XXIII. Introduction

- a. Introduction to human osteology
  - i. Watch video about Dr. William Bass and the creation of the first ever Body Garden and its importance in forensic anthropology.
- b. Sub-fields of osteology
  - i. Forensic osteology
  - ii. Paleoanthropology
  - iii. Archaeology
    1. bioarchaeology
- c. Information gained from skeletal morphology
  - i. Environment
  - ii. Populations
  - iii. Cultural behaviors
  - iv. Evolutionary history
  - v. Age, sex, stature, diet, ancestry, and pathology of an individual
- d. Differentiating between human and non-human remains
  - i. Quadruped long bones
  - ii. Biped long bones
    1. Give example of local business owners reaching out to determine if bones discovered were animal or human and how hard/easy it is to distinguish.
- e. Differentiating between multiple human remains
  - i. How many individuals
  - ii. What you can gain from fragmentary remains
  - iii. How to distinguish between multiple individuals

XXIV. Anatomical language

- a. Anatomical position
- b. Cranial & post cranial
- c. Axial & appendicular
- d. Plans & sections
  - i. Coronal
  - ii. Frontal
  - iii. Sagittal
  - iv. Cross
  - v. Longitudinal
  - vi. Oblique

e. Directional terminology
    i. Body
        1. Anterior/posterior
        2. Cranial/caudal
        3. Medial/lateral
        4. Proximal/distal
        5. Palmar/dorsal
        6. Plantar/dorsal
    ii. Teeth
        1. Distal/mesial
        2. Buccal/lingual
f. Anatomical regions
g. Joint movement
    i. Flexion/extension/hyperextension
    ii. Abduction/adduction
    iii. Circumduction
    iv. Medial/lateral rotation
    v. Elevation/depression
    vi. Dorsiflexion/plantar flexion
    vii. Inversion/eversion
    viii. Radial deviation/ulnar deviation
    ix. Supination/pronation
        1. Joint movement corresponds with a lab activity using a goniometer to test joint range-of-motion of class and compares it to the average. Use real tools common in a PT clinic, AT clinic, or other Sport's medicine facility.
h. General meaning of words and how it affects skeletal feature

XXV. Ethics in osteology
a. Ethics
    i. Define
    ii. Components of ethics
        1. Legal
        2. Political
        3. Societal
        4. Economical
        5. Expert Witnessing
    iii. Common ethical issues
        1. NAGPRA
        2. Australian Aborigines
        3. Orthodox Jews
        4. African Americans
    iv. Caring for the dead
        1. Religious
        2. Cultural
    v. Discuss potential solutions to ethical issues studying human remains have
        1. 3D scanning
        2. Racial repayment
        3. Only that ethnicity working with remains
        4. Etc.

XXVI. Bone Biology and Variation
a. Skeletal system
    i. Function & structure

b. Blood formation
    i. Red bone marrow
    ii. Yellow bone marrow
    iii. WBC
    iv. RBC
c. Skeletal ontogeny
d. Skeletal morphology & high amounts of variation
    i. Every skeleton is unique
    ii. Sexual dimorphism
    iii. Population variation
    iv. Idiosyncratic variation
e. Bone materials
    i. Collagen
    ii. Hydroxyapatite
    iii. Periosteum
    iv. Collagen
f. Bones as levers to the muscular system
    i. 1,2,3 levers
    ii. Joints
        1. Tendon vs ligament
    iii. Types of joints
        1. Fibrous
            a. Syndesmoses
            b. Gomphosis
            c. Synostosis
        2. Cartilaginous
            a. Synchondroses
            b. Symphysis
        3. Synovial
            a. Pivot
            b. Ball and socket
            c. Hinge
            d. Condyloid
            e. Saddle
            f. Plane
    iv. Origin/insertion
        1. Agonist/antagonist
g. Gross anatomy of bone
    i. Cortical/trabecular
        1. Endosteal surface
        2. Periosteal surface
        3. Medullary cavity
h. Ontogeny
    i. Diaphysis
    ii. Osteogenic tissue
    iii. Metaphysis
    iv. Epiphyses
        1. Epiphyseal plate
        2. Epiphyseal line
        3. Pseudo-epiphysis
i. Skeletal histology

i. Differentiate between mature and immature bone
ii. Secondary osteons
iii. Haversian canal
iv. Volkmann's canal
v. Lacunae
vi. Osteoblasts
vii. Osteoclasts

j. Osteogenesis
i. Intramembranous ossification
ii. Endochondral ossification
iii. Medical issues- osteogenesis imperfecta

k. Bone repair
i. Callus
ii. Primary bony callus
iii. Compact bone
iv. Medical issue- fibrodysplasia ossificans profressiva (FOP)

XXVII. Skull & Teeth

a. 20 bones of the skull
i. Articulated & disarticulated
1. Cranial bones
2. Facial bones
3. Wormian bones
4. Inca bone
5. All bony landmarks
6. Siding
7. Age
8. Sex
9. Stature
10. Ancestry

b. Bone growth
i. Skull bones
ii. Suture fusion
iii. Teeth
1. Deciduous
2. Adult

c. Craniometric & odontometrics

d. Dental form and function
i. Dental terminology
ii. Dental formula
1. 2:1:2:3/2:1:2:3
iii. Tooth anatomy

e. Medical issues
i. Cavities
ii. Infections
iii. Braces
iv. Concussions
v. Early skull fusion

XXVIII. Hyoid and vertebrae

a. Disarticulated and articulated bones
1. Age
2. Sex

3. Stature
4. Ancestry

b. Bone growth
c. Function of vertebrae and hyoid
d. Joints
e. Medical
    i. Scoliosis
    ii. Lordosis
    iii. Hyoid fracture
    iv. Spinal injuries
    v. Disk problems

XXIX. Thorax: sternum and ribs

a. Disarticulated and articulated bones
    1. Age
    2. Sex
    3. Stature
    4. Ancestry
b. Bone growth
c. Siding
d. Function and purpose
e. Joints
f. Medical
    i. CPR
    ii. Rib fracture

XXX. Shoulder girdle

a. Disarticulated and articulated bones
    1. Age
    2. Sex
    3. Stature
    4. Ancestry
b. Bone growth
c. Siding
d. Joints
e. Medical
    i. Rotator cuff

XXXI. Arm

a. Disarticulated and articulated bones
    1. Age
    2. Sex
    3. Stature
    4. Ancestry
b. Bone growth
c. Siding
d. Joints
e. Medical
    i. Fractures
    ii. Tennis elbow

XXXII. Hand

a. Disarticulated and articulated bones
    1. Age
    2. Sex

3. Stature
4. Ancestry

b. Bone growth
c. Joints
d. Medical
    i. Carpal tunnel
    ii. Arthritis

XXXIII. Pelvis

a. Disarticulated and articulated bones
    1. Age
    2. Sex
    3. Stature
    4. Ancestry
b. Bone growth
c. Siding
d. Joints
e. Medical
    i. Hip dysplasia
    ii. Arthritis
    iii. Hip dislocation
    iv. Coccyx facture
    v. Human ‘tail’
    vi. Hip replacement

XXXIV. Leg

a. Disarticulated and articulated bones
    1. Age
    2. Sex
    3. Stature
    4. Ancestry
b. Bone growth
c. Siding
d. Joints
e. Medical
    i. Knee replacement
    ii. Athletic injuries

XXXV. Foot

a. Disarticulated and articulated bones
    1. Age
    2. Sex
    3. Stature
    4. Ancestry
b. Bone growth
c. Joints
d. Medical
    i. Sprained ankle
    ii. Bipedal
    iii. Broken foot

XXXVI. Biomechanics

a. Muscular attachments and movements
b. Walking, running
c. Medical

i. How to tell if someone has a bone condition based on gait
ii. Athletic effects on skeleton

XXXVII. Field procedures for skeletal remains
a. How to excavate human remains
i. Document
ii. Photo
iii. Sketch
iv. Bag
v. Clean
vi. Label
vii. Analyze
b. Common archeological tools

XXXVIII. Laboratory procedures and reports
a. Clean
b. Stabilize/repair broken bones
c. Prepare skeletons for analysis
d. Difference between fossil and skeletal
e. Restoration
i. CT
ii. MRI
iii. 3D scan
iv. 3D print
f. Use standard osteometric tools
i. Calipers
ii. Osteometric board
iii. Mandibulometer
iv. Spreading calipers
g. Students will conduct osteological analyses on a set of skeletal remains and file these reports

XXXIX. Pathology
a. Antemortem
b. Postmortem
c. Perimortem
d. Paleoepidemiology
e. Paleopathology
f. Fracture
g. Dislocation
h. Artificial deformities
i. Trephining
ii. Skull binding
i. Skeletal disorders
i. Cranial
ii. Vertebral
iii. Circulatory
iv. Osteoarthritis
v. Infectious disease
vi. Metabolic disease
vii. Endocrine disorders
viii. Periodontal disease

XL. Postmortem skeletal modifications
a. Taphonomy
b. Antemortem

c. Bone fracture
d. Chemistry
e. Weather
f. Human vs non-human
g. Scavenging
h. Human bone modification
    i. Cuts, chops, gun, scraps

Outcome Competencies and Methods of Assessment

LEARNING outcomes for Osteology

1. Utilize methods for advanced and accurate skeletal identification. I.e.: siding, age, sex, ancestry, height.
2. Distinguish between human and non-human remains.
3. Discuss the accepted theory of the nature and origin of diversity between human populations and how these are affected by cultural practices.
4. Analyze biomechanical functions of the skeletal system of living and non-living individuals.
5. Execute proper handling and respect when working with human skeletal remains.

Assessment for lecture/discussion/lab LEARNING outcomes

Learning outcomes will be assessed by standard exam and quiz questions that are multiple choice or matching or essay format. Other objectives will be tested by lab practicals. Students are responsible for conducting an in-class research project that will overlap with all concepts learned throughout the semester. This resulting project will end with a scientific poster and presentation to the class. – This ties into the overarching program outcomes: 3.1 Written Expression and 4.1 Oral Expression.

2. FORS 3305 – Forensic Anthropology

Introduction to Forensic Anthropology Course Outline

XLI. Introduction

a. What is Forensic anthropology?
b. History of Forensic Science
    i. Thomas Dwight- father of forensic anthropology
    ii. Wilton Marion- wrote FBI manual on skeletal identification
    iii. William Bass, Ellis Kerley, Clyde Snow- Body farm
c. Medicolegal
    i. Define
d. Forensic anthropology protocol
    i. Are they human?
    ii. How many individuals?
    iii. When was death?
    iv. How old?
    v. Sex, race, stature?
    vi. Anatomical anomalies?
    vii. COD?
    viii. Manner of death?
e. Anthroposcopy
    i. Osteometry

ii. Standard osteometric tools
iii. Contemporary/noncontemporary remains
iv. Regression for skeletal data

XLII. Basics of human osteology and odontology
- a. Anatomical language
  - i. Anatomical position
  - ii. Cranial & post cranial
  - iii. Axial & appendicular
  - iv. Plans & sections
    1. Coronal
    2. Frontal
    3. Sagittal
    4. Cross
    5. Longitudinal
    6. Oblique
  - v. Directional terminology
    1. Body
       a. Anterior/posterior
       b. Cranial/caudal
       c. Medial/lateral
       d. Proximal/distal
       e. Palmar/dorsal
       f. Plantar/dorsal
    2. Teeth
       a. Distal/mesial
       b. Buccal/lingual
- b. Skeleton
  - i. All bones and landmarks
  - ii. Histology

XLIII. Medicolegal significance
- a. What is medicolegal?
- b. Distinguishing bone and teeth from other materials
  - i. Human and non-human
  - ii. Residue
  - iii. Ash
    1. Histological differences in each
- c. Distinguishing bone maturity
  - i. Human vs non-human
  - ii. Morphology of human vs non-human
- d. State of preservation
  - i. Color
  - ii. Texture
  - iii. Hydration
  - iv. Weight
  - v. Condition
  - vi. Fragility
  - vii. Soft tissue
- e. Body modifications
  - i. Personal belongings
- f. Condition of interment
  - i. graves

XLIV. Recovery scene methods
    a. Issues
        i. Police and the forensic anthropologist
    b. Locating the remains
        i. GPR
        ii. Magnetometer
        iii. Visual assessment
    c. Searching for remains
        i. Soil compaction
    d. Searching for associated materials
        i. Search patterns
        ii. Mapping
    e. Datum point
        i. Quadrates
        ii. Rough sketch
        iii. Final sketch
    f. Grave excavation
        i. Common tools
        ii. Excavating and documenting
        iii. Collecting remains
            1. Labeling
            2. Chain of custody
    g. Mass disasters
        i. Personnel
        ii. Locating, mapping, collecting
        iii. Temporary morgue
        iv. Victim information
        v. DMORT
    h. Genocide investigation
        i. Field conditions
        ii. Excavating mass graves

XLV. Postmortem interval
    a. Forensic taphonomy
    b. Postmortem interval PMI
    c. Decomposition
        i. Autolysis
        ii. Putrefaction
        iii. Adipocere
        iv. Mummification
        v. Skeletonization
    d. Surface finds
        i. Climate
            1. Hot/dry
            2. Warm/moist
            3. Cold
        ii. Buried
        iii. Submerged
        iv. Body score
    e. Animal scavenging
        i. Stages of scavenging
    f. Forensic entomology

g. Forensic botany
h. Chemical analysis

XLVI. Treatment and examination
a. Forensic anthropology laboratory
b. Preparing remains
c. Examination
i. Removal of soft tissue
ii. Disarticulation
iii. Reconstruction
iv. Sorting
v. Reassembly
d. Inventorying
i. Standard osteological analysis
e. Fragmented remains
i. MNI- minimum number of individuals
ii. GIS- geographic information system

XLVII. Ancestry
a. Cultural affiliation
i. NAGPRA
b. Ethnicity/race
c. Anthroposcopic traits
i. Eyes
ii. Nose
iii. Maxilla
iv. Face
v. Vault
vi. Jaw/teeth
vii. Frequency of traits
d. Osteometric traits
i. Direct measurements
1. Long bones
2. Skull
e. Other ancestral characteristics
i. Mandible
ii. Hair
f. Genetics
i. Blood types
ii. DNA
1. Ancestry Informative markers (AIMS)

XLVIII. Sex
a. Pelvis
b. Anthroposcopic traits
i. Pelvis
ii. Skull
iii. Mandible
iv. Sacrum
c. Osteometric traits
d. Subadults

XLIX. Age at death
a. Subadults
i. Epiphyses

ii. Diaphysis
iii. Long bone length
iv. Primary and secondary ossification centers
1. Epiphyseal union
v. Deciduous teeth
1. Tooth eruption
vi. Skull fusion

b. Adults
i. Symphyseal surface
1. Pubic symphysis
2. Os coxae auricular surface
3. Ribs
4. Sutures

L. Stature

a. Long bones
i. Various formulas for each bone and ethnicity
ii. Partial long bone formula

LI. Death, trauma, and the skeleton

a. Define trauma
b. Cause and manner of death
c. Basic bone trauma
i. Fractures
1. Complete
2. Incomplete
3. Hinge
4. Greenstick
5. Displacement
6. Simple
7. Comminuted
8. Hoop
9. Radiating
10. Pathological
11. Stress
12. Fatigue

d. Characteristics of force trauma
i. Direction
ii. Tension
iii. Compression
iv. Torsion
v. Shearing
vi. Speed
vii. Focus

e. Types of trauma
i. Blunt
ii. Sharp
iii. Projectile
iv. Miscellaneous

f. Timing of bone injury
i. Antemortem
ii. Perimortem
iii. Postmortem

LII. Projectile trauma
- a. Ammunition & firearms
  - i. Caliber
  - ii. Gauge
  - iii. Pellets
  - iv. Bullet construction
    1. Hollow
    2. Full-metal
    3. Semijacket
- b. Velocity
  - i. Calculating velocity
  - ii. Rifling
  - iii. Entry wound
  - iv. Exit wound
- c. Bullets on bone
- d. Wound beveling
  - i. Inward beveling
  - ii. Beveling
  - iii. Outward beveling
  - iv. Reverse beveling
- e. Wound shape
  - i. Round
  - ii. Oval
  - iii. Keyhole
  - iv. Irregular
  - v. Fracture lines
    1. Radiating
    2. Concentric
    3. Butterfly
- f. Bullet wound analysis
  - i. Description
  - ii. Caliber
  - iii. Bullet construction
  - iv. Velocity
  - v. Direction of fire
  - vi. Sequence
- g. Pellet wound analysis
  - i. Misc projectiles
- h. Determining cause & manner of death

LIII. Blunt trauma
- a. Size
  - i. Length x width
- b. Shape
  - i. Round
  - ii. Angular
- c. Weight
  - i. Heavy vs light objects
- d. Fractures
  - i. Bow
  - ii. Plastic
  - iii. Bruise

iv. Occult intraosseous
v. Torus/buckling
vi. Greenstick
vii. Toddler's
viii. Vertical
ix. Depressed
x. Complete fractures
1. Transverse fracture
2. Oblique fracture
3. Spiral fracture
4. Comminuted fracture
5. Epiphyseal fracture

e. Effects of BFT
i. Outbending
ii. Inbending
1. Skull
iii. Buttresses
1. Alveolar ridge
2. Malar eminences
3. Nasofrontal process
4. LeFort fracture
a. LeFort 1
b. LeFort 2
c. LeFort 3
5. Midfrontal
6. Midoccipital
7. Posterior temporal
8. Anterior temporal
iv. Ring fracture
v. Long bones
vi. Other bones

f. Wound analysis
i. Description
1. Size
2. Shape
3. Direction
4. Energy
5. Number of blows
6. Sequence
7. Misc analysis
8. Cause & manner of death

LIV. Sharp and miscellaneous trauma

a. Sharp trauma
i. Wastage
ii. Effects of sharp trauma
1. Puncture
2. Incisions
3. Characteristics
4. Clefts
iii. Wound analysis
1. Description

2. Instrument characteristics
3. Force
4. Number of traumatic events
5. Sequence

b. Blast trauma
c. Strangulation
    i. Hanging
    ii. Ligature
    iii. Manual
        1. Hyoid
            a. Mature
            b. Immature
d. Chemical trauma
e. Cause and manner of death

LV. Antemortem skeletal conditions
a. Accessory ossicle
    i. Accessory foramen
    ii. Foramen of Huschke
    iii. Septal aperture
b. Skeletal anomalies
    i. Wormian bones
    ii. Epipteric bone
    iii. Japonium
    iv. Metopism
    v. Spondylolysis
    vi. Spina bifida
    vii. Bipartite patella
    viii. Congenital pseudoarthrosis
    ix. Persistent ulna styloid ossicle
    x. Os trigonum
c. Markers of occupational stress
    i. Hypertrophy
    ii. Insertion of muscles
    iii. Osteophytosis
    iv. Facets
    v. Grooves
    vi. Deformations
    vii. Accessory bones
d. Pathological conditions
    i. Osteolytic disease
    ii. Osteoproliferative lisions
    iii. Rickets
    iv. Lytic lesions
        1. Anemia
        2. Porotic hyperstosis
        3. Schmorl’s nodes
    v. Proliferative lesions
        1. Osteophytes
        2. Generalized bone disease
        3. Button osteoma
    vi. Deformative lesions

1. Wedging
2. Osteomalacia
3. Kyphosis

e. Misc anomalies
   i. Trephination
   ii. Trauma-induced pseudoarthrosis

LVI. Postmortem changes to bone
   a. Dismemberment
   b. Saw & saw damage
      i. Crosscut saws
      ii. Rip saws
      iii. Tooth set
         1. Kerf
      iv. Superficial false start scratches
         1. False start kerf
      v. Sectioned bone cut
      vi. Breakaway spur
      vii. Analysis of saw marks
         1. Description
         2. Direction
         3. Teeth
         4. Blade width
         5. Blade type
         6. Blade shape
         7. Energy
   c. Animal scavenging
      i. Carnivores
      ii. Punctures
      iii. Pits
      iv. Scoring
      v. Furros
         1. Rodents
   d. Fire damage
      i. Temperature
      ii. Color change
   e. Weathering
   f. Burial damage
   g. Water transport damage
   h. Miscellaneous
      i. Cryoturbation
      ii. Mineralization

LVII. Additional aspects of individualization
   a. Define individualization
   b. Facial approximation
      i. Facial thickness
         1. Width = opening width + 12.2
         2. Width = opening width + 1.63
         3. PP = 0.56 X Na-M
      ii. Epicanthic fold
      iii. Pat pads
      iv. Everted lips

v. Ear length
1. Length = 54.95 + (4.85*sex) + (.1*age)

c. Handedness

d. Body weight
i. Wt = 0.024 (dry skeletal wt) + 50.593
ii. Wt = 0.013 (dry skeletal wt) + 85.406

LVIII. Obtaining an identification

a. Positive
i. Personal identification
ii. Radiography
1. Frontal sinuses
2. Septum
3. Scalloping
iii. Dental/surgical devices

b. Probable
i. Point comparison
ii. Combing information
1. Match to antemortem characteristics
2. Bayesian statistics
iii. Photographic superimposition

c. Misc
i. Identification by exclusion
1. DNA testing

LIX. Ethics

a. Responsibilities
i. Confidentiality
ii. Honesty
iii. Evidence
iv. Opinion
v. Expert witnessing
vi. Possible
vii. Probable
viii. General tendency
ix. Certainty
x. Word qualifiers
xi. inconsistent

b. Personal ethics

c. Final report
i. Court testimony
ii. Pretrial meeting
iii. Qualifications
iv. Direct examination
v. Corss-examine
vi. Impeach
vii. Redirect examination

Outcome Competencies and Methods of Assessment

LEARNING outcomes for Forensic Anthropology

1. Apply advanced and accurate skeletal identification to individuals with pathologies.
2. Distinguish between multiple individuals based on fragmentary remains.

3. Apply proper forensic techniques when analyzing cause of death on skeletal remains.
4. Execute proper handling and respect when working with human skeletal remains.

Assessment for lecture/discussion/lab LEARNING outcomes
Learning outcomes will be assessed by standard exam and quiz questions that are multiple choice or matching or essay format. Other objectives will be tested by lab practicals. Students are responsible for conducting an in-class research project that will overlap with all concepts learned throughout the semester. This resulting project will end with a scientific poster and presentation to the class. – This ties into the overarching program outcomes: 3.1 Written Expression and 4.1 Oral Expression.

3. FORS 3225 – Forensic Taphonomy

LX. Introduction
- a. What is taphonomy?
- b. Osseous data
- c. Taphonomic characteristics
- d. How to collect materials

LXI. Microscopic destruction of bone
- a. Skeletal histology
  - i. Bone regrowth
  - ii. Bone death

LXII. Human decomposition ecology
- a. Grave autopsy
  - i. Recognizing graves
  - ii. Collecting
  - iii. Preserving

LXIII. Forensic entomology
- a. Define
- b. Collection techniques
- c. Insect life
  - i. Flies
  - ii. Beetles
  - iii. Bees
- d. Insect development and temperature

LXIV. Human decomposition
- a. Algor mortis
- b. Rigor mortis
- c. Livor mortis
- d. Adipocere
- e. Autolysis
- f. Putrefaction
- g. Mummification
- h. Skeletonization
  - i. How weather/environment affects each of these

LXV. Decomposition effects
- a. Burial
  - i. Open
  - ii. Grave
  - iii. Shallow grave
  - iv. Under cement

v. Greenhouse effect
vi. water

b. Weather
i. Hot/dry
ii. Hot/humid
iii. Cold
iv. wet

c. Insect activity
i. Flesh eating beetles
ii. Flies
iii. Other beetles

d. Drugs, toxins

Outcome Competencies and Methods of Assessment

LEARNING outcomes for Forensic Taphonomy

1. Explain the stages of decomposition and recognizes such stages when encountering remains.
2. Analyze insect activity to determine time of death.
3. Compare and contrast insect activity and decomposition.
4. Discuss how environment, weather, and location can affect decomposition.
5. Apply proper preservation techniques.

Assessment for lecture/discussion/lab LEARNING outcomes

Learning outcomes will be assessed by standard exam and quiz questions that are multiple choice or matching or essay format. Other objectives will be tested by lab practicals. Students are responsible for conducting an in-class research project that will overlap with all concepts learned throughout the semester. This resulting project will end with a scientific poster and presentation to the class. – This ties into the overarching program outcomes: 3.1 Written Expression and 4.1 Oral Expression.

4. FORS 3310 – Forensic Toxicology

LXVI. Fundamentals

a. Introduction
i. Define forensic toxicology
ii. Job of forensic toxicologists

b. History of forensic toxicology
i. Ancient Egypt
ii. Ancient Greece
iii. Ancient Rome
iv. Dark Ages and Medieval period
v. Dr. addington
vi. Orfila, the father of forensics
vii. Marsh text
viii. Lafarge case
ix. Reinsch test
x. Isolation of alkaloid poisons
xi. Development of forensic toxicology
1. Europe
2. US
a. Dr. Buchanan

b. Alcohol testing
xii. Chromatography
xiii. Mass spectrometry

c. Toxicity and toxidromes
i. Prongs of toxicity
1. Exposure
2. Dose
3. Mechanism
ii. Multiple drug effects
1. Additive
2. Synergistic
3. Potentiation
4. Antagonism
iii. Descriptions of toxicity or toxic potential
1. Issues
a. Concentration units
b. Unexpected effects
c. Class descriptions of toxicity
2. Measuring and describing
a. Measuring /describing the environment
b. Epidemiological studies
c. Individual symptoms/behaviors
d. Characterization of toxin levels
iv. Medical response
1. Clinical evaluation and response
a. Evaluation/stabilization
b. Emergency medical technician response
c. Consciousness assessment
d. History and physical examination
2. Patient monitoring and clinical laboratory testing
3. Toxidromes
a. Cholinergic
b. Anticholinergic
c. Sympathomimetic
d. Opiate
e. Hallucinogenic
f. Sedative-hypnotic
4. Antidotes
5. Decontamination

d. Toxicokinetics
i. Introduction to toxicokinetics
1. Mechanism
2. Expression
3. Magnitude
4. Pharmacokinetics
5. Pharmacodynamics
6. Toxicokinetics
ii. Fate of drugs and poisons in the body
iii. Blood
iv. Routes in & out
1. Absorption

a. Mechanisms of absorption
b. Factors affecting absorption
c. Drug delivery mechanisms
d. Bioavailability

2. Distribution
    a. Distribution process
    b. Compartments
    c. Volume of distribution
3. Elimination
    a. Parameters
    b. Kinetics
    c. Multiple dose considerations

e. Biotransformation
    i. Metabolism
        1. How metabolism occurs
        2. Metabolic transformations are enzymatic processes
        3. Limitation of enzymatic processes
            a. Saturation of enzyme catalysis
            b. Enzyme induction
            c. Inhibition of enzymatic processes
        4. Drug-drug interaction
    ii. Phase I and phase II reactions
        1. Phase I
            a. Cytochrome P450s
            b. Flavin-containing monooxygenases
            c. Cytosolic enzymes
        2. Phase II
            a. Glucuronidation
            b. Sulphation
            c. Methylation
            d. Acetylation
            e. Amino acids
            f. Glutathione
            g. Mercapturic acids
    iii. Reactive metabolites
f. Postmortem toxicology
    i. Postmortem examinations
        1. Role of medical examiner
        2. Scene investigation
        3. Types of postmortem examinations
            a. Records review
            b. External examination
            c. Autopsy
        4. Findings and reports
        5. Autopsy process
    ii. Role of toxicologist in postmortem forensic examinations
        1. Samples and sampling
        2. Scope of testing
            a. Screening
            b. Quantitative analysis
            c. Specialized toxicology testing

3. Challenges and confounders of postmortem testing
    a. Analytical
    b. Interpretive
4. Pediatric cases
5. Geriatric cases

LXVII. Organ system toxicology

a. Neurotoxicology
    i. Anatomy
    ii. Physiology
        1. Neurons
        2. Glial cells
    iii. Neurotoxicologic responses
        1. Susceptibility of the nervous system
        2. Manifestations of neurotoxicity
    iv. Neurotransmission
        1. Neuronal membrane potential
        2. Propagation of depolarization
        3. Events at the synapse
        4. Inhibitory neurotransmission
    v. Ion channel toxins
        1. Sodium channel agents
            a. Antiarrhythmic sodium channel agents
            b. Local anesthetics
        2. Potassium channel agents
        3. Calcium channel agents
    vi. GABA receptor inhibitors and agonists
    vii. Neural body toxins
    viii. Toxins that attack myelin
    ix. Toxins that attack axons
    x. Toxins that affect synaptic functions
    xi. Cholinergic toxins
b. Cardiac toxicology
    i. Anatomy and physiology
        1. Normal anatomy
        2. Normal electrophysiology
        3. Electrocardiogram
        4. Clinical assessment of heart conditions
    ii. Disease state
        1. Hypertrophy
        2. Ischemia and infarction
        3. Rate abnormalities
        4. Rhythm disturbances
            a. Atrial fibrillation
            b. Ventricular fibrillation
            c. Long QT syndrome and Torsades de Pointes
        5. Cardiomyopathies
        6. Tamponade
        7. Inflammation
        8. Heart failure
        9. Valvular disease
    iii. Mechanisms of therapy

1. Inhibition of Na-K ATPase
2. Sodium channel blockers
3. Calcium channel blockers
4. Potassium channel blockers
5. Adrenergic receptor blockers
6. Nitrates
7. Angiotensin-converting enzyme (ACE) inhibitors

iv. Common toxins
1. Cocaine and other sympathetic amines
2. Nicotine
3. Digoxin/digitalis
4. Doxorubicin
5. Tricyclic antidepressants

v. Uncommon toxins
1. Aconitine
2. Tetrodotoxin
3. Grayanotoxins
4. The yew plant
5. Lily of the valley
6. Oleander

c. Hepatotoxicity

i. Anatomical description
1. Gross description
2. Microscopic description
a. Classic lobule
b. Liver acinus
c. Portal lobule

ii. Physiological processes
1. Energy and nutrient processing
2. Synthesis of biomolecules
3. Detoxification
4. Bile formation and elimination
5. Storage

iii. Hepatic injury
1. Hepatocellular death: apoptosis and necrosis
2. Cholestasis and jaundice
3. Fatty liver
a. Steatosis
4. Cirrhosis
5. Disease states
a. Hepatitis
b. Diabetes

iv. Liver function tests
1. Other hepatic function measures

v. Hepatotoxins
1. Acetaminophen
2. Alcohol
3. Carbon tetrachloride
4. Mushroom toxins
5. Microcystins
6. Bromobenzene

7. Warfarin

d. Kidney toxicology
    i. General overview
        1. Anatomy and physiology, and basic functions
    ii. Excretion
        1. Filtration
        2. Reabsorption
        3. Secretion
    iii. Blood pressure control
    iv. Hormone production
        1. Erythropoietin
        2. Calcitriol
        3. Gluconeogenesis
    v. Clinical measurements of renal function
        1. Blood urea nitrogen
        2. Creatinine
        3. Glomerular filtration rate
    vi. Examples of toxins
        1. Heavy metals
        2. Aminoglycosides
        3. Chemotherapeutic agents
        4. Hexachorobutadiene
        5. Aristolochic acid
        6. Orellanine
e. Pulmonary toxicology
    i. Anatomy and physiology
        1. Lungs
        2. Physiology of breathing
        3. Clinical assessment of pulmonary function
    ii. Disease states
        1. Bronchial disease
        2. Parenchymal disease
        3. Interstitial diseases
    iii. Asphyxia
        1. Interference with cellular utilization of oxygen
            a. Biochemistry and physiology of respiration
            b. Cyanide
            c. Hydrogen sulfide
        2. Interference with transport/absorption- carbon monoxide
        3. Caustic action within the airway
            a. Mechanism
            b. Symptoms
            c. Pathology
                i. Smoke inhalation
    iv. Oxygen blockage and displacement
        1. Hypoxic environments
        2. Physical asphyxia
        3. Huffing solvents and aromatic hydrocarbons
    v. Common toxins
        1. Nicotine
        2. Ammonia gas

3. Chlorine gas
4. Sulfur dioxide
5. Ozone
6. Nitrogen dioxides

vi. Uncommon toxins

1. Phosgene
2. Silicon
3. Asbestos
4. Paraquat

LXVIII. Toxins, drugs, and drug classes

a. Alcohol

i. Ethanol

1. Ethanol pharmacokinetics
    a. Absorption
    b. Distribution
    c. Metabolism
    d. Elimination
2. Physiological effects of ethanol
    a. Mechanism of action
    b. Effects of ethanol and correlation with blood alcohol concentration
3. Alcohol calculations and inferences
    a. Back-extrapolation
4. Alcohol and diabetes
5. Health effects of chronic ethanol use
6. Alcohol testing
7. Ethanol consideration in postmortem cases
    a. Ethanol-drug combinations

ii. Methanol

1. Pharmacokinetics
2. Methanol toxicity
    a. Toxic mechanism
    b. Clinical presentation
    c. Treatment
    d. Pathology
    e. Forensic toxicology considerations

iii. Isopropanol

1. Pharmacokinetics
2. Toxicology

iv. Ethylene glycol

1. Pharmacokinetics
2. Ethylene glycol toxicity

b. Opiates and opioids

i. History

ii. Chemistry

1. Morphine and structural analogs

iii. Pharmacokinetics

1. Absorption/distribution
2. Metabolism
3. Elimination

iv. Mechanism of action

1. Effects on the nociceptive response

v. Physiological effects
    1. Analgesia
    2. Euphoria
    3. Respiratory depression
    4. Intestinal motility
    5. Cardiovascular effects
    6. Miosis
    7. Cough suppression
vi. Opiate/opioid toxicity
    1. Mechanism
    2. Clinical presentation
    3. Treatment
    4. Withdrawal
    5. Postmortem considerations
vii. Tolerance and dependence
viii. Morphine analogs and related compounds
    1. Heroin
    2. 6-mono-acetylmorphine
    3. Codeine
    4. Thebaine
    5. Hydrocodone, hydromorphone, oxycodone, oxymorphone
    6. Meperidine
    7. Methadone
    8. Fentanyl
    9. Buprenorphine
    10. Naloxone and naltrexone

c. Non opiate sedative/hypnotic drugs
    i. Barbiturates
    ii. Benzodiasepines
    iii. Z-drugs
    iv. Antihistamines
    v. Herbal medications
    vi. Tricyclic antidepressants
    vii. Antipsychotics
    viii. Misc compounds
        1. Trazodone
        2. Chloral hydrate
        3. Glutethimide
        4. Methaqualone
        5. Craisoprdol/meprbamate
        6. Y-hydroxybutyric acid

d. Sympathomimetic amines
    i. History
    ii. Examples and mechanisms
        1. Amphetamine
        2. Methamphetamine
        3. MDA and MDMA
        4. Ephedrine, pseudoephedrine, and related b-hydroxyphenylethylamines
        5. Methylphenidate
        6. Cocaine
        7. Cathinones

8. Benzyl-and phenylpiperazines

iii. Analysis and interpretation of SMA results

e. Hallucinogens, psychedelics, and cannabinoids
   i. Psychedelics
      1. Serotonin-releasing agents and receptor agonists
      2. Tryptamines
      3. Lysergic acid and related structures
      4. Phenethylamines
      5. Cannabinoids
   ii. Dissociative agents
   iii. Deliriants
f. Cholinergic and anticholinergic toxins
   i. History
   ii. Cholinergic synapse
      1. Normal cholinergic neurotransmission
      2. Cholinergic toxins and mechanisms
         a. Presynaptic toxicity
         b. Synaptic toxicity
         c. Postsynaptic toxicity
      3. Anticholinergic toxins and mechanism
         a. Presynaptic toxicity
         b. Postsynaptic
g. Metals
   i. Arsenic
   ii. Antimony
   iii. Cadmium
   iv. Lead
      1. Gastrointestinal toxicity
      2. Heme synthesis toxicity
      3. Neurotoxicity
   v. Mercury
      1. Elemental mercury toxicity
      2. Organic mercury toxicity
      3. Inorganic mercury toxicity

Outcome Competencies and Methods of Assessment

LEARNING outcomes for Forensic Toxicology

1. Utilize proper collection methods.
2. Discuss how types of drugs will affect an individual and the physiology behind the organ systems.
3. Test various substances to determine presence of drugs.
4. Differentiate between toxins, drugs, and other chemicals.
5. Apply toxicology to a forensics setting.

Assessment for lecture/discussion/lab LEARNING outcomes

Learning outcomes will be assessed by standard exam and quiz questions that are multiple choice or matching or essay format. Other objectives will be tested by lab practicals. Students are responsible for conducting an in-class research project that will overlap with all concepts learned throughout the semester. This resulting project will end with a scientific research paper and presentation to the class. – This ties into the overarching program outcomes: 3.1 Written Expression and 4.1 Oral Expression.

5. FORS 3215 Fingerprint Analysis

LXIX. Fingerprint Analysis
- a. History of fingerprints
  - i. Nonsystematic methods of identification
- b. Systematic methods of identification
  - i. Bertillonage
  - ii. Fingerprints
    1. Define
    2. Fingerprint patterns and characteristics
    3. Additional fingerprint definitions
- c. Fingerprint pattern types and associated terminology
  - i. Loop pattern
    1. Loop ridge counting
    2. Radial and ulnar loops
    3. Issues
  - ii. Plain arch and tented arch patterns
    1. Plain arch
    2. Tented arch
  - iii. Whorl pattern
    1. Plain whorl
    2. Central pocket loop whorl
    3. Double loop whorl
    4. Accidental whorl
    5. Ridge tracing and counting whorl patterns
    6. Palm print
- d. Classification
  - i. Henry with FBI Extensions, NCIC, IAFIS
    1. Henry with FBI extensions
       a. Ridge count conversion
       b. Conversion chart
       c. Referencing
       d. Filing sequence
    2. NCIC classification system
    3. IAFIS
    4. Other systems
       a. Manual methods

LXX. Development, identification, and presentation of fingerprints
- a. Known fingerprints
  - i. Manual method
  - ii. Live scan
- b. Unknown fingerprints
  - i. Conditions affecting latent prints
  - ii. Crime scene search and fingerprint development
  - iii. Fingerprint development techniques
    1. Powder techniques
    2. Chemical techniques
  - iv. Procedure after developing prints
  - v. Fingerprint comparison and identification
- c. Court presentation
  - i. Preparation
  - ii. Court presentation

1. Verbal
2. Nonverbal

iii. Challenges to the science of fingerprints

Outcome Competencies and Methods of Assessment

LEARNING outcomes for Fingerprint analysis

1. Apply manual and live scanning methods to fingerprint collection.
2. Critique known and unknown fingerprint collection methods.
3. Differentiate between systematic and nonsystematic methods of identification.
4. Apply proper identification techniques.
5. Defend fingerprint identification in a court room setting.

Assessment for lecture/discussion/lab LEARNING outcomes

Learning outcomes will be assessed by standard exam and quiz questions that are multiple choice or matching or essay format. Other objectives will be tested by lab practicals. Students are responsible for conducting an in-class research project that will overlap with all concepts learned throughout the semester. This resulting project will end with a scientific paper and presentation to the class. – This ties into the overarching program outcomes: 3.1 Written Expression and 4.1 Oral Expression.

Appendix D. FEPAC Accreditation standards

FEPAC accreditation standards comparison of current and proposed Forensic Science program

Standard	**Current program**	**Proposed program**
4.1.1a Natural science core At least one biology course with lab One year of physics At least 4 courses in chemistry with lab At least one course in calculus and stats	BIOL 1106 – Biological Principles II Physics 1101 and 1102 (or 1105 and 1106, which are calculus based) CHEM 1105, 2200, 2201, and 2202 MATH 1185 or 1190 and MATH 1113	BIOL 1106 – Biological Principles II Physics 1101 and 1102 (or 1105 and 1106, which are calculus based) CHEM 1105, 2200, 2201, and 2202 MATH 1185 or 1190 and MATH 1113
4.1.1b Specialized science courses Additional 12 semester hours of advanced chemistry or biology	BIOL 3360 - Biochemistry – 4 hours CHEM 2205 – Analytical Chemistry – 4 hours CHEM 3385 – Instrumental Analysis – 4 hours	BIOL 3360 - Biochemistry – 4 hours CHEM 2205 – Analytical Chemistry – 4 hours CHEM 3385 – Instrumental Analysis – 4 hours
4.1.1c Forensic Science courses A minimum of 15 hours, with at least 9 hours having a lab component	FORS 2201 – Intro to For. Sci. – 4 hours FORS 2225 – Forensic Microscopy – 3 hours FORS 4401 – Forensic Capstone – 3 hours FORS 4411 – Internship – 2 hours BIOL 4495 or CHEM 4403 – 2 hours	FORS 2201 – Intro to For. Sci. – 4 hours FORS 2225 - Trace Analysis and Microscopy – 3 hours (new name) FORS 3201 – Forensic Biology – 4 hours FORS 4411 – Internship – 2 hours FORS 4401 – Forensic Capstone – 3 hours
4.1.1d Additional courses A minimum of 19 semester hours of advanced, upper level course	BIOL 3380 – Genetics – 4 hours BIOL 3390 – Molecular Biotech. – 4 hours FORS3385 – Research – 3 hours Specialization electives BIOL or CHEM electives – 8 hours	BIOL 3380 – Genetics – 4 hours BIOL 3390 – Molecular Biotech. – 4 hours FORS 3385 – Research – 3 hours Specialization electives CHEM electives – 8 hours FORS 3301 – Human Osteology – 4 hours (new) FORS 3305 – Forensic Anthropology – 4 hours (new) FORS 3225 – Forensic Taphonomy – 2 hours (new) FORS 3310 – Forensic Toxicology – 4 hours (new) FORS 3215 – Fingerprint Analysis – 2 hours (new)

Appendix E. Registrar course number approval

Hi Professor Henson—

These course numbers are available as well.

Lori

From: Ransom, Laura
Sent: Tuesday, September 18, 2018 11:24 AM
To: FSU Office of the Registrar <registrar@fairmontstate.edu>
Cc: Gonzalez, Cheri <Cheri.Gonzalez@fairmontstate.edu>
Subject: RE: Request for Course Number availability

Hi Lori,

They are all available. Mark Flood and Kristy Henson sent the same list.

Laura

From: FSU Office of the Registrar
Sent: Tuesday, September 18, 2018 10:51 AM
To: Ransom, Laura <lransom@fairmontstate.edu>
Cc: Gonzalez, Cheri <Cheri.Gonzalez@fairmontstate.edu>
Subject: FW: Request for Course Number availability

Laura—

Can you check these courses as well?

Thanks, again!

Lori

From: Henson, Kristy
Sent: Tuesday, September 18, 2018 9:16 AM
To: FSU Office of the Registrar <registrar@fairmontstate.edu>
Subject: Re: Request for Course Number availability

Thank you Lori,

If you have time could you please check these FORS course numbers?
FORS 3301
FORS 3305
FORS 3310
FORS 3225
FORS 3215