

# General Education Course Proposal

Proposed Course: ANTH 161 Bio/Behavioral Evolution of Units 3  
Prefix No. the Human Species

Department: Anthropology School: Social Sciences

**GE Category (Indicate one category only):**

Foundation: A1\_\_\_; A2\_\_\_; A3\_\_\_; B4\_\_\_  
Breadth: B1\_\_\_; B2\_\_\_; C1\_\_\_; C2\_\_\_; D\_\_\_; E\_\_\_  
Integration: B X; C\_\_\_; D\_\_\_; International/Multicultural\_\_\_

Existing Course\_\_\_; Revised Course X ; New Course\_\_\_

Course Included in Current GE Program\_\_\_

New courses require the Undergraduate Course Proposal form in addition to this form.

Revised courses require the Undergraduate Course Change Request in addition to this form.

**Proposed catalog description:** Limit course description to 40 words using succinct phrases. Include prerequisites, limitations, lecture/lab hours. Indicate former course number, e.g., (Former Biol 105)

Course Description: ANTH 161 BIO/BEHAVIORAL EVOLUTION OF THE HUMAN SPECIES (3) Examines the evolution of the human species, its relationship to living and extinct primates, and explores the biological basis of human culture. The course integrates evolutionary biology, geochronology, and anthropology in order to understand the bio/behavioral nature of modern humans. AREA B2 UPPER DIVISION, Life Sciences. Prerequisite: Area B(2) Lower Division. (2 lecture, 2 lab hours)

Enrollment limit per section: 50

Expected number of sections per semester – Year 1 1 ; Year 3 4

**Attachments:**

1. A statement presenting the ways in which this course meets the Specifications provided in the appropriate section of the General Education Policy as well as in the Policies for Inclusion and Evaluation of General Education Courses.
2. A statement of elements common to all sections of this course, identifying content, objectives, required student activities, grading policy, representative texts, and an approximate schedule for the course. Required student activities include such things as papers, research projects, homework, laboratory and/or studio performance, recitations, participation, attendance, and exams.
3. A typical syllabus for a particular offering of the course.
4. Any special cost factors associated with this course.

**Approval for Inclusion in General Education**

R.M. LaFrenese 9/28/98  
Department Chair Date

Ellen Gruenbaum 10/6/98  
School Dean Date

Brandt Kehoe 12/22/98  
Associate Provost Date

J. Sed 10/6/98  
School Curriculum Committee Date

Redmond 12/15/98  
General Education Subcommittee Date

Forward Original and TWELVE copies to:  
Associate Provost for Academic Affairs, M/S 54

## Attachment #2

### Common Content

The common content for all sections of this course will include the topics outlined below. Because Anthropology 161 integrates basic scientific understandings related to the study of human origins with theories concerning the development of human nature, it is essential, we believe, to include all of these topics in the course's presentation. Variation between instructors may include, however, the order and emphasis of some of the subsections, the topics selected for student papers, the format of the examinations given, and the textbooks used. The laboratory subject matter will also be standardized in order to insure that students from each of the lecture sections will be exposed to the same materials.

### Topics/Weeks/Readings

#### Section I Foundations (Six Weeks)

##### Course Objectives for Section I

1. Provide students an understanding of the interdisciplinary nature of paleoanthropology.
2. Provide students with an understanding of the modern evolutionary synthesis and its application to the study of the human species.
3. Explore the use DNA in the creation of hominid phylogenies.
4. Provide students with an understanding of various relative and absolute dating techniques used in the study of fossil man sites.
5. Examine the comparative anatomical data pertaining the study of hominoid evolution, involving locomotion, chewing, and the function of the hand.

##### Week #1 Course Introduction

Readings: *Human Evolution*, Roger Lewin, Chapters 1 and 2

Topics:

1. Course format and requirements.
2. Introduction to bio/behavioral evolution.
3. ~~Humans' place in nature.~~ Humans' place in nature.

##### Week #2 Modern Evolutionary Theory

Readings: *Human Evolution*, Roger Lewin, Chapters 4, 5, 6, and 8  
*Anthropology Reader*, Macro-evolution.

Topics:

1. Micro-evolutionary processes of genetic drift, selection, and mutation.
2. Natural selection and the formation of species and higher evolutionary taxa.
3. Integration of micro- and macroevolution into the Modern Synthesis

4. Phyletic gradualism and evolutionary change.
5. Shifting balance theory and its paleontological application—punctuated equilibria.

Week #3 Molecular Evolution

Readings: *Anthropological Reader*, DNA and Phylogeny

Topics:

1. Mutation and evolutionary change.
2. Pan-selectionist viewpoint.
3. Neutral theory of evolutionary change.
4. Molecular phylogenies.
5. MtDNA and the "Eve hypothesis"
6. Y-chromosome DNA and the "Adam hypothesis".

Week #4 Physical Context of Evolution

Readings: *Reconstructing Human Origins*, Glen Conroy, Chapter

Topics:

1. Reconstructing Plio-Pleistocene Climates
2. Plio-Pleistocene Time Scale.
3. Archaeological Time Scale.
4. Effects of Miocene and Plio-Pleistocene Climates on Hominid Evolution.

Week # 5 Geochronology and Fossil Finds

Readings: *Reconstructing Human Origins*, Glen Conroy, Chapter 2  
*Anthropology Reader*, Dating Techniques.

Topics:

1. Taphonomy and the study of fossil deposits.
2. Relative dating techniques and their use at hominid sites.
  - law of superposition
  - nitrogen and fluorine
  - floral and faunal sequences
  - paleomagnetic reversals
3. Absolute dating techniques and their use at hominid sites.
  - radiometric dating
    - <sup>14</sup>C, K/Ar, Thorium/Uranium
    - thermoluminescence
    - electron spin resonance
    - dendrochronology
    - amino-acid racemization

### Week #6 Comparative Hominoid Anatomy

Readings: : *Reconstructing Human Origins*, Glen Conroy, Chapter 3; *Human Evolution*, Roger Lewin, Chapters 16, 17, and 18; *Anthropology Reader*, Comparative Hominoid Morphology.

Topics:

1. Hominoid origins.
2. Origins of bipedalism and biomechanical principles.
3. Gnathic evolution of the hominoids.

## Section II Fossil Record (Four Weeks)

### Course Objectives for Section II

1. Discuss the fossil data based currently used in the study of human evolution.
2. Examine the theoretical foundations used in the classification of the hominid taxa.
3. Provide students with an understanding of the data based related to the interpretation of human culture and behavior.
4. Provide students with an understanding of the technological changes that have occurred during human evolution.

### Week #7 Plio-Pleistocene Hominids

Readings: *Reconstructing Human Origins*, Glen Conroy, Chapters 4 and 5

Topics:

1. Plio-Pleistocene hominid fossil record of East and South Africa
2. Molecular clocks and hominid evolution.
3. Craniodental and postcranial characteristics of  
*A. ramidus*, *A. anamensis*, *A. afarensis*, *A. africanus*, *A. robustus*, and *A. boisei*.
4. Morphology and the evidence for bipedalism.

### Week #8 Origins of the Genus *Homo*

Readings: *Reconstructing Human Origins*, Glen Conroy, Chapters 6 and 7.

Topics:

1. Morphological features of *Homo habilis*.
2. Early hominid behavior and tool making.
3. Geographical dispersal of the genus *Homo*.
4. Fossil record of *Homo erectus*.

Week #9 Neanderthal and Anatomically Modern *Homo sapiens*.

Readings: *Reconstructing Human Origins*, Glen Conroy, Chapters 8 and 9; *Anthropology Reader*, "Adam" and "Eve" Hypotheses.

Topics:

1. Glaciation and human adaptation.
2. Neanderthal cranio-facial morphology.
3. mtDNA and the relationship between Neanderthal and anatomically modern *Homo sapiens*.
4. Eve and Adam hypotheses reconsidered.

Week #10 Hominid Cranial Evolution

Readings: *Reconstructing Human Origins*, Glen Conroy, Chapter 10.

Topics:

1. Brain size and human evolution.
2. Evidence for the evolution of language.
3. Evidence for the evolution of tool making.

### Section III Synthesis (Four Weeks)

Course Objectives for Section III

1. Provide students with an understanding of the role of learned behavior in the various adaptations made by hominoids.
2. Provide students with an integrated view of the cultural and biological changes that have affected the evolution of our species.
3. Provide students with an understanding of current theoretical issues that pertain to the evolution of our species.
4. Provide students with a sociobiological understanding of the evolution of the human family.

Week #11 Evolution of Human Behavior

Readings: *Human Evolution*, Roger Lewin, Chapters 23, 25, and 26; *Anthropology Reader*, Cultural Evolution.

Topics:

1. Tool technologies and materials—flintknapping
2. Tool technologies and human evolution  
Oldowan, Acheulean, Mousterian, and Upper Paleolithic
3. Tool manufacture and language.
4. Hunting hypothesis v. scavenging.
5. The savanna biome.
6. The use of fire for hunting/cooking/tool manufacture.

Week #12 Synthesis I: The Role of Culture in Human Evolution

Readings: : Human Evolution, Roger Lewin, Chapters 31 and 32.

Topics:

1. Human evolution: a case for punctuated equilibria?
2. Concept of culture and the competitive exclusion hypothesis.
3. The emergence of human consciousness and development of art.
4. The role of language in becoming human.

Week #13 Synthesis II: Sociobiology and Human Adaptation

Readings: *Anthropology Reader*, Sociobiology.

Topics:

1. Group v. individual selection in human societies.
2. Aspects of kin selection and human behavior.
3. Parental investment theory and the human family.
4. Reciprocal altruism and human society.

Week #14 Synthesis III: Evolution of Culture

Readings: *Anthropology Reader*, Language and Culture.

Topics:

1. Culture defined by tool use/making  
Tool using/making chimpanzees
2. Culture defined by language use  
Symbolic capacity of chimpanzees
3. Culture defined in terms of social organization  
Chimpanzee group structure
4. Culture defined in terms of aesthetic expression  
Chimpanzee artistic expression.
5. How do we relate human and chimpanzee behavior  
(Issues from Weeks #12 and #14)

Week #15: Conclusion/Review

Readings: None

Topics:

1. Preparation for Lab and Course Final Examination.

Course Paper: The writing requirement for this course is a minimum of 4,000 words or approximately 20 typed pages. The subject of this paper will be chosen in consultation with the instructor. You are required to submit an annotated bibliography and an abstract of your thesis before approval of your topic will be granted. The abstract will be carefully evaluated to determine whether or not your thesis can be supported by the bibliography you have chosen. The subject of your paper must be integrative, dealing with both the biological and cultural aspects of human evolution. A list of suggested topics will be distributed in class.

### Paper Topics:

The subject of your 4,000 word writing assignment will be a paper that integrates some of topics covered in this course. At the end of each of the chapters in Lewin's *Human Evolution*, you will find a list of additional readings that may assist you in selecting both a topic and a bibliography. Below you will find some examples of topics appropriate for this assignment.

1. Individual v. Group Selection and Human Evolution.
2. Human evolution: a case for phyletic gradualism or punctuated equilibrium.
3. Human culture and adaptation to climatic changes.
4. Language and the diaspora of anatomically modern *Homo sapiens*.
5. The cultural gulf between man and the African apes.
6. Human culture and its impact on speciation.
7. Kin selection and the evolution of the human family.
8. Technology, language, and cultural evolution in the Pleistocene.

Writing Evaluation: Writing will be evaluated in terms of the usual mechanical categories, including grammar, syntax, spelling, and punctuation. The format of your paper will conform to the style of the American Anthropological Association, the recognized standard format in our discipline. A style sheet will be distributed in class.

### Laboratory Objectives

This one unit laboratory component meets once a week for two hours. One of the objectives of this 30 hour experience will be to learn the methods and techniques used in the collection and analysis of paleoanthropological data. Students will be given hands-on instruction in the procedures of data collection, using the Department's hominoid cast collection, which is representative of a vast array of both living and extinct forms. The part of the laboratory work will also include instruction in the methods of statistical analysis employed in the interpretation of these data bases, as well as a presentation of the anatomical foundations employed in the analyses.

Another objective of this laboratory experience will have the opportunity to learn to make early tools that have been associated with our Pleistocene ancestors. This will include the selection of appropriate lithic materials and their reduction into usable implements. The focus will be on the mechanical aspects of the tool-making, which will serve to underpin their understanding of man's cognitive development through his evolution.

The final objective will be to introduce students to the methods and theory associated with primate social behavior. Students will be required to make observations of living primates, using the collection that is now part Chaffe Zoological Gardens. These field observations will be analyzed in terms of sociobiological theory and its application to living primate.

Additional Texts for the Course

Bilsborough, A. (1992) *Human Evolution*. Blackie.

Foley, R. A. (1987) *Another Unique Species*. Longman.

Klein, R. G. (1989) *The Human Career*. University of Chicago Press.

Wolpoff, Milford, (1999) *Paleoanthropology* (2<sup>nd</sup> Edition). McGraw-Hill.



## **Laboratory** **Bio/Behavioral Evolution of the Human Species**

### Laboratory Objectives

This one unit laboratory component meets once a week for two hours. One of the objectives of this 30 hour experience will be to learn the methods and techniques used in the collection and analysis of paleoanthropological data. Students will be given hands-on instruction in the procedures of data collection, using the Department's hominoid cast collection, which is representative of a vast array of both living and extinct forms. The part of the laboratory work will also include instruction in the methods of statistical analysis employed in the interpretation of these data bases, as well as a presentation of the anatomical foundations employed in the analyses.

Another objective of this laboratory experience will have the opportunity to learn to make early tools that have been associated with our Pleistocene ancestors. This will include the selection of appropriate lithic materials and their reduction into usable implements. The focus will be on the mechanical aspects of the tool-making, which will serve to underpin their understanding of man's cognitive development through his evolution.

The final objective will be to introduce students to the methods and theory associated with primate social behavior. Students will be required to make observations of living primates, using the collection that is now part Chaffe Zoological Gardens. These field observations will be analyzed in terms of sociobiological theory and its application to living primate.

Laboratory Manual and Handouts prepared by R. M. La Jeunesse

### Course Schedule

#### 1. Introduction (Week #1, 2 hrs)

- Lab facilities and equipment
- Computers and data bases
- Format for laboratory reports

#### 2. Quantitative Considerations (Weeks 2-4, 6 hours)

- Statistical methods
  - Means, variances
  - Regression
  - Distributions
    - Gaussian
    - Binomial
    - Poisson

- Chi-square
- Student's -t
- Multivariate techniques
- Force vectors (analysis of levers)
- Applications to anthropological data bases
- Methods of data collection
  - Techniques of measurement
  - Data presentation/interpretation
- Problem sets
  - Anthropometric
  - Osteometric
  - Craniometric
  - Odontometric

3. Human and Primate Comparative Osteology/Odontology (Weeks 4-7, 6 hours)

- Hominoid comparative osteology
  - Methods
    - Qualitative
    - Quantitative
  - Comparisons with casts
- Hominoid comparative odontology
  - Methods
    - Qualitative
    - Quantitative
  - Comparisons with casts

4. Human and Primate Comparative Functional Anatomy (Weeks 8-9, 4 hours)

- Hominoid Gnathic Comparisons
- Hominoid Locomotor Comparisons
- Applications to Fossil Data
  - Functional analysis of fossil casts

5. Molecular Genetics (Weeks 10-11, 4 hours)

- Methods and Assumptions
  - Molecular dendrograms
  - Molecular clocks
    - mtDNA ("Eve" hypothesis)
    - y-chromosome ("Adam" hypothesis)

6. Human behavior/Primitive Technology (Weeks 12-13, 4 hours)

- Material Selection
- Fracture Mechanics
- Manufacture of Stone Tools
- Mechanical Analysis of stone fracture

7. Sociobiological Interpretations (Week 14, 2 hours)

- Assumptions and Calculations of Sociobiological Theory
  - Kin selection
  - Parental Investment
  - Reciprocal Altruism
- Applications
  - Zoo Observations/Report

7. Laboratory Final (Week 15, 2 hours)

Laboratory Procedures

Each of the laboratory sections (supra) is intended to complement the subject matter of the lectures. These labs are designed to provide hands-on experience in the collection and analysis of primary data in the study of paleoanthropology. Throughout these labs, you will be handling equipment that is fragile and expensive, so we ask that you treat them with care.

Most of the labs incorporate components that stress collaboration with other students. These collaborations are encouraged, however, the reports you prepare will reflect your own work.

Laboratory Grades

You must have a passing grade in the laboratory to receive a passing grade for the course. The laboratory component of the course is worth a total of 500 points, consisting of 250 points for reports, 10 reports @25 points apiece, and a 250 point laboratory final.

## Attachment #3

### **Anthropology 161 Bio/Behavioral Evolution of the Human Species**

Course Description: **ANTH 161 BIO/BEHAVIORAL EVOLUTION OF THE HUMAN SPECIES** (3) Examines the evolution of the human species, its relationship to living and extinct primates, and explores the biological basis of human culture. The course integrates evolutionary biology, geochronology, and anthropology in order to understand the bio/behavioral nature of modern man. AREA B2 UPPER DIVISION, Life Sciences. Prerequisite: Area B(2) Lower Division. (2 lecture, 2 lab hours).

Instructor: Dr. Roger Marks La Jeunesse

Office: Peters Building 389, extension 8-3002

Office Hours:

Course Calendar:

- Section I: Foundations (Weeks 1 through 6)  
Examination I/Week 6 (100 points)
  
- Section II: Fossil Record (Weeks 7 through 10)  
Examination II/ Week 10 (100 points)
  
- Section III: Synthesis (Weeks 11 through 14)  
Examination III/Week 14 (100 points)
  
- Comprehensive Final Examination (400 points)

Course Paper: The writing requirement for this course is a minimum of 4,000 words or approximately 20 pages. The subject of this paper will be chosen in consultation with the instructor. You are required to submit an annotated bibliography and an abstract of your thesis before approval of your topic will be granted. The abstract will be carefully evaluated to determine whether or not your thesis can be supported by the bibliography you have chosen. The subject of your paper must be integrative, dealing with both the biological and cultural aspects of human evolution. A list of suggested topics will be distributed in class.

Writing Evaluation: Writing will be evaluated in terms of the usual mechanical categories, including grammar, syntax, spelling, and punctuation. The format of your paper will conform to the style of the American Anthropological Association, the recognized standard format in our discipline. A style sheet will be distributed in class.

### Paper Topics:

The subject of your 4,000 word writing assignment will be a paper that integrates some of topics covered in this course. At the end of each of the chapters in *Lewin's Human Evolution*, you will find a list of additional readings that may assist you in selecting both a topic and a bibliography. Below you will find some examples of topics appropriate for this assignment.

1. Individual v. Group Selection and Human Evolution.
2. Human evolution: a case for phyletic gradualism or punctuated equilibrium.
3. Human culture and adaptation of climatic changes.
4. Language and the diaspora of anatomically modern Homo sapiens.
5. The cultural gulf between man and the African apes.
6. Human culture and its impact on speciation.
7. Kin selection and the evolution of the human family.
8. Technology, language, and cultural evolution in the Pleistocene.

### Course Grades:

Three mid-terms	=	300 points (19% of course grade)
Comprehensive Final	=	400 points (28% of course grade)
Term Paper	=	300 points (19% of course grade)
Lab Assignments	=	250 points (17% of course grade)
<u>Lab Final</u>	=	<u>250 points (17% of course grade)</u>
Total Points		1500 points

A = 1,350 points

B = 1,200 points

C = 1,050 points

D = 900 points

A student must complete this course with "C" or better to receive General Education credit.

Optional Materials: Interactive computer program and workbooks are available. They are optional for this course

University Policies: In this course the guidelines set forward in the University Policy Manual will be followed, particularly in regard to student disabilities, plagiarism and cheating, and classroom conduct.

- Texts:
1. *Reconstructing Human Origins: A Modern Synthesis*, 1997, Glenn C. Conroy.
  2. *Principles of Human Evolution*, 1998, Roger Lewin.
  3. *Anthropology Reader*, an anthology of professional journal articles relating to specific topics in human evolution, prepared by R.M. La Jeunesse
  4. *Laboratory Manual*, prepared by R. M. La Jeunesse

## Topics/Weeks/Readings

### Section I Foundations

#### Week #1 Course Introduction

Readings: *Human Evolution*, Roger Lewin, Chapters 1 and 2

Topics:

1. Course format and requirements.
2. Introduction to bio/behavioral evolution.
3. Man's place in nature.

#### Week #2 Modern Evolutionary Theory

Readings: *Human Evolution*, Roger Lewin, Chapters 4, 5, 6, and 8  
*Anthropology Reader*, Macro-evolution.

Topics:

1. Micro-evolutionary processes of genetic drift, selection, and mutation.
2. Natural selection and the formation of species and higher evolutionary taxa.
3. Integration of micro- and macroevolution into the Modern Synthesis
4. Phyletic gradualism and evolutionary change.
5. Shifting balance theory and its paleontological application—punctuated equilibria.

#### Week #3 Molecular Evolution

Readings: *Anthropological Reader*, DNA and Phylogeny

Topics:

1. Mutation and evolutionary change.
2. Pan-selectionist viewpoint.
3. Neutral theory of evolutionary change.
4. Molecular phylogenies.
5. MtDNA and the "Eve hypothesis"
6. Y-chromosome DNA and the "Adam hypothesis".

#### Week #4 Physical Context of Evolution

Readings: *Reconstructing Human Origins*, Glen Conroy, Chapter

Topics:

1. Reconstructing Plio-Pleistocene Climates
2. Plio-Pleistocene Time Scale.
3. Archaeological Time Scale.

4. Effects of Miocene and Plio-Pleistocene Climates on Hominid Evolution.

#### Week # 5 Geochronology and Fossil Finds

Readings: *Reconstructing Human Origins*, Glen Conroy, Chapter 2  
*Anthropology Reader*, Dating Techniques.

Topics:

1. Taphonomy and the study of fossil deposits.
2. Relative dating techniques and their use at hominid sites.
  - law of superposition
  - nitrogen and fluorine
  - floral and faunal sequences
  - paleomagnetic reversals
3. Absolute dating techniques and their use at hominid sites.
  - radiometric dating
    - $^{14}\text{C}$ , K/Ar, Thorium/Uranium
    - thermoluminescence
    - electron spin resonance
    - dendrochronology
    - amino-acid racemization

#### Week #6 Comparative Hominoid Anatomy

Readings: : *Reconstructing Human Origins*, Glen Conroy, Chapter 3; *Human Evolution*, Roger Lewin, Chapters 16, 17, and 18; *Anthropology Reader*, Comparative Hominoid Morphology.

Topics:

1. Hominoid origins.
2. Origins of bipedalism and biomechanical principles.
3. Gnathic evolution of the hominoids.

## Section II Fossil Record

#### Week #7 Plio-Pleistocene Hominids

Readings: *Reconstructing Human Origins*, Glen Conroy, Chapters 4 and 5

Topics:

1. Plio-Pleistocene hominid fossil record of East and South Africa
2. Molecular clocks and hominid evolution.
3. Craniodental and postcranial characteristics of  
*A. ramidus*, *A. anamensis*, *A. afarensis*, *A. africanus*, *A. robustus*, and *A. boisei*.
4. Morphology and the evidence for bipedalism.

#### Week #8 Origins of the Genus *Homo*

Readings: *Reconstructing Human Origins*, Glen Conroy, Chapters 6 and 7.

Topics:

1. Morphological features of *Homo habilis*.
2. Early hominid behavior and tool making.
3. Geographical dispersal of the genus *Homo*.
4. Fossil record of *Homo erectus*.

Week #9 Neanderthal and Anatomically Modern *Homo sapiens*.

Readings: *Reconstructing Human Origins*, Glen Conroy, Chapters 8 and 9; *Anthropology Reader*, "Adam" and "Eve" Hypotheses.

Topics:

1. Glaciation and human adaptation.
2. Neanderthal cranio-facial morphology.
3. mtDNA and the relationship between Neanderthal and anatomically modern *Homo sapiens*.
4. Eve and Adam hypotheses reconsidered.

Week #10 Hominid Cranial Evolution

Readings: *Reconstructing Human Origins*, Glen Conroy, Chapter 10.

Topics:

1. Brain size and human evolution.
2. Evidence for the evolution of language.
3. Evidence for the evolution of tool making.

### Section III Synthesis

Week #11 Evolution of Human Behavior

Readings: *Human Evolution*, Roger Lewin, Chapters 23, 25, and 26; *Anthropology Reader*, Cultural Evolution.

Topics:

1. Tool technologies and materials—flintknapping
2. Tool technologies and human evolution  
Oldowan, Acheulean, Mousterian, and Upper Paleolithic
3. Tool manufacture and language.
4. Hunting hypothesis v. scavenging.
5. The savanna biome.
6. The use of fire for hunting/cooking/tool manufacture.

Week #12 Synthesis I: The Role of Culture in Human Evolution

Readings: : *Human Evolution*, Roger Lewin, Chapters 31 and 32.



Topics:

1. Human evolution: a case for punctuated equilibria?
2. Concept of culture and the competitive exclusion hypothesis.
3. The emergence of human consciousness and development of art.
4. The role of language in becoming human.

Week #13 Synthesis II: Sociobiology and Human Adaptation

Readings: *Anthropology Reader*, Sociobiology.

Topics:

1. Group v. individual selection in human societies.
2. Aspects of kin selection and human behavior.
3. Parental investment theory and the human family.
4. Reciprocal altruism and human society.

Week #14 Synthesis III: Evolution of Culture

Readings: *Anthropology Reader*, Language and Culture.

Topics:

1. Culture defined by tool use/making  
Tool using/making chimpanzees
2. Culture defined by language use  
Symbolic capacity of chimpanzees
3. Culture defined in terms of social organization  
Chimpanzee group structure
4. Culture defined in terms of aesthetic expression  
Chimpanzee artistic expression.
5. How do we relate human and chimpanzee behavior  
(Issues from Weeks #12 and #14)

Week #15: Conclusion/Review

Readings: None

Topics:

1. Preparation for Lab and Course Final Examination.

## **Laboratory Bio/Behavioral Evolution of the Human Species**

### Laboratory Objectives

This one unit laboratory component meets once a week for two hours. One of the objectives of this 30 hour experience will be to learn the methods and techniques used in the collection and analysis of paleoanthropological data. Students will be given hands-on instruction in the procedures of data collection, using the Department's hominoid cast collection, which is representative of a vast array of both living and extinct forms. The part of the laboratory work will also include instruction in the methods of statistical analysis employed in the interpretation of these data bases, as well as a presentation of the anatomical foundations employed in the analyses.

Another objective of this laboratory experience will have the opportunity to learn to make early tools that have been associated with our Pleistocene ancestors. This will include the selection of appropriate lithic materials and their reduction into usable implements. The focus will be on the mechanical aspects of the tool-making, which will serve to underpin their understanding of man's cognitive development through his evolution.

The final objective will be to introduce students to the methods and theory associated with primate social behavior. Students will be required to make observations of living primates, using the collection that is now part Chaffee Zoological Gardens. These field observations will be analyzed in terms of sociobiological theory and its application to living primate.

Laboratory Manual and Handouts prepared by R. M. La Jeunesse

### Course Schedule

#### 1. Introduction (Week #1, 2 hrs)

- Lab facilities and equipment
- Computers and data bases
- Format for laboratory reports

#### 2. Quantitative Considerations (Weeks 2-4, 6 hours)

- Statistical methods
  - Means, variances
  - Regression
  - Distributions
    - Gaussian
    - Binomial
    - Poisson

- Chi-square
- Student's -t
- Multivariate techniques
- Force vectors (analysis of levers)
- Applications to anthropological data bases
- Methods of data collection
  - Techniques of measurement
  - Data presentation/interpretation
- Problem sets
  - Anthropometric
  - Osteometric
  - Craniometric
  - Odontometric

3. Human and Primate Comparative Osteology/Odontology (Weeks 4-7, 6 hours)

- Hominoid comparative osteology
  - Methods
    - Qualitative
    - Quantitative
  - Comparisons with casts
- Hominoid comparative odontology
  - Methods
    - Qualitative
    - Quantitative
  - Comparisons with casts

4. Human and Primate Comparative Functional Anatomy (Weeks 8-9, 4 hours)

- Hominoid Gnathic Comparisons
- Hominoid Locomotor Comparisons
- Applications to Fossil Data
  - Functional analysis of fossil casts

5. Molecular Genetics (Weeks 10-11, 4 hours)

- Methods and Assumptions
  - Molecular dendrograms
  - Molecular clocks
    - mtDNA ("Eve" hypothesis)
    - y-chromosome ("Adam" hypothesis)

6. Human behavior/Primitive Technology (Weeks 12-13, 4 hours)

Material Selection  
Fracture Mechanics  
Manufacture of Stone Tools  
Mechanical Analysis of stone fracture

7. Sociobiological Interpretations (Week 14, 2 hours)

Assumptions and Calculations of Sociobiological Theory  
Kin selection  
Parental Investment  
Reciprocal Altruism  
Applications  
Zoo Observations/Report

7. Laboratory Final (Week 15, 2 hours)

Laboratory Procedures

Each of the laboratory sections (supra) is intended to complement the subject matter of the lectures. These labs are designed to provide hands-on experience in the collection and analysis of primary data in the study of paleoanthropology. Throughout these labs, you will be handling equipment that is fragile and expensive, so we ask that you treat them with care.

Most of the labs incorporate components that stress collaboration with other students. These collaborations are encouraged, however, the reports you prepare will reflect your own work.

Laboratory Grades

You must have a passing grade in the laboratory to receive a passing grade for the course. The laboratory component of the course is worth a total of 500 points, consisting of 250 points for reports, 10 reports @25 points apiece, and a 250 point laboratory final.