IPEM CURRICULUM GUIDELINES

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SECTION 1: Core Courses

Interdisciplinary Training

BIOLOGY STUDENTS: All Biology students must take **anthropology** courses (in addition to Evolution and Society) to fulfill at least two IPEM core course area requirements (from Areas B, C, D or E below).

ANTHROPOLOGY STUDENTS: Anthropology students must take **biology** courses (in addition to Evolution and Society) to fulfill at least two IPEM core course area requirements (from areas B, C, D or E below).

REQUIRED COURSES for IPEM students (one from each of the following AREAS)

AREA A: Evolution and Society

- WSU ANTH 571/BIOL 565 Evolution and Society (taught as "special topics" course for Fall 2007, new course number after that) (Webster, Lynch Alfaro: 3 cr)— The goal for this course is to produce professionals who are well poised to convey to the public the relevance and importance of evolutionary biology, and to thereby address misunderstandings and misrepresentations of this key scientific theory that are prevalent in our society. *This course has a strong outreach component. It is to be taken by each IPEM cohort in their first or second fall semester (at WSU).*

AREA B: Comparative Biology of Social Behavior

- UW BIOL 408: Mechanisms of Animal Behavior (Beecher, Brenowitz: 4 cr) Comparative exploration of physiological and perceptual mechanisms that control behaviors necessary for survival and reproduction in animals. Model systems discussed include animal communication, mate choice, escape behavior, learning and memory, orientation, biological rhythms, foraging behavior.
- WSU BIOL 447: Behavioral Ecology (Verrell: 3 cr) How ecological factors shape the evolution of animal behaviors contributing to survival and reproduction.
- WSU BIOL 538: Animal Behavior (Webster: 3 cr) Biological study of animal behavior as viewed from ethological, genetic, developmental, ecological, and evolutionary perspectives.
- WSU BIOL 559: Hormones, Brain and Behavior (Schwabl: 3 cr). Classical behavioral endocrinology from molecular to whole organisms, integrating evolutionary ecology, neuroethology and behavioral neuroendocrinology.
- WSU ANTH 567: Primate Behavioral Ecology (Lynch Alfaro: 3 cr) Seminar-based course focusing on evolutionary analysis of primate behavior, morphology and ecology.
- WSU ANTH/BIOL 581: Comparative Biology of Social Traditions (Lynch Alfaro: 3 cr) This course uses phylogenetic and modeling perspectives to examine the evolution of social learning and cultural transmission in humans and other animals.

AREA C: Evolution of Human Social Behavior

- UW BIOL 409: Sociobiology (Rowher: 5 cr) Biological bases of social behavior, emphasizing evolution as a paradigm. Emphasizes how to think like an evolutionary biologist, especially with regard to interest conflict. Topics are individual versus group selection, kin selection, altruism, mating systems, sexual conflict, alternate reproductive strategies, and parent/offspring conflict.
- UW BIOA 470: Evolution of Human Social Behavior (Smith: 5 cr). Key concepts, research strategies, and debates concerning the processes and outcomes of human behavioral evolution. Emphasizes the complementarily of various methods and theories for understanding human biocultural evolution,

including behavioral ecology, dual transmission theory, phylogenetic analysis, and evolutionary psychology.

- UW BIOA 520: Human Behavioral Ecology (Smith: 3-5 cr) Principles and methods of evolutionary behavioral ecology, and critical examination of their application to human behavior in such areas as resource utilization, mating, parenting, life history, cooperation, and competition.
- UW Archy 520: Principles in Archaeological Theory: Problem Development and Modeling (Fitzhugh: 5 cr) Review of principles of archaeological theory. Student presentation of research on archaeological theory and seminar discussion or presentations.
- WSU ANTH 564: Advances in Evolution and Human Behavior (R. Quinlan: 3 cr). Recent trends in the study of evolution and human behavior.
- WSU-Vancouver ANTH 569: Evolutionary Cultural Anthropology (Hewlett: 3 cr) Evolutionary nature of culture and its interactions with human biology (genes) and ecology.

- **AREA D: Evolutionary Modeling**

- UW BIOL 428: Techniques for Mathematical Biology (3 cr) Equips students to use, rather than prove, many applied mathematics techniques essential in mathematical biology. Includes instruction to use symbolic computation software (Mathematica, Macsyma) to do by computer the kind of mathematical formula manipulation that mathematicians formerly performed by hand. Recommended: calculus, linear algebra. Offered: irregularly.
- UW BIOL 429: Models in Biology (Bergstrom: 4 cr) Explores use of models in biology in a wide range of topics, including morphogenesis, nerve signals, ecological interactions, population biology, and evolutionary theory. Emphasis on the biological insights models can provide rather than mathematical techniques.
- UW BIO A 526: Quantitative Methods and Modeling for Biocultural Anthropology (Holman or Goodreau: 5 cr) Surveys the concepts, tools, and methods for developing quantitative models based on underlying biocultural processes. Introduces methods of testing models from observations collected in anthropological field studies. Oriented toward longitudinal research of fertility, mortality, disease dynamics, population genetics, and other biocultural processes.
- WSU Anth 547: Models in Anthropology (Kohler: 3 cr) Models and model-building as an anthropological approach to present and past cultures.
- WSU BIOL 566 Mathematical Genetics (Gomulkiewicz: 3 cr). Mathematical approaches to population genetics and genome analysis; theories and statistical analyses of genetic parameters.
- UI/WSU BIO 5XX: Evolutionary Modeling (Nuismer: 3 cr). Course under development.

AREA E: Phylogenetics, Phylogeography or Population Genetics

- UW BIO A 482: Human Population Genetics (Holman, Goodreau: 5 cr) Surveys population genetics theory as applied to studies of micro-evolutionary changes in human populations.
- WSU BIOL 519: Introduction to Population Genetics (Gomulkiewicz: 3 cr). Survey of basic population and quantitative genetics.
- WSU BIOL 522: Molecular Population Genetics and Evolution (Gomulkiewicz: 2 cr). Evolutionary change of molecular sequences; genetic distance and phylogeny; genomic evolution.
- WSU BIOL 533: Modern Methods in Systematics (Alfaro: 4 [2-6] cr). Selecting, gathering, and analyzing morphological, cytological, molecular data for phylogenetic and evolutionary studies.
- WSU BIOL 564: Molecular Ecology and Phylogeography (Webster: 3 cr). Use of genetic markers for the study of ecological phenomena, including kinship, population structure, and phylogeography.
- UW GENOME 570: Phylogenetic Inference (Felsenstein: 3 cr). Biological assumptions, statistical foundations, and computational methods. A comprehensive introduction for graduate students in the biological sciences to phylogenetic methods using data from molecular sequences, continuous and discrete characters, and gene frequencies. Offered: alternate years; Sp.

AREA F: Ethics

- UW MHE 411: Introduction to Bioethics (3 cr) Basic concepts, principles, and methods of analysis, with application to some major issues in the field of bioethics. Case studies utilized to illustrate nature of questions arising in bioethics and to provide students with opportunity to develop skills in ethical analysis.
- WSU PHIL 530: Bioethics (2 cr). Professional ethics for scientists; ethical implications of new technologies; obligations to human and non-human research subjects. Cooperative course taught by WSU, open to UI students.
- UW MHE 536: Research Ethics and Regulation (Mastroianni: 3 cr) Explores the ethical principles and concepts and U.S. laws related to (1) research conducted with animals, (2) research on humans, and (3) the responsible conduct of research. Required for graduate students in the Department of Medical History and Ethics, School of Medicine. Offered: jointly with LAW H 536; W.

OTHER IGERT REQUIREMENTS

IPEM seminar every semester/term (1 cr/semester or 2 cr/quarter for up to 3 academic years). All IGERT Fellows must participate in the IPEM seminar series each academic term that they are supported by the fellowship.

Team Project Directed Study (UW BioA or Archy 600) (1 cr) During Winter and Spring quarters of year 1 all IPEM Fellows will participate in the planning of the summer team project, to be conducted during the subsequent summer term.

Summer Research WSU (3 cr only): Anth 600. UW (2 cr only): BIOA 600 or ARCHY 600.

SECTION 2: Academic Expectations and Guidelines

IPEM Policy on Requests to Waive or Substitute Courses

Substitutions or permission to waive IPEM core courses can be requested on an individual basis. The student must first get approval from his or her chair in order to petition the IPEM curriculum committee for the change. Along with the request for a substitution of a course, the student should include a course syllabus of the proposed course to be taken. If the student wants credit for a course previously taken, students should provide course syllabus and assignments, along with their grade for the course. Final determination will be made by the IPEM curriculum committee, which includes a representative from each Stream of the Program. (As of April 2007, this committee includes Jessica Lynch Alfaro, Karen Lupo, Mike Webster, Darryl Holman, Ben Fitzhugh.)

Requests to study at collaborating institutions and to use courses from these IPEM-affiliated institutions (Santa Fe Institute, University College London, University of Costa Rica, etc.) during the summer or academic year must be approved by both the students' chair and the curriculum committee. Note that any requests for IPEM funding for these travel and study arrangements will need to be approved by the IPEM research funding committee (currently Mike Alfaro, Barry Hewlett, Darryl Holman).

Deadline for IPEM Core Course Completion

Students coming into the IPEM program without a Master's Degree are expected to finish their IPEM core courses prior to taking their prelims or advancing to candidacy (receiving their Master's and becoming ABD).

Students entering the IPEM with Master's Degree in hand, or after already being accepted into the PhD program, are expected to finish all IPEM core course requirements within the first two years of the IPEM award.

Any petitions to change this schedule must be made through the student's chair and go to the IPEM curriculum committee for approval.

Academic expectations and criteria for termination of IPEM fellow status

We expect all trainees to successfully complete the five items below in accordance with the schedule above, in addition to retaining good standing in their home (degree) programs and universities. Failure to do so will be considered possible grounds for termination of IPEM Trainee status. Core Faculty may vote to terminate any trainee as part of their annual spring review of all trainees (see Faculty By-Laws: Faculty Responsibilities) or, in exceptional cases, at other times of the year.

1. Completion of IGERT core courses
2. Completion of Stream or Dept. Required Courses
3. Completion of Team Project
4. Development of dissertation research project
5. Educational outreach associated with Evolution and Society

SECTION 3: Other Requirements, by Department and Stream

Note: the following requirements are current as of April 2007, but it is the responsibility of Trainees to be aware that these requirements may change.

UW ARCHAEOLOGY REQUIREMENTS

The University of Washington Graduate Program in Archaeology is designed to train students in archaeological method and theory, in critical thinking, and in the scientific analysis of the physical content of archaeological sites. The program is also designed to train professional archaeologists capable of working in a wide variety of contexts.

IPEM fellows embedded within the UW Archaeology program must also complete the regular Archaeology requirements and take the comprehensive examinations (scheduled for the beginning of year 3). This requirement should have a limited impact on IPEM fellows in the UW Archaeology program, with the likely exception of occasional conflicts between the semester at WSU in Fall of the second year and core course requirements offered in that term (UW Autumn quarter).

In the event that the semester at WSU interferes with UW Archaeology required courses, the IPEM fellow must petition the UW Archaeology Faculty requesting a postponement of the required course/s and detailing when the missed coursework will be made up. Under exceptional circumstances, the Archaeology Faculty may approve a request for delay of 1 year of the comprehensive examination to allow for completion of the required coursework.

Detailed program guidelines for the UW Archaeology Program can be found at the UW Anthropology Web site through the following URL or by contacting the UW Anthropology Graduate Program Assistant, Catherine Zeigler (czeigler@u.washington.edu).

http://depts.washington.edu/anthweb/programs/grad_req.php

The following is a **summary** of requirements of the UW Archaeology program, in addition to the IPEM core courses.

Each student is required to:

- Develop expertise in data collection at a professional level through course work and practical experience;
- Acquire thorough control of archaeological method and theory;
- Acquire substantial competence in at least one technical and one major geographic area;
- Demonstrate an ability to conceive, design, and execute significant research within archaeology; and
- Develop skill in classroom instruction to a level deemed adequate for university-level teaching.

To meet these goals, students are required to take the required courses in archaeological method and theory (ARCHY 495, 498/570, 480, 481, 482, 483 etc.) and courses that cover areas and topical concerns in which this knowledge can be put to practical use, and participate in archaeological fieldwork (though the Ph.D. dissertation need not be based on field research). To succeed in the program, students must pass the comprehensive examination, write a dissertation proposal, have it approved by their dissertation committee, pass the general examination, present a colloquium on their dissertation plans, conduct significant and original archaeological research, write a dissertation based on this research, and pass the dissertation defense. Foreign language and demonstrated teaching competency are also required for the

PhD.

UW BIOCULTURAL ANTHROPOLOGY REQUIREMENTS

FOR IPEM STUDENTS:
All coursework beyond the IPEM core courses are at the discretion of each student's dissertation committee. All other requirements are the same as for other PhD students, as described below (i.e. Master's thesis, which can be satisfied by group project, comp exam, oral proposal, colloquium, teaching requirement, dissertation)

The normal requirements for PhD students in the Biocultural stream are as follows:

Curriculum
A student with a weak background in biological anthropology must complete, upon entry to the program:
BIO A 502 (6 credits) Preceptorial Reading in Biological Anthropology.
If, in the view of the advisor, a student has a weak background in other subfields of anthropology, the student must complete, as soon as possible, either or both of the following:
ANTH 500 (6 cr) Preceptorial Reading in Sociocultural Anthropology
ARCHY 501 (6 cr) Preceptorial Reading in Archaeology
The following courses constitute the core curriculum:
BIO A 450 (5 cr) Biodemography Seminar
BIO A 473 (5 cr) Biological Adaptability of Human Populations
BIO A 482 (5 cr) Human Population Genetics
BIO A 486 (3 cr) Primate Socioecology
BIO A 491 (5 cr) Issues in Human Paleontology
BIO A 520 (5 cr) Human Behavioral Ecology
BIO A 569 (5 cr) Demographic Analysis
A student is encouraged to take all of the core courses, and is required to take at least 5 core courses selected under the guidance of his or her faculty advisor.
In addition, the research design course is required:
BIO A 525 (5 cr) Biocultural Research Methods & Study Design
These courses provide a broad view of the theory, methods and research concerns of biocultural anthropology. They also provide students an opportunity to identify their primary research interests and those of the faculty. A student must complete the core courses with a cumulative grade point average of at least 3.0. A grade of less than 2.7 in any core course is unsatisfactory; normally, the student must repeat the course, but may, by petition to the supervisory committee, seek to remedy the deficiency in another way.
Finally, each student must complete the course sequence offered by the Department of Biostatistics:
BIOST 511-512-513 (4 cr ea.) **Medical Biometry I, II, III** or its equivalent (as approved by the Supervisory Committee).
Each student must satisfactorily complete all of the above courses before taking the comprehensive examination. Additional courses, relevant to particular research interests, should be chosen in consultation with the student's advisor or supervisory committee.
Comprehensive (Written) Examination
This is an examination of the student's general knowledge of biocultural anthropology, as derived primarily from the contents of the core courses and as applied to current issues in the field. The examination consists of questions selected by the supervisory committee and is designed to test a student's ability to analyze, synthesize, and evaluate theories, concepts and data. A student is expected to take this examination no later than the eighth quarter of enrollment in the Program in Biocultural Anthropology. The supervisory committee sets the dates of the examination. The exam comprises four questions and is scheduled for six hours. The complete examination may be taken once, and leads to one of three

outcomes:
Pass, with the recommendation to proceed in the Ph.D. program – awarded when the score on each question is 3.0 or above.
Conditional Pass – awarded when the answer to one or two questions are scored at or below 2.9. The condition is satisfied when the student demonstrates competence by successfully retaking the relevant portion(s) of the examination.
Failure – awarded when the answers to three or more questions are scored at or below 2.9. Students who fail this examination may not proceed toward the Ph.D. although they may, provided the overall score on the comprehensive examination is at least 2.7, earn an M.A. by completing all requirements for that degree.

Master's Paper

Within one quarter of passing the Comprehensive Examination and before taking the General Examination, the student submits a Master's paper in some area of special interest within biocultural anthropology. The topic and scope of the paper must be approved by the Supervisory committee. The paper may be a literature review that offers a critical synthesis of the material covered or an original research paper. (The scope of the Master's paper is similar to articles in *Evolutionary Anthropology*.) The completed Master's paper will be graded on a scale of 1.0 to 4.0 by each member of the Supervisory committee. A passing grade is earned when each score is 3.0 and above, a conditional pass is earned when one or two members give a score below 2.9. A student who passes conditionally will be required to revise and resubmit the paper for a grade. A failing grade results when all graders give a score of 2.9 or lower. Students who receive a failing grade may not proceed toward the Ph.D; however, the paper will count toward the Master's paper requirement if the average score is at least a 2.7.

An MA degree can be obtained upon successfully completing the comprehensive examination and the Master's paper.

Dissertation Proposal

After completing the Master's paper, the student subsequently presents a formal written proposal of original research to the Supervisory Committee. The Supervisory committee may require the student to complete one or more literature reviews as part of developing the dissertation proposal. Where appropriate, the proposal should be prepared in a form suitable for (1) submission to the Human Subjects Review and/or the Vertebrate Animals Review Committee(s) and (2) one or more funding agencies.

General (Oral) Examination

A two-hour general examination focusing on the candidate's proposed area of research and its theoretical and methodological foundation is administered by the supervisory committee. The general examination must be taken within five quarters (of enrollment) of taking the comprehensive examination, and must be scheduled several weeks in advance with the Graduate School (via the Graduate Program Assistant in Anthropology). Note that the Graduate School requires that the supervisory committee be officially formed at least four months prior to the date of the general examination. Upon successful completion of the general examination, the student is admitted to candidacy for the doctoral degree.

Colloquium

After the general examination, the candidate presents an overview of the proposed dissertation research in a colloquium to which all members of the Department of Anthropology are invited. The colloquium is held within one quarter of passing the general examination.

Teaching Requirement

Before receiving the Ph.D. degree, the candidate is expected to teach a course in anthropology with course design, content and preparation subject to the approval of a faculty member. The course must be evaluated by the students enrolled; the biocultural faculty must be apprised of the evaluation. In the event that such a teaching opportunity is not available, the student may, upon approval of the biocultural faculty, use experience as an instructor of courses in other departments or as a teaching assistant to meet this requirement.

Seminar and Final Examination
Following completion of research, the candidate prepares a dissertation which is submitted to the dissertation reading committee (see University of Washington Bulletin). On the recommendation of this committee, the candidate presents to the community a seminar based upon the dissertation, and then sits for the final examination (an oral defense of the dissertation required by the Graduate School and administered by the Ph.D. supervisory committee).

WSU ARCHAEOLOGY REQUIREMENTS

Below are the normal course requirements for graduate students in the Archaeology program at WSU, a list of changes to these requirements for the IPEM students, and a sample course schedule for IPEM students.

WSU Course Requirements for the M.A. Program in Archaeology

Lecture and seminar courses provide 3 units, laboratory courses 4. In creating a program, students choose at least the indicated number of units from each of the following course groups:

Group A - Required Courses: [Take all four for a total of 13 units]
ANTH 510 Fundamentals of Cultural Anthropology (3 units)
ANTH 530 Archaeological Method & Theory (3 units)
ANTH 537 Quantitative Methods in Anthropology (4 units)
ANTH 562 Evolutionary Method and Theory in Anthropology and Archaeology (3 units)

Group B - Topical Courses: [Choose 1, for a total of 3 units]
ANTH 535 Cultural Resource Management (3 units)
ANTH 536 Ethnoarchaeology (3 units)
ANTH 547 Models and Simulation (3 units)
ANTH 548 Hunter and Gatherers Past & Present (3 units)
ANTH 549 Settlement and Food Production (3 units)

Group C - Laboratory Courses: [Choose 3, for a total of 12 units]
ANTH 513 Lithic Technical Organization (4 units)
ANTH 514 Ceramic Analysis (4 units)
ANTH 570 Sediments in Geoarchaeology (4 units)
ANTH 573 Zooarchaeology (4 units)
ANTH 576 Palynology (4 units)

Group D - Area Courses: [Choose 1, for a total of 3 units]
ANTH 539 Prehistory of the Southwest (3 units)
ANTH 540 Prehistory of the Northwest Coast (3 units)
ANTH 542 Prehistory of Alaska and Eastern Siberia (3 units)
ANTH 543 Prehistory of the Plateau and Basin (3 units)
ANTH 544 Archaeology of the Tropics (3 units)

Group E - Thesis: [Minimum 4 units]
ANTH 700 Master's Research, Thesis, and/or Examination.

Group F - Electives: [Minimum 3 units]

Electives other than thesis, dissertation, and research units, as required by student's own program specialization.

Total Units: Minimum 38

WSU Course Requirements for the Doctorate in Archaeology
In creating a program, students choose at least the indicated number of units from the following course groups:

Group A - Required Courses: [Take all four for a total of 13 units]
ANTH 510 Fundamentals of Cultural Anthropology (3 units)
ANTH 530 Archaeological Method & Theory (3 units)
ANTH 537 Quantitative Methods in Anthropology (4 units)
ANTH 562 Evolutionary Method and Theory in Anthropology and Archaeology (3 units)

Group B - Topical Courses: [Choose 2, for a total of 6 units]
ANTH 535 Cultural Resource Management (3 units)
ANTH 536 Ethnoarchaeology (3 units)
ANTH 547 Models and Simulation (3 units)
ANTH 548 Hunter and Gatherers Past & Present (3 units)
ANTH 549 Settlement and Food Production (3 units)

Group C - Laboratory Courses: [Choose 4, for a total of 16 units]
ANTH 513 Lithic Technical Organization (4 units)
ANTH 514 Ceramic Analysis (4 units)
ANTH 570 Sediments in Geoarchaeology (4 units)
ANTH 573 Zooarchaeology (4 units)
ANTH 576 Palynology (4 units)

Group D - Area Courses: [Choose 3, for a total of 9 units]
ANTH 539 Prehistory of the Southwest (3 units)
ANTH 540 Prehistory of the Northwest Coast (3 units)
ANTH 542 Prehistory of Alaska and Eastern Siberia (3 units)
ANTH 543 Prehistory of the Plateau and Basin (3 units)
ANTH 544 Archaeology of the Tropics (3 units)

Group E - Dissertation: [Minimum 20 units]
ANTH 800 Doctoral Research, Dissertation, and/or Examination

Group F – Electives: [Minimum 12 units]
Electives other than thesis, dissertation, and research units, as required by student's own program specialization.

Total Units: Minimum 76

Course Requirements, IPEM. IGERT programs are supposed to be PhD and so these requirements have to be fulfilled by the time of granting the PhD. The program though encourages the IPEM students to take these core requirements early in their programs. Some IPEM Fellows will probably come in with MA or MS degrees already in hand; others will come in with only BA or BS degrees.

Proposals Accepted by WSU Archaeology Faculty, November 2006:

- At MA & PhD Level, accept whatever course an IPEM student takes to satisfy IPEM's "AREA C: Evolution of Human Social Behavior" requirement in lieu of ANTH 562 Evolutionary Method and Theory in Anthropology and Archaeology (3 units).
- At MA & PhD level, accept whichever course an IPEM student takes to satisfy the or IPEM's "AREA D: Evolutionary Modeling" as satisfying a "Group B" (topical course) requirement.
- At MA & PhD level, accept whichever course an IPEM student takes to satisfy IPEM's "AREA E: Phylogenetics, Phylogeography or Population Genetics" requirement as satisfying a "Group C" (lab course) requirement.
- At PhD level, accept whichever course an IPEM student takes to satisfy the IPEM's "AREA B: Comparative Biology of Social Behavior" in lieu of one area course ("Group D").

Here is an example MA program for a WSU IPEM Fellow in Archaeology under these proposals:

Group A - Required Courses: [Take all four]
ANTH 510 Fundamentals of Cultural Anthropology (3 units)
ANTH 530 Archaeological Method & Theory (3 units)
ANTH 537 Quantitative Methods in Anthropology (4 units)
UW BIOA 470 Evolution of Human Social Behavior (5 units)

Group B - Topical Courses: [Choose 1]
WSU Anth 547: Models in Anthropology

Group C - Laboratory Courses: [Choose 3, for a total of 12 units]
ANTH 513 Lithic Technical Organization (4 units)
WSU BIOL 533 Modern Methods in Systematics (Alfaro: 4 [2-6])
ANTH 570 Sediments in Geoarchaeology (4 units)

Group D - Area Courses: [Choose 1, for a total of 3 units]
ANTH 543 Prehistory of the Plateau and Basin (3 units)

Group E - Thesis: [Minimum 4 units]
ANTH 700 Master's Research, Thesis, and/or Examination.

Group F - Electives: [Minimum 3 units]
WSU BIOL 5XX Evolution and Society (Webster)

Upshot: IPEM Fellow would end up taking all the above plus one additional full course (in the Comparative Biology of Social Traditions area, and one in Ethics (not full credit) plus a continuing 1-credit seminar). As a result, the IPEM Fellow should be able to finish the MA in about the same length of time as a regular student in the archaeology MA program (or at most a semester longer).

Here is an example PhD program for an IPEM Fellow under these proposals:

Group A - Required Courses:
ANTH 510 Fundamentals of Cultural Anthropology (3 units)
ANTH 530 Archaeological Method & Theory (3 units)
ANTH 537 Quantitative Methods in Anthropology (4 units)
UW BIOA 470 Evolution of Human Social Behavior (5 units)

Group B - Topical Courses: [Choose 2]
WSU Anth 547: Models in Anthropology
ANTH 549 Settlement and Food Production (3 units)

Group C - Laboratory Courses: [Choose 4]
ANTH 513 Lithic Technical Organization (4 units)
WSU BIOL 533 Modern Methods in Systematics (Alfaro: 4 [2-6])
ANTH 570 Sediments in Geoarchaeology (4 units)
ANTH 576 Palynology (4 units)

Group D - Area Courses: [Choose 3, for a total of 9 units]
ANTH 543 Prehistory of the Plateau and Basin (3 units)
WSU Primate Behavioral Ecology ANTH 567 (Lynch Alfaro)
ANTH 539 Prehistory of the Southwest (3 units)

Group E - Thesis: [Minimum 4 units]
ANTH 700 Master's Research, Thesis, and/or Examination.

Group F - Electives: [Minimum 3 units]
WSU BIOL 5XX Evolution and Society (Webster)

Upshot: IPEM Fellows would end up getting credit within the PhD program for everything they needed to take as an IPEM Fellow except for the one course in Ethics (not full credit) plus the continuing 1-credit IPEM seminar. As a result, the IPEM Fellow should be able to finish the PhD in about the same length of time as a regular student in the archaeology PhD program (or at most a semester longer).

WSU EVOLUTIONARY ANTHROPOLOGY REQUIREMENTS

IPEM students in the Evolutionary Anth stream at WSU will be required to take the IPEM core courses. Other courses will be required at the discretion of each student's dissertation committee.

Below is the coursework normally required for graduate students in the evolutionary stream.

Non-IPEM Student Requirements for the Ph.D. program in Evolutionary Anthropology
Required Core Courses - Students must take all of the following:
ANTH 510 Fundamentals of Cultural Anthropology [3 units]
ANTH 530 Introduction to Archaeological Method and Theory [3 units]
ANTH 537 Quantitative Methods in Anthropology [4 units]
ANTH 562 Evolutionary Method and Theory in Anthropology and Archaeology [3 units]
Evolutionary Topic Courses - Six of the following *(this probably needs to be updated with IPEM courses included)*:
ANTH 547 Models and Simulation [3 units]
ANTH 548 Hunter and Gatherers Past and Present [3 units]
ANTH 561 Current Trends in Physical Anthropology [3 units]
ANTH 563 Anthropology of Life and Death [3 units]
ANTH 564 Advances in Evolutionary and Human Behavior [3 units]
ANTH 565 Human Evolution [3 units]
ANTH 569 Evolutionary Cultural Anthropology [3 units]
Electives
Electives, including at least six hours emphasizing research methods and skills [to be agreed on with the

graduate committee, minimum 21 units]

Dissertation Research Hours

ANTH 800 Doctoral Research, Dissertation and/or Examination [minimum 20 units]

WSU SCHOOL OF BIOLOGICAL SCIENCES REQUIREMENTS

IPEM students in the SBS program will be expected to take all the IPEM core courses and to satisfy all the regular SBS requirements for PhD students, as described below. In practice, many of the IPEM core courses can be used to satisfy the area requirements of SBS, and by using the other IPEM courses as electives, students should be able to satisfy both requirements without adding extra courses beyond the minimum required by the IPEM program.

Ph.D. Programs in the School of Biological Sciences

Graduate School--minimum of 34 credits of 400- and 500-level graded course work for the degree (see *Graduate School Policies and Procedures* at http://www.gradsch.wsu.edu/policiesprocedures.html). Transfer credits may be accepted from another university (e.g., for students with a M.S.) under Graduate School regulations.

School of Biological Sciences--minimum of 15 graded credits from the School of Biological Sciences (Biol) for the degree program in Botany and Zoology. The program for both degrees must include course work from all 3 areas of the core curriculum within the School of Biological Sciences. As a part of the graded credits from the school, Ph.D. students are expected to take two credits of special topics seminar (e.g., Biol 590), defend orally a research proposal before their thesis committee (Biol 501 2 credits) and present a seminar to the school based on the student's thesis research (e.g., one credit of Biol 500).

Core SBS Curriculum

CORE CURRICULUM REQUIREMENTS FOR A GRADUATE DEGREE

Ecology

Biol 525 (1 cr) Experimental Plant Ecology
Biol 532 (4 cr) Biology of Amphibians and Reptiles
Biol 538 (3 cr) Animal Behavior (counts toward IPEM requirements)
Biol 540 (3 cr) Stable Isotopes
Biol 560 (3 cr) Plant Ecophysiology
Biol 562 (3 cr) Community Ecology
Biol 563 (2 cr) Field Ecology
Biol 564 (3 cr) Molecular Ecology & Phylogeography (counts toward IPEM requirements)

Evolution

Biol 505 (3 cr) Processes of Organic Evolution
Biol 511 (2 cr) Reproductive Biology of Fishes
Biol 514 (2 cr) Fish Genetics
Biol 519 (2 cr) Introduction to Population Genetics (counts toward IPEM requirements)
Biol 520 (2 cr) Conservation Genetics
Biol 521 (2 cr) Quantitative Genetics
Biol 522 (3 cr) Molecular Population Genetics & Evolution (counts toward IPEM requirements)
Biol 531 (3 cr) Principles of Systematic Biology
Biol 533 (4 cr) Modern Methods in Systematics (counts toward IPEM requirements)

Biol 535 (3 cr) Angiosperm Families of the World
Biol 548 (3 cr) Evolutionary Ecology
Biol 566 (3 cr) Mathematical Genetics (counts toward IPEM requirements)
Biol 570 (3 cr) Plant Diversity

Physiology
Biol 504 (3 cr) Experimental Methods in Plant Physiology
Biol 506 (4 cr) Microtechnique
Biol 509 (4 cr) Plant Anatomy
Biol 512 (3 cr) Molecular Mechanisms of Plant Development
Biol 513 (3 cr) Plant Metabolism
Biol 516 (3 cr) Nutrient Transport and Partitioning in Plants
Biol 517 (3 cr) Stress Physiology of Plants
Biol 518 (3 cr) Photosynthesis, Photorespiration, & Plant Productivity
Biol 551 (3 cr) Comparative Vertebrate Reproduction
Biol 552 (3 cr) Comparative Physiology
Biol 555 (4 cr) General & Cellular Physiology
Biol 557 (4 cr) Advanced Mammalian Physiology
Biol 559 (3 cr) Hormones, Brain and Behavior (counts toward IPEM requirements)
Biol 561 (3 cr) Environmental Physiology

Seminars & Special Topics
Biol 500 (1 cr) SBS Departmental Seminar
Biol 565 (V cr) Topics in Ecology and Evolution
Biol 589 (V cr) Advanced Topics in Zoology
Biol 590 (V cr) Advanced Topics in Botany
Biol 591 (V cr) Topics in Evolution and Ecology
Biol 592 (V cr) Advanced Topics in Cell Biology
Biol 593 (V cr) Seminar I
Biol 594 (V cr) Advanced Topics on Vertebrate Form and Function
Biol 595 (V cr) Seminar II
Biol 597 (V cr) Teaching Practicum
Biol 598 (1 cr) IPEM Seminar
E MIC 586/587 (V cr) Special Projects in Electron Microscopy

Seminars and Attendance
All thesis-option graduate students must present their thesis research in a public seminar and register for Biol 500, usually during the last semester of their degree programs. Support from various fellowships/scholarships/ traineeships should be acknowledged. All graduate students are expected to attend and participate in regular seminars scheduled by the School of Biological Sciences. If time conflicts arise, the student should notify organizing faculty in charge of seminars.

Preparation for College Teaching
The School of Biological Sciences requires that graduate students take Preparation for College Teaching (Univ 590) or an equivalent course (with approval), preferably during their first semester on campus. Univ 590 is valuable for graduate students who are planning careers that include an instructional role. This 2-credit, 8-week course is provided principally as a service to graduate students. There are no formal course requirements other than attendance. One absence is permitted and videotapes are available to make up missed sessions. Graduate students with formal instructional training may petition GSAC for an exemption from this requirement. Topics covered by multiple instructors include:
The Role of the TA at WSU

The Culture of the American Classroom
Motivating Students to Learn
Policies and Procedures for Dealing with Problem Situations
Racial and Sexual Harassment at WSU: Policies and Procedures
Dialogue with Multicultural Students
Collaborative Teaching and Collaborative Learning
Teaching Techniques for Laboratories and Discussion Sections
Using Writing to Foster Learning
Problem Solving in Lecture Format
Developing and Evaluating Tests of Student Knowledge
Audio-Visual Techniques
An Application of Audio-Visual Techniques in the Classroom
Computing Services at WSU
Library Research Assignments for Undergraduates
Time and Stress Management

PRELIMINARY EXAMINATION

Key points for the SBS policy on preliminary examinations:
1. There will be two oral examinations. One examination will consist of an oral defense of the student's thesis proposal, and the other examination will be an oral preliminary examination based on the general knowledge of the student. The preliminary examination for candidacy in the Ph.D. program will be formally administered through the Graduate School. While concentrating on the area of interest as defined by the student's research topic, no topic is excluded from oral preliminary. The student must pass both examinations to successfully complete a degree program within the school.

2. A written preliminary exam prior to the oral examination is not a requirement of the School of Biological Sciences, but such an examination may be given if requested by the student or the thesis committee. This is not the proposal defense described above but a general knowledge examination and would be based on questions solicited from the thesis committee.

If a written preliminary examination is required, questions for the written preliminary examination will be solicited from the candidate's Thesis Research Committee. The written preliminary examination will cover the particular area of interest and, like the oral preliminary examination, will emphasize this particular area; however, no area is necessarily excluded.

Preliminary examinations will be scheduled only for graduate students whose programs have been approved by the Graduate School, the Associate Director for Graduate Studies and the thesis research committee, and only after most of the course work is completed. *The Preliminary Examination must be taken no later than the end of the fourth semester for Ph.D. students with an M.S. degree, and no later than the end of the sixth semester for Ph.D. students without an M.S. degree*.

Forms scheduling the preliminary examination may be obtained online at http://www.gradsch.wsu.edu/forms.htm or from the Graduate School and should be submitted at least 10 working days before the examination date.

Failure of the examination makes it uncertain whether the candidate is qualified for the Ph.D. If a candidate fails the preliminary examination, the examining committee may decide:
1. that the candidate is not qualified and should not continue for the Ph.D. degree in the School of Biological Sciences at WSU; or
2. that the candidate should retake the preliminary exam. The examination must be taken no earlier than

three months after the first preliminary exam and no later than six months after the first exam.

RESEARCH PROPOSAL

In addition to the oral preliminary examination, Ph.D. students are required to write and defend a research proposal. The research proposal will:

1. follow the format of a large granting agency for competitive grants, e.g., NSF, USDA, or NIH.
2. be developed in conjunction with the thesis research committee; it is the committee's responsibility to approve the proposal and schedule the oral defense of the research proposal.
3. be submitted to the Academic Coordinator for the student's permanent file upon successful completion of the defense; the student will receive graded credit from the thesis research committee.
4. be defended no later than one semester after the general-knowledge oral preliminary examination; however, it may be scheduled at anytime, including before the oral preliminary examination.

THESIS

For information on formatting the theses please refer to http://www.gradsch.wsu.edu/forms.htm. All theses must generally adhere to the following guidelines for the reference section as approved by the individual candidate's research committee:

1. The format for each chapter may follow the format for the journal to which the manuscript has been or will be presented (i.e., no consistent format is required between chapters).

2. Full citation for each reference (i.e., including all the authors and the title of the article) must be given throughout the thesis, but otherwise each chapter may follow the format of a particular journal.

3. Use a consistent form of citations throughout the thesis with the student selecting the format of a particular journal that gives the complete citation.

FINAL ORAL EXAMINATION

Final examinations for M.S. and Ph.D. degrees will follow existing Graduate School regulations (see Graduate School Policies and Procedures http://www.gradsch.wsu.edu/policiesprocedures.html). All graduate students must satisfactorily pass a final oral examination in defense of their thesis research. After preliminary approval of the thesis by the thesis committee, the final examination will be scheduled through the Graduate School. Copies of the thesis must be provided to each member of the thesis committee, thesis advisor, school, and the graduate faculty representative at least two weeks before the oral examination. An abstract must also be placed in Owen Science and Engineering Library. Questions asked during the final examination usually relate to the thesis research but are not limited to the thesis. All faculty may attend the examination and ask questions, but only members of the thesis committee and the graduate faculty may vote. Upon completion of the oral examination, a signed copy of the thesis must be presented to the Graduate School within five working days. Copies of the thesis will also be presented to the school and the thesis advisor.

TIMING OF DEFENSE FOR M.S. THESES AND PH.D. DISSERTATIONS

Thesis and dissertation defenses will take place during fall and spring semesters of each academic year. Only under unusual circumstances can a defense be held during summer, and only with prior approval of the student's committee early in the preceding spring. Students should not assume that committee members will be able to convene for a defense during summer, and should plan accordingly. Students need to find a day when everyone is available and allow a few weeks for all members of the committee to

read and comment on the penultimate draft. Only after each committee member's comments have been received and corrections made to the draft will each committee member be expected to sign the form allowing the defense to be scheduled. Many faculty in the school have research programs that keep them away from campus during summer, and many professional meetings and symposia take place at that time. Consequently, it may be impossible to find sufficient time during summer for the committee to read thoroughly the draft, provide comments, allow sufficient time to incorporate comments into a version suitable for defense, and identify a date for the defense.

GRADUATION

Students are encouraged to apply for their degree the semester before they plan to graduate and obtain the appropriate packet of information regarding procedures and deadlines for thesis defense and graduation. Failure to meet deadlines could require enrollment for an additional semester.