

MASTER OF SCIENCE IN FORENSIC SCIENCES PROGRAM

Mission Statement for Forensic Sciences Program Master of Science Degree

The mission of the program at Chaminade University of Honolulu leading to the degree Master of Science in Forensic Sciences is to train students in the objective application of scientific principles and methods to the analyses and solutions to criminal problems in keeping with the Marianist principles. This is particularly relevant to the ideal Marianist principles of fostering inquiry into and the supporting of social justice. In pursuing this aim, the highest level of ethical behavior will be required of students

Learning Outcomes for Forensic Sciences Program Master of Science

1. Students completing the MSFS program will be able to demonstrate mastery of basic techniques and principles in the major subdisciplines in the forensic sciences.
 - a. Required courses: Forensic Photography (FS 650), Blood Stain and Pattern Analysis, Fingerprint Analysis, Trace Evidence, Tool marks and Firearms (FS 638), Forensic Anthropology, and Instrumentation.

2. Students completing the MSFS program will be able to demonstrate an understanding of the legal and ethical systems governing the admissibility of the evidence they will be collecting and analyzing.
 - a. Required courses: CJ 151, 223, 423 and 424/624, FS 340, Laboratory management (FS 620)), and FS 790

3. Students completing the MSFS program will be able to demonstrate a proficiency in preparation of written and oral reports and testimony.
 - a. Required courses: CJ 223, FS 790, 799, Laboratory management (FS 620)
 - b. Support/elective courses: Death investigation (FS 6XX)

4. Students completing the MSFS program must be able to demonstrate an advanced level of competence in one or more of the subdisciplines in the forensic sciences.
 - a. Required courses: FS 790, 799
 - b. Additional specialized courses relevant to the specialty must be completed from the list of elective courses or by supervised individual study

PROGRAM GOALS FOR THE M.S. DEGREE IN FORENSIC SCIENCES

Upon completion of the M.S. Degree program in Forensic Sciences, the student will demonstrate a sophisticated understanding of:

- 1. the scientific method and its application in the Forensic Sciences:**
 - a. Graduate Forensic Sciences courses have imbedded in their course content material discussions of the scientific approaches contained within their respective subdiscipline areas. Further exposure to actual applications takes place during the internship experience.
 - b. Relevant Courses: FS 635/L, FS 638/L, FS 650/L, Blood stain and Pattern Analysis, Fingerprint Analysis, Instrumentation/L, Trace Evidence, Forensic Toxicology.
 - c. Support courses: FS 790, FS 799, FS 800, Internship,

- 2. the legal constraints and ethical bases for research and practice in the Forensic Sciences:**
 - a. The student is exposed to the American system of criminal justice and ethical concerns through a series of courses dealing with criminal law. In order to function in the field, students must understand the system and be able to prepare appropriate reports and research publications for use by the legal system and academic pursuits.
 - c. Relevant Courses: CJ 614, FS 620, FS 632, Internship
 - b. Support/elective courses: CJ 424, 465

- 3. the different areas of research and practice contained within the Forensic Sciences:**
 - a. Unlike many disciplines, the Forensic Sciences are an eclectic grouping of many subdisciplines. As no two crimes are the same, the skills required for each solution will differ. Students will be exposed to all of the areas contained in the Forensic Sciences through a series of consecutive required major courses.
 - d. Relevant Courses: FS 635/L, FS 638/L, FS 650/L, Blood stain and Pattern Analysis, Fingerprint Analysis, Instrumentation/L, Trace Evidence, Forensic Toxicology.

- 4. the techniques involved in the recognition, documentation and analysis of forensic evidence:**

- a. The student will become competent in appropriate collection, documentation and preservation techniques that must be undertaken to assure the integrity, condition and admissibility of evidence discovered at a crime scene.
- b. Required courses: FS 632, FS 638/L, FS 650, Blood Stain and Pattern Analysis, Fingerprint Analysis, Instrumentation/L, Trace Evidence, Internship.
- c. Support/elective courses: Underwater Forensics, Forensic Toxicology/L, Forensic Anthropology, Death Investigation, PSY 780

Forensic Sciences Assessment Process

Individual Course Assessment:

Individual progress through a given course is evaluated by at least 2 processes. Students take a pre-test during the first class session and a post-test during the last class session. The same test is administered at both times. Questions are constructed to cover the areas listed in the course syllabus for which the student should be able to demonstrate competence (Appendix 1). A typical Pre and Post-test for the FS 635, Forensic Entomology course is appended as Appendix 2. Further evaluations of the student's comprehension of the significant materials are made during the semester through traditional testing, either written or practical. An example of the examination is attached as Appendix 3. Assessments of the student's perception of the efficiency of the instructor are made using the end of semester student evaluations provided by Chaminade University.

Assessment of Student Progress through Curriculum:

As the courses in the Forensic Sciences major are designed to be completed in sequence and the materials are cumulative in nature, a measure of the student's overall comprehension of the techniques and theories is reflected in their continued success in the Forensic Sciences Core Courses. Due to the overlapping nature of the core courses, weaknesses exhibited by the student will be detected and can be remedied during subsequent core courses. Following the completion of the majority of the core courses, students select elective courses and Directed Studies Projects allowing for a degree of specialization at the M.S. Degree level.

Pre-exit Assessment:

The ultimate assessment of the success of the Forensic Sciences Program in preparation of a student is their performance following completion of the program. This assessment consists of

two parts and will take place during the final year of the program. The first is in the Internship and the second will be a capstone examination administered during the last semester of the program. All students are required to complete an internship program. This internship is to be based in a functioning forensic laboratory in an accredited agency, such as the Department of the Medical Examiner, Honolulu Police Department or Naval Criminal Investigation Section. During the internship the student is to perform actual forensic examinations under the supervision of a professional in a given area of expertise. The supervisor provides a written assessment of the student's competence and professionalism during their internship experience. Additionally, the student is required to submit a journal detailing their activities and an assessment of their internship experience. Copies of the assessment forms are attached as Appendix 4.

The Capstone Examination covers the major concepts of the Forensic Sciences, including technical aspects and ethical issues. Questions are designed to demonstrate competence in the major areas expected for advanced crime laboratory workers or scene investigators. These questions will be tied directly to the materials covered in the required Forensic Sciences Core courses. This examination is currently being developed.

Post-exit Assessment:

A significant measure of the effectiveness of the program would be the success of the student in employment following graduation or further postgraduate education. Graduating students will be polled 1 year and 2 years following completion of the program. Their employment and/or further postgraduate status will be determined. They will be asked to provide feedback on aspects of the program they believe were helpful to them in their careers as well as aspects they feel require improvement.

APPENDIX 1

FS 635 - Forensic Entomology

Spring Day
10:50
Lecture 3 credits; Lab. 1 credit
Goff

TR: 8:00 –

Dr. M. Lee

COURSE SYLLABUS AND OUTLINE

This is a basic course in forensic entomology. The field may be broadly defined as the interactions between insects as evidence and the legal system. This definition includes the areas of stored product, structural, and medicocriminal or medicolegal entomology. The primary focus of this course will be in the area of medicocriminal forensic entomology. The other two areas will be covered more briefly. Since forensic entomology in all three sub disciplines entails more than just the analyses of entomological evidence, several non-entomological topics will be covered. Forensic entomology operates within our legal system and is concerned with assisting in the administration of justice. To this end, the highest moral and ethical standards must be an integral part of the investigations undertaken. Areas to be covered in lectures will include: crime scene processing, detection and recovery of remains, evidence collection and processing, processing and identifications of insects, techniques for estimation of the postmortem interval, entomotoxicology, patterns of decomposition, life cycles of forensically important taxa, preparation of case reports, and techniques in providing expert witness testimony. Additionally, a case study will be provided to each student during the semester. This case will include all pertinent data and specimens. The student will provide an analysis of this case in the form of a written case report in proper form for submission to an investigating agency.

The laboratory portion of this course will serve to compliment the lectures materials and provide hands-on experience with different aspects of forensic entomology. Practical experience will be provided through processing of mock crime scenes, recovery of scattered remains, and grave excavation. A decomposition study will be conducted during the course and this will provide the basis for laboratory exercises in collection and preservation of arthropod materials, evidence collection and documentation, identification of immature arthropod specimens, and calculations of postmortem intervals. A final report of the results and analyses of this decomposition study will be required from each student.

Learning Outcomes: At the end of this course the student will:

1. demonstrate the ability to identify different arthropod taxa of significance in the decomposition process.
2. demonstrate an understanding of the life cycles of the various species involved in decomposition.
3. demonstrate they are able to properly collect, preserve and document arthropod specimens.
4. demonstrate calculation of the postmortem interval using ADH and ADD calculations.

5. demonstrate an understanding the patterns of decomposition of a human body under different conditions.
6. demonstrate the differences in development of arthropods related to presence of drugs and/or toxins in tissues.
7. demonstrate an understanding of the role of the forensic entomologist in the moral and legal systems of our society.
8. demonstrate they are able to prepare case reports.

GRADING:

The point spread for the lecture is as follows:

Lecture Exam 1	100 pts
Lecture Exam 2	100 pts
<u>Case Study</u>	<u>100 pts</u>
Total	300 pts

The point spread for the laboratory is as follows:

Laboratory Exam 1	100 pts
Laboratory Exam 2	100 pts
<u>Decomposition Report</u>	<u>100 pts</u>
Total	300 pts

GRADING SCALE:

The grading scale for both lecture and laboratory is as follows:

90% +	=	A
80-89%	=	B
70-79%	=	C
60-69%	=	D
59 % and lower	=	F

Text: Entomology and Death - A Procedural Guide. Catts, E.P. & Haskell, N.H., eds. 1990. Joyce's Print Shop, Clemson, SC. - Required

A Fly for the Prosecution. Goff, M.L. 2000. Harvard Univ. Press.
Optional

Forensic Taphonomy: The Postmortem Fate of Human Remains.
Haglund, W.D. & Sorg, M.H., eds. 1997. CRC Press, New York –
Suggested

Reminders of Important University-Wide Policies

The following policies are summarized from the 2004-2005 Student Handbook. Please be sure that you have reviewed these and the other policies that your Handbook contains.

1. Attendance

Students are expected to attend all classes. The University assumes you are mature enough to be responsible for your own behavior.

Any absence of two weeks or more will be reported to the Office of the Associate Provost and the Registrar.

You should notify me when illness prevents you from attending class and make arrangements to complete missed assignments. Notification may be done by calling me, or by leaving word at the Faculty Services (735-4739). Depending on your circumstances, I may modify deadlines of course requirements. Anyone who stops attending a course, without officially withdrawing may receive a failing grade.

Students with three or more unexcused absences will lose one letter grade.

2. Classroom Department

- You are expected to be punctual; unexcused tardiness will be considered an absence
- Smoking and alcoholic beverages are prohibited in all classrooms, whether or not class is in session.
- No pets are allowed in class. Exceptions will be made in the case of a seeing-eye dog.
- Radios, tape decks, headsets, televisions, and other personal audiovisual equipment not pertinent to the class are prohibited during class.

- Beepers and cellular telephones are also prohibited during class except in extenuating circumstances for which you have received my approval in advance.
- And, finally, I expect you to follow the University's "dress code" requiring footwear and appropriate shirts to worn during all classes, as well as in the library, cafeteria and administrative offices.

3. Academic Honesty

Students are responsible for promoting academic honesty at Chaminade by not participating in or facilitating others' participation in any act of academic dishonesty, and by reporting incidences of academic dishonesty (such as theft of tests, records, and other confidential materials, altering grades, and/or plagiarism) to their instructors.

4. Freedom of Expression

Students are free to take reasoned exception to the views offered in particular courses of study. They maybe required to know thoroughly the specific bodies of knowledge or interpretations or theories set by the professor, but are free to reserve personal judgment as to the truth of falsity of them.

Students are expected to maintain the standards of academic performance articulated in course syllabi, supplemental readings, assignments, and Academic and Student Affairs policies. The instructor is considered the normal and competent judge of academic work. Students have an appeals process in the rare cases of unjust grading and evaluation by the procedure detailed in the Academic Grievance section of the Student Handbook.

**You are responsible for all of the information in this document:
losing it or not reading it are not excuses
for not knowing what's in it!**

FS 635 -Forensic Entomology Lecture Schedule

Lecture #	Topic
1	Introduction and Scope of Course
2	Insect Morphology
3	Insect Morphology
4	Insect Classification
5	Life Cycles
6	Life Cycles
7	Decomposition – early changes
8	Decomposition Patterns
9	Abnormal Decomposition
10	Collection of Insect Evidence
11	Collection of Insect Evidence
12	Laboratory Rearing
13	Laboratory Rearing
14	Detection and Recovery of Surface Remains
15	Detection and Recovery of Buried Remains
15	Forensic Anthropology – guest lecture
17	Insect Succession Patterns

18	Review
19	Lecture Exam 1
20	Diptera of Forensic Significance
21	Diptera of Forensic Significance
22	Diptera of Forensic Significance
23	Coleoptera of Forensic Significance
24	Coleoptera of Forensic Significance
25	Coleoptera of Forensic Significance
26	Hymenoptera of Forensic Significance
27	Soil-dwelling arthropods
28	Aquatic Insects
29	Estimation of the Postmortem Interval – early stages
30	Estimation of the postmortem Interval – early stages
31	Estimation of the Postmortem Interval – late stages
32	Estimation of the Postmortem Interval – climatic factors
33	Postmortem Movement of the Body
34	DNA Applications
35	Myiasis in Abuse and Neglect
36	Defining the Crime Scene and Wound Evaluation
37	Entomotoxicology
38	Preparation of Reports
39	Preparation of Reports
40	Expert Testimony
41	Open – Case Study Report Due

Final Examination Per University Schedule

FS 635 - Forensic Entomology Laboratory Schedule

Lab #	Topic
1	Introduction and scope of course
2	Insect morphology and classification
3	Insect morphology and classification
4	Insect life cycles
5	Insect life cycles
6	Insect orders of forensic significance - Apterygota, Exopterygota
7	Collection techniques - begin decomposition study *
8	Insect orders of forensic significance - Exopterygota
9	Insect orders of forensic significance - Exopterygota
10	Insect orders of forensic significance - Diptera
11	Insect orders of forensic significance - Diptera
12	Insect orders of forensic significance - Diptera
13	Insect orders of forensic significance - Coleoptera
14	Review
15	Laboratory Exam #1
16	Insect orders of forensic significance - Coleoptera
17	Insect orders of forensic significance - Coleoptera

18	Insect orders of forensic significance - Coleoptera
19	Insect orders of forensic significance - Hymenoptera
20	Insect orders of forensic significance - Hymenoptera
21	Insect orders of forensic significance - Hymenoptera
22	Insect orders of forensic significance - Misc. orders
23	Insect orders of forensic significance - Misc. orders
24	Insect orders of forensic significance - Misc. orders
25	Decomposition study analysis
26	Decomposition study analysis
27	Decomposition Study Analysis
28	Open lab
30	Open lab
31	Open lab. - Review & Decomposition study report due
32	Lab Exam #2

- The decomposition study will be a continuing activity throughout the semester.

APPENDIX 2

FS 635 - Forensic Entomology

Pretest/Post test

NAME: _____

- Estimates of the postmortem interval based on entomological analyses are typical given as:
 - exact time period
 - time period + 1 standard deviation
 - maximum time since death
 - minimum time since death

- Growth of an insect or other arthropod
 - is directly related to ambient temperature
 - is inversely related to ambient temperature
 - ceases at temperatures below 10°C
 - ceases at temperatures above 30°C

- Insects most commonly associated with the initial invasion of a body are found in the family

a. Calliphoridae	c. Chrysomelidae
b. Dermestidae	d. Cleridae

4. Insects develop from egg to adult by passing through a series of morphologically different stages. These stages are called
- a. pharates
 - b. stadia
 - c. instars
 - d. larvae
5. Analyses of insect populations on a body can provide significant information concerning
- a. wounds on the body
 - b. postmortem movement of the body
 - c. characteristics of the scene
 - d. all of the above
6. In converting laboratory rearing data to thermal equivalents, the ADH values are obtained by multiplying the time by
- a. temperature in °C
 - c. ambient temperature - base 6°C

- b. temperature in °F d. ambient temperature in °C
7. To correlate scene temperature with temperature data from an established NOAA weather station you would use
- a. chi-square test c. Duncan's multiple range test
b. linear regression d. student's t-test
8. Members of the order Diptera have _____ type of development.
- a. anamorphic c. ametabolous
b. hemimetabolous d. holometabolous
9. The Coleoptera are characterized by modifications of the anterior pair of wings to form
- a. hemielytra c. elytra
b. halteres d. sensillaria
10. Fixation of immature insects is accomplished by placing the specimens into
- a. KAA c. 70-80% Ethyl Alcohol
b. ice water d. 70% Isopropyl Alcohol
11. Maggots collected from a decomposing □□□△body are generally divided into 2 lots. One portion is killed and the other raised to the adult stage to
- a. confirm the species identification.
b. provide additional data for the PMI estimation
c. provide a source of DNA
d. A and B
e. A and C
12. Soil-dwelling insects show a
- a. positive response to gravity and sunlight.
b. negative response to gravity and a positive response to sunlight.
c. positive response to gravity and a negative response to sunlight.
d. neutral response to both gravity and sunlight.
13. The decomposition of a human body can best be divided into _____ distinct stages.
- a. 3 c. 5
b. 4 d. 6
14. Presence of cocaine in a decomposing body will _____ the rate of development of an insect using it as a food source.
- a. not influence c. decrease
b. accelerate d. totally confuse
15. For practical purposes, the best stage of development to use for analyses of drugs and toxins would be the

- a. egg
 - b. first stage maggot
 - c. third stage maggot
 - d. puparium
16. Maggot activity is the predominant feature of the _____ stage of decomposition.
- a. fresh
 - b. decay
 - c. skeletal
 - d. post decay
17. The changes in the invertebrate population associated with a decomposing body are termed
- a. degeneration
 - b. opportunistic
 - c. succession
 - d. random
18. _____ insects are a potential source of DNA from the perpetrator of the crime
- a. Necrophagous
 - b. Omnivorous
 - c. Parasitic
 - d. Parasitoid
19. The only stage in the decomposition process with a physical event marking its end point is the
- a. fresh stage
 - b. bloated stage
 - c. decay stage
 - d. skeletal stage
20. In providing an analysis of a case, the forensic entomologist in the United States serves as an
- a. advocate for the side hiring him.
 - b. officer of the court.
 - c. impartial expert
 - d. adjunct for the prosecutor

APPENDIX 3

Forensic Entomology

FS 635 Lect Exam 2

NAME: _____

I. Define or give the significance of the following (4 pts each = 20 pts):

a. Bioaccumulation

b. Obligatory myiasis

c. Redirect examination

d. Fry/Daubert rulings

e. Surgical myiasis

II. Short answers (10 pts each = 80 pts)

1. Why is it important for the forensic entomologist to be aware of the presence of drug residues and/or toxins in a decomposing body ?

2. What stages in the life cycle of a fly can be used for analyses to determine the presence of drugs and/or toxins in a decomposing body ?

3. You are writing a manuscript for publication. What are the first and last major sections of the manuscript to be written and why ?

