

Part II. New Syllabus of Record

I. Catalog Description

BIOL 107 Introduction to Forensic Biology

3c-0l-3cr

Prerequisites: Non-Biology department majors and minors only

A broad overview of basic principles underlying modern applications of biology in forensic science. The course explores the science of forensic biology, traditionally known as *serology*, and the broad scope of laboratory tests used to investigate crimes involving DNA, blood, and other body fluids. Focuses on the issues related to DNA fingerprinting as they apply to public or legal proceedings in the law enforcement arena. (Does not count toward Biology Electives, Controlled Electives, or Ancillary Sciences for Biology majors and minors).

II. Course Outcomes

Students will be able to:

Objective 1:

Describe and apply an understanding of the general methodology of modern biology in forensic science.

Expected Student Learning Outcomes 1 and 2:

Informed and Empowered Learners

Rationale:

Assignments will require students to have a level of knowledge DNA fingerprinting and serology that will enable them to understand how these techniques work. Assignments will also require students to evaluate ways to collect evidence, preserve samples of biological evidence, and critically analyze DNA data and to use this examination to explain how DNA fingerprinting tests are interpreted.

Objective 2:

Compare how general forensic evidence has been perceived over the years by identifying the issues related to forensic science and modern methods and strategies in forensic biology.

Expected Student Learning Outcome 2:

Empowered Learners

Rationale:

Assignments will require students to evaluate common forensic evidence collected by crime scene labs from the crime scene (photography, weapon, narcotics, ballistics tissues, and blood). In addition, these assignments will engage students in assessing a knowledge base in science and how that knowledge influenced the perception and management of DNA fingerprinting data with crime scene investigation.

Objective 3:

Describe how Forensic Biology and DNA fingerprinting are used in today's society.

Expected Student Learning Outcomes 3:

Responsible Learners

Rationale:

Assignments will require students to assess their own views and concerns about the impact of DNA technology on threats to liberty and privacy and how DNA typing technology has the potential for uncovering and revealing a great deal of information that most people consider to be intensely private. Other assignments will have the students analyze the impact of DNA fingerprinting technology in the public realm (e.g. legal system; prosecution of crimes; and in civil litigation) and to use this analysis to determine how their personal lives are and will be affected.

Objective 4:

Analyze how quality DNA analysis and methods are fundamental to forensic DNA technology and its use in tracing the origins of criminal evidence.

Expected Student Learning Outcome 1 and 2:

Informed and Empowered Learners

Rationale:

Assignments will require students to gain an understanding of how quality DNA analysis and methods are fundamental to forensic DNA technology and its use in tracing the origins of criminal evidence. They will then apply these analyses to the evaluation of their own view for high-quality final results which are comparable to the results of other laboratories and to ensure the making of correct and impartial decisions in DNA testing.

III. Course Outline

- A. Introduction- What is Forensics? **(3 hours)**
1. Forensic Sciences: Type of Evidence
 2. Forensic Anthropology, Forensic Dentistry and Toxicology
 3. Definition and scope of Forensic DNA
 4. Functions of the Forensic Scientist

B. Forensic Biology terminology and definitions (7 hours)

1. Blood
2. Serum
3. Proteins
4. Saliva
5. Semen
6. X and Y chromosomes; Loci
7. DNA- source and types
8. Nucleotide Repeats

Exam 1 (1 hour)

C. DNA fingerprinting – Evidence Based Science (6 hours)

1. DNA structure
2. DNA Evidence: Basics of Identifying, Gathering and Transporting
3. Types of Samples Suitable for DNA Testing: Questioned or Unknown Samples
4. Samples From Unidentified Bodies: Samples collected from unidentified bodies can include: blood, buccal swabs, hairs, bone, teeth, fingernails, tissues from internal organs (including brain), muscle, and skin.
5. Significance of Reference Samples From Known Individuals
6. Use of Samples from Relatives for Testing: Because a child inherits half of its DNA from each parent, it is possible to use reference samples collected from close relatives
7. Determination of Paternity or Maternity of a Child or Fetus Aborted fetal tissue significance for determining paternity, for example, in sexual assault and/or incest cases where conception occurred

D. Safety as it relates to Evidence Collection, Sample Preservation, and Examples of contamination (4 hours)

1. Crime Scene Integrity: Protection of the crime scene is essential to the protection of evidence
2. Contamination: The risk of contamination of any crime scene can be reduced by limiting incidental activity
3. Chain of Custody: If DNA evidence was contaminated, it may be necessary to identify persons who have handled that evidence
4. Transportation and Storage: Any probative biological sample that has been stored dry or frozen, regardless of age, may be considered for DNA analysis
5. DNA fingerprinting and criminal justice system

Exam 2 (1 hour)

E. DNA Evidence: Basics of Analyzing (3 hours)

1. Overview of Steps in Analyzing DNA Evidence
2. Steps in DNA Sample Processing: Samples obtained from crime scenes or paternity investigations are subjected to defined processes involving biology, technology, and genetics

3. Types DNA Evidence Analysis Polymerase Chain Reaction (PCR); Short Tandem Repeats (STR); Y-Chromosome; and Mitochondrial DNA

F. Evolution of DNA testing: Restriction Fragment Length Polymorphism (RFLP); and PCR **(7 hours)**

1. DNA Typing — Short Tandem Repeat (STR) Analysis of Short tandem repeat (STR) technology is a forensic analysis that evaluates specific regions (loci) that are found on nuclear DNA.

2. Significance of 13 specific STR loci and The Federal Bureau of Investigation (FBI)

3. DNA Typing — Y-Chromosome Analysis: Several genetic markers have been identified on the Y chromosome that can be used in forensic applications. Y-chromosome markers target only the male fraction of a biological sample.

4. DNA Typing — Mitochondrial Analysis Mitochondrial DNA (mtDNA) analysis: significance of mtDNA testing to the investigation of an unsolved case.

Exam 3

(1 hour)

G. DNA Initiative: Advancing Criminal Justice through DNA Technology **(4 hours)**

1. DNA Initiative Goals: Significance of DNA technology to ensure accuracy and fairness in the criminal justice system. DNA can be used to identify criminals with incredible accuracy when biological evidence exists, and DNA can be used to clear suspects and exonerate persons mistakenly accused or convicted of crimes.

2. The Initiative calls for increased funding, training, and assistance Federal, State, and local forensic labs; to police; to medical professionals; to victim service providers; and to prosecutors, defense lawyers, and judges.

3. DNA Legislative Milestones: Significance of "Justice for All Act of 2004," enforceable rights for victims of crimes; enhances DNA collection and analysis efforts; provides for post-conviction DNA testing; DNA Backlog Elimination Act (2000)-- To make grants to States for carrying out DNA analyses for use in the Combined DNA Index System of the Federal Bureau of Investigation; Crime Information Technology Act (1996),-- CITA allowed for grants for programs relating to the identification and analysis of DNA.

4. DNA Initiative Partners: Office on Violence against Women, U.S. Department of Justice; Federal Bureau of Investigation, U.S. Department of Justice

H. Post-conviction Testing and Wrongful Convictions **(5 hours)**

1. Overview of Wrongful Convictions: The strength of our criminal justice system depends on its accuracy — its ability to convict the guilty and to clear the innocent

2. Post-conviction DNA Testing Post conviction DNA testing is a major factor contributing to the increased discovery of wrongful convictions.
3. Research on Actual Innocence and DNA Exoneration: The increase in exonerations over the last 20 years has accentuated the need for research on how, why and how often wrongful convictions occur.

Final exam (Exam 4) during final exam week

(2 hours)

IV. Evaluation Methods

1. 60% Four examinations (15% for each exam) – three during the semester and a fourth during exam week. Exams will be short answer essays.
2. 20% Four case studies (5% for each case study) - Students will be analyzing four case studies that use DNA to solve crimes. These case studies will have questions that must be answered and turned in by the student. Each case study will be worth 5% of the final grade.
3. 15% Students will develop one case study for the class. This case study will be based on articles and ideas related to DNA evidence that is linked to DNA offender profiles through DNA databases. Student resources may include newspapers, newsmagazines, and popular science and medical magazines (e.g. Discover Magazine, Science and Medicine or Journal of Forensic Research). It will follow the format of the case studies given by the professor and will be worth 15% of their final grade.
4. 5% Critique of the non-textbook reading. Students will submit a critique with a maximum of five printed pages.

V. Grading Scale

Grading scale: A 90-100%; B 80-89%; C 70-79%; D 60-69%; F 59% and below

VI. Undergraduate Course Attendance Policy

The course attendance policy will follow the IUP University-wide undergraduate course attendance policy.

VII. Required Textbook

Gunn, A. 2009. Essential Forensic Biology, 2nd ed., Wiley-Blackwell, West Sussex U.K.

Supplemental Non-text book readings

Bowen, T.R. 2009. Ethics and the Practice of Forensic Science, CRC press

Gerber, S.M. 2011. Chemistry and Crime: From Sherlock Holmes to Today's Courtroom (American Chemical Society Publication) ISBN: 0841207852. Publisher: Oxford Univ. Press

Koff, C. 2005. Bone Woman: A Forensic Anthropologist's Search for Truth in the Mass Graves of Rwanda, Bosnia, Croatia, and Kosovo - 04 edition ISBN13: 978-0812968859 Publisher: Random House, Inc.

Ramsland, K. 2007. *The Human Predator: A Historical Chronicle of Serial Murder and Forensic Investigation*. Published by Berkley Trade

Suggested Readings

Alessandrini, F., M. Cecati, M. Pesaresi, C. Turchi, F. Carle, and A. Tagliabracci, 2003. "Fingerprints as evidence for a genetic profile morphological study on fingerprints and analysis of exogenous and individual factors affecting DNA typing," *J. Forensic Science* 48(3): 1–7

Bertino, A.B., and Bertino, P.N. 2012. *Forensic Science: Fundamentals and Investigations* ISBN 13: 978-0-538-73155-3 South-Western Publishers

Butler, J.M., 2005. *Forensic DNA Typing, Second Edition: Biology, Technology, and Genetics of STR Markers* ISBN-13: 978-0121479527

Houck, M.A., Siegel, J.A., 2010 *Fundamentals of Forensic Science* 978012374989-5 Academic Press

Levy, R.J., 2011. *The Michael Jackson Autopsy: Insights Provided by a Forensic Anesthesiologist*. *J Forensic Res* 2:138. doi:10.4172/2157-7145.1000138

President's DNA Initiative, *Lessons Learned From 9/11, 2006. DNA Identification in Mass Fatality Incidents*, NCJ 214781 (Washington, D.C.: U.S. Department of Justice, National Institute of Justice, Available at <http://massfatality.dna.gov/>).

Roman, J., K. Walsh, P. Lachman, and J. Yahner, "Post-Conviction DNA Testing and Wrongful Conviction" 2012, Final report to the National Institute of Justice, contract number 2008F-08165, NCJ 238816.

Verma, K., Joshi, B., 2012. Different Animal Species Hairs as Biological Tool for the Forensic Assessment of Individual Identification Characteristics from Animals of Zoological Park, Pragti Maidan, New Delhi, India. *J Forensic Res* 3:160. doi:10.4172/2157-7145.1000160

VIII. Bibliography

Barnett, P.D. 2001. *Ethics in Forensic Science: Professional Standards for the Practice of Criminalistics*, CRC Press, Boca Raton

Carracedo, A. 2005. *Forensic DNA Typing Protocols (Methods in Molecular Biology, V. 297.)* Humana Press

Casarett, T., & Doull's K. 2003. *Essentials of Toxicology* edited by Curtis D., and Watkins, J.B. McGraw-Hill

Colin, E. 2002. *Question of Evidence: The Casebook of Great Forensic Controversies, from Napoleon to O. J.* John Wiley & Sons Inc.

Coyle, H.M. 2004. *Forensic Botany: Principles and Applications to Criminal Casework* CRC Press, Boca Raton

DiMaio, V.J.M. 2001. *Forensic Pathology, Second Edition*, CRC Press, Boca Raton

Inman, K. 2000. *Principles and Practice of Criminalistics: The Profession of Forensic Science*, CRC Press, Boca Raton

James, S.H. and Nordby, J.J. 2003. *Forensic Science: An Introduction to Scientific and Investigative Techniques*, CRC Press, Boca Raton

Kubic, T. 2005. *Forensic Science Laboratory Manual and Workbook, Revised Edition*, CRC Press, Boca Raton

LeBeau, M.A. 2004. *Quality assurance guidelines for laboratories performing forensic analysis of chemical terrorism: Scientific Working Group on Forensic Analysis of Chemical Terrorism*, Thomson Gale.

Lincoln, P.J., Thomson, J.A. 1998. *DNA Profiling Protocols: Methods in Molecular Biology* ed., by Humana Press, New Jersey, USA

Mozayani, A., Noziglia, C. 2005. *The Forensic Laboratory Handbook: Procedures and Practice (Forensic Science and Medicine)*, Humana Press.

Ngaire, E.G. 2008. *The Forensic Casebook: The Science of Crime Scene Investigation* Prentice hall

Ogle, R.R., and Fox, M.J. 1998. *Atlas of Human Hair: Microscopic Characteristics* CRC Press

Richard, Li. 2008. *Forensic Biology: Identification and DNA Analysis of Biological Evidence* ISBN-13: 978-1420043433. CRC Press, Boca Raton

Roberts, G.W. 2012 *Forensic Crime Scenes Health and Safety* CRC Press

Rudin, N. 2001. *An Introduction to Forensic DNA Analysis, Second Edition*, CRC Press

Saferstein, R.E. 1982, 1988, & 1994. *Forensic Science Handbook Vols. I, II & III*, Prentice-Hall, Englewood, NJ

Stuart, J. 2005. *Forensic Science: An Introduction to Scientific and Investigative Techniques*, 2nd ed., Humana Press, New Jersey, USA

Stuart, J. 2005. *Principles of Bloodstain Pattern Analysis: Theory and Practice* 2nd ed., Humana Press, New Jersey, USA

Answers to Liberal Studies Questions

- 1) Not applicable, only one instructor will teach this course.
- 2) Major aspect including women will be a section about specific investigative and forensic processes related to sex crimes from the work of John Savino, Brent Turvey, and J. Baeza and the recent advances that has led to a new, more efficient approach to processing DNA from rape evidence. The majority of contributions by women in the field of Forensic science have come in the past decade. In the last portion of the class we will discuss the contributions of two of the major contributors in the field of forensic research - Katherine Ramsfield and Clea Koff. Three of the four non-textbook readings available are related to crimes case studies that will incorporate women and minorities as part of the study.
- 3) Students will be required to read one of the following books a supplementary book in addition to the required text for the course. In addition to the textbook ", a number of non-textbook readings like *The Human Predator: A Historical Chronicle of Serial Murder and Forensic Investigation* by K. Ramsland ; *Chemistry and Crime : From Sherlock Holmes to Today's Courtroom* by Samuel M. Gerber will be incorporated into the course.
- 4) This is an introductory course. It differs from our non-majors beginning courses (General Biology I) by focusing on one theme – forensic biology rather than the entire realm of biology. In addition, the General Biology I course does not cover any DNA Initiative involving Criminal Justice and DNA Technology.

Answers to Course Analysis Questionnaire

Section A: Details of the Course

- A1 How does this course fit into the programs of the department? For what students is the course designed? (majors, students in other majors, liberal studies). Explain why this content cannot be incorporated into an existing course.
This course is intended to satisfy the Liberal Studies Natural Science non-Lab Science requirement. This course will give the student as up-to-date introduction of a particular field of forensic biology that is intended to be relevant to their everyday lives. The content of this course reflects growing recognition of the importance of biological evidence in forensic science. This course will include several topics previously not taught in any of the courses offered by the biology department.
- A2 Does this course require changes in the content of existing courses or requirements for a program? If catalog descriptions of other courses or department programs must be changed as a result of the adoption of this course, please submit as separate proposals all other changes in courses and/or program requirements. This will not change the content of any other existing course in the program.
- A3 Has this course ever been offered at IUP on a trial basis (e.g. as a special topic) If so, explain the details of the offering (semester/year and number of students).
No.
- A4 Is this course to be a dual-level course? If so, please note that the graduate approval occurs after the undergraduate.
No.
- A5 If this course may be taken for variable credit, what criteria will be used to relate the credits to the learning experience of each student? Who will make this determination and by what procedures?
N/A
- A6 Do other higher education institutions currently offer this course? If so, please list examples (institution, course title).
University of Central Florida: Forensic Biochemistry
University of Portsmouth: Forensic Biology and Biochemistry
Suffolk University: Forensic Biochemistry
University of Kent: Forensic Biology
Southern Illinois University: Forensic Biochemistry
New Mexico State University: Forensic Biochemistry
- A7 Is the content, or are the skills, of the proposed course recommended or required by a professional society, accrediting authority, law or other external agency? If so, please provide documentation.
No.

Section B: Interdisciplinary Implications

- B1 Will this course be taught by instructors from more than one department or team taught within the department? If so, explain the teaching plan, its rationale, and how the team will adhere to the syllabus of record.
Not applicable
- B2 What is the relationship between the content of this course and the content of courses offered by other departments? Summarize your discussions (with other departments) concerning the proposed changes and indicate how any conflicts have been resolved. Please attach relevant memoranda from these departments that clarify their attitudes toward the proposed change(s).
There are no conflicts with other departments at IUP.
- B3 Will this course be cross-listed with other departments? If so, please summarize the department representatives' discussions concerning the course and indicate how consistency will be maintained across departments.
No.

Section C: Implementation

- C1 Are faculty resources adequate? If you are not requesting or have not been authorized to hire additional faculty, demonstrate how this course will fit into the schedule(s) of current faculty. What will be taught less frequently or in fewer sections to make this possible? Please specify how preparation and equated workload will be assigned for this course.
The current faculty resources are sufficient.
- C2 What other resources will be needed to teach this course and how adequate are the current resources? If not adequate, what plans exist for achieving adequacy? Reply in terms of the following:
*Space- the current rooms used for lectures that can accommodate 132 students are adequate.
*Equipment- Not applicable
*Laboratory Supplies and other Consumable Goods- Not applicable
*Library Materials- there will be no necessity of using library materials in this course other than existing electronic databases.
*Travel Funds- there will be no travel funds required for this course.
- C3 Are any of the resources for this course funded by a grant? If so, what provisions have been made to continue support for this course once the grant has expired? (Attach letters of support from Dean, Provost, etc.)
None.
- C4 How frequently do you expect this course to be offered? Is this course particularly designed for or restricted to certain seasonal semesters?
This course will be offered once a year, as needed. Because of the nature of the topics covered in this course, there are no seasonal requirements.
- C5 How many sections of this course do you anticipate offering in any single semester? While it is difficult to determine ahead of time, it is expected to have one lecture section.

- C6 How many students do you plan to accommodate in a section of this course? What is the justification for this planned number of students?
Enrollment will be determined by room size.
- C7 Does any professional society recommend enrollment limits or parameters for a course of this nature? If they do, please quote from the appropriate documents.
No.
- C8 If this course is a distance education course, see the Implementation of Distance Education Agreement and the Undergraduate Distance Education Review Form in Appendix D and respond to the questions listed.
It is not a distance education course.

Part III. Letters of Support or Acknowledgment

Department of Criminology (attached)

Department of Chemistry (attached)

Sample assignment

Assignment 4 (5% of grade)

Critique of the non-textbook reading. Students will submit a critique with a maximum of five printed pages.

1. Read the following article.

2. Guided Questions for non-text book reading

- i) What is Forensic entomology? What information can a forensic entomologist provide at the death scene?
- ii) What are the major challenges of identification of the maggots to the species?
- iii) What were the major methods of Human DNA analysis that the authors employed to non-human organisms?
- iv) Based on this article how would you relate the application of Entomological evidence to help determine the circumstances of abuse and rape?

Evaluation: Grading Rubric (non-text book reading)

Organization and Format

.....5 Case analysis is neat and organized, word processed, and contains all required components as outlined on the handout including artifacts to support each instructional strategy.

..... 4 Case analysis is organized and word processed, and all items are included but are not well developed.

..... 3 Case analysis has some organized sections but not all are included or well developed.

.....1-2 Case analysis lacks organization and/or required components, not word processed, or is missing artifacts to support instructional strategies.

Word Choice in Writing

..... 5 Writing reflects carefully chosen words and uses a precise, professional vocabulary.

..... 4 Writing includes a minimal amount of interesting or professional language.

..... 3 Writing includes only ordinary or common terms.

..... 1-2 Writing lacks precise and appropriate language; does not communicate the purpose of the case analyses.

Case Analyses Content Summary (Reflections and Recommendations)

.....5 Summaries are concise and reflective with specific future instructional recommendations based upon assessment data.

.....4 Summaries are concise and reflective but lack specific future instructional recommendations.

.....3 Summaries are brief and provide limited conclusions; do not demonstrate complete understanding.

.....1-2 Summaries are incomplete; do not demonstrate understanding; do not include future recommendations for instruction.

Other exercises including interpretation of practical data from case studies and problem solving will provide informal formative feedback to students and support the preparation of the summative assessed coursework assignment.

24. Akaike H (1974) A new look at the statistical model identification. *IEEE Transactions on Automatic Control* 19: 716-723.
25. Guindon S, Gascuel O (2003) A simple, fast, and accurate algorithm to estimate large phylogenies by maximum likelihood. *Systematic Biology* 52: 696-704.
26. Posada D (2008) jModelTest: Phylogenetic model averaging. *Molecular Biology and Evolution* 25: 1253-1256.
27. Zwickl DJ (2006) Genetic algorithm approaches for the phylogenetic analysis of large biological sequence datasets under the maximum likelihood criterion. Ph.D. dissertation, The University of Texas at Austin.
28. Smith SA, Dunn CW (2008) Phyutility: a phyloinformatics tool for trees, alignments, and molecular data. *Bioinformatics* 24: 715-716.
29. Jobling MA, Gill P (2004) Encoded evidence: DNA in forensic analysis. *Nature Reviews Genetics* 5: 739-751.
30. Ridley ME (2007) *Evolution*. New Delhi: Oxford University Press.
31. National Research Council (U.S.) (1996) *The evaluation of forensic DNA evidence*. Washington, D.C.: National Academy Press.
32. Scaduto DI, Brown JM, Haaland WC, Zwickl DJ, Hillis DM et al. (2010) Source identification in two criminal cases using phylogenetic analysis of HIV-1 DNA sequences. *Proceedings of the National Academy of Sciences of the United States of America* 107: 21242-7.
33. Singh B, Kurahashi H, Wells JD (2011) Molecular phylogeny of the blowfly genus *Chrysomya*. *Medical and Veterinary Entomology* 25: 128-34.
34. Wells JD, Introna F, Di Vella G, Campobasso CP, Hayes J, Sperling FAH (2001) Human and insect mitochondrial DNA analysis from maggots. *Journal of Forensic Sciences* 3: 685-7.
35. Wells JD, Stevens JR (2008) Application of DNA-based methods in forensic entomology. *Annual Review of Entomology* 53: 103-20.
36. Wells JD, Sperling FAH (2001) DNA-based identification of forensically important *Chrysomyinae* (Diptera: Calliphoridae). *Forensic Science International* 120: 110-115.
37. National Climatic Data Center Land-Based Data. (Report generated May 2011). National Oceanic and Atmospheric Administration.
38. Goff ML (1991) Determination of postmortem interval by arthropod succession: A case study from the Hawaiian Islands. *Journal of Forensic Sciences* 2: 220-225.
39. Bass WM (1996) Chapter 12. Outdoor Decomposition Rates in Tennessee. *Forensic taphonomy: The postmortem fate of human remains*. Haglund WD and Sorg MH (eds.) Boca Raton: CRC Press.

CASE STUDY ASSIGNMENT INSTRUCTIONS

- All case study assignments must be **TYPED** with your **name**, the **course number**, and **my name** in the right hand corner.
- You do not need to re-type the question on your assignment, but should number your answers to correspond to the correct question.

ASSESS Assignments

- You will need to read **the Case study provided** and provide answers to the ASSESS questions at the end of each case.
- You will have to apply the course material for those topics prior to completing these assignments.
- Your answers will be based on your prior knowledge so personal opinions are acceptable but should be written in a professional manner.
- Assignments must be typed with your name, the course number, and my name in the right hand corner.
- You do not need to re-write the question, but should number your answers.
- Each ASSESS assignment will be worth 4 points:
 - 2 points for the Elementary School case
 - 2 points for the High School case
- The grading criteria will be based on:
 - the thoughtfulness or completeness of the answer
 - professional writing (grammar, spelling, etc.).

REFLECT & EVALUATE Assignment (See a sample assignment below for Module 7)

- You will choose **one** of the two case studies you read for the ASSESS assignment
 - Elementary School **or**
 - High School.
- You will complete the assignment *after* reading the course material on those topics.
- Answers should be based on **integrating information from the course readings** (modules) including the use of key concepts and theories.
- Personal opinions are not appropriate in these assignments.
- The length of each answer will vary with some being only a couple of sentences and others requiring more details.
- Each REFLECT & EVALUATE assignment will be worth 20 points (approximately 4 points per question).
- The grading criteria for each question will be based on:
 - 2 points for integration with the module (use key concepts; no personal opinions),

- 1 point for the thoughtfulness and completeness of each answer
- 1 point for professional writing style (grammar, spelling, etc.)

Original Message-----

From: George R. Long

Sent: Monday, December 10, 2012 10:56 AM

To: Bharathan N

Subject: Re: Forensic Biology BIOL 107: Letter of support

Dr. Bhrathan,

We have received the course proposal "introduction to Forensic biology, and have had it reviewed by our curriculum committee. This course proposal is a nice complement to CHEM 105 and doesn't overlap the topics in CHEM 105 in any significant way. CHEM 105 has sections on blood spatter and blood alcohol measurements but the serology in this course is much more detailed. We are happy to support the approval of this course.

Dr. George Long

Chair, Chemistry Department

Original Message-----

From: Randy L Martin

Sent: Tuesday, November 27, 2012 9:30 PM

To: Dr. N. Bharathan ; George R. Long

Cc: Sandra Newell ; Carl Luciano ; Seema Bharathan

Subject: Re: Forensic Biology BIOL 107: Letter of support

Dr. Bharathan,

We have reviewed the proposed course Introduction to Forensic Biology (BIOL 107) and are very excited about it. We believe it will be an excellent course for our majors and should add significantly to their understanding of the investigative process in the Criminal Justice System. The course should provide the students with a sufficient background in forensic biology to make them informed consumers in this area, while also introducing them to broader scientific concepts. We were also happy to see that there is a unit on ethics relating to the utilization of the different forensic technologies.

We are confident that the course will be of interest to our students, and once approved, we will most certainly make them aware of it and the benefits we believe it can provide.

If you need any further information from us feel free to contact me.

Randy Martin, Chair

Department of Criminology

Indiana University of Pennsylvania

On Tue, 27 Nov 2012 12:08:49 -0500

"Dr. N. Bharathan" <bharathn@iup.edu> wrote:

Dr. Martin & Dr. Long: We have put together a new course titled Introduction to Forensic biology (BIOL 107). Please find attached the course. The Department curriculum committee has reviewed the course for accuracy and towards LS requirements. It is a non-lab course. The major part of the course deals with the Basics of forensic Biology, DNA, DNA initiative for advancing Criminal Justice through DNA technology.

The authors of this course have offered an advance graduate level course in SDR program for the FBI and the members of the CST's and first responders. They have an ongoing research project with the Department of Defense on developing forensic signatures for identifying biological agents using a fungal model system. So it is possible to "bring a variety of situations" in the classroom for students to get the best experience in forensic biology.

I am requesting your Department to review the course content and write a letter of support or acknowledgment. Thank you in advance for your time. If you need any additional information, please do not hesitate to contact one of us.

Best,

Dr. N.Bharathan/Dr. Seema Bharathan

Professor/Associate Professor of Biology

Bharathn@iup.edu/Bharaths@iup.edu