

University of Colorado, Colorado Springs
Center for Cognitive Archaeology
ANTH 4345/5345: PALEONEUROLOGY

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Course Objective

This course introduces topics and issues regarding the evolution of both primate and fossil hominid endocranial anatomy. The course will begin with a brief history of paleoneurology and the study of endocranial casts (endocasts). The anatomy of the ectocranium will be briefly presented while the anatomy of the endocranium will be discussed in detail, including information on morphogenesis and functional morphology. The course includes basic introductions to primatology and human evolution, to supply the required background information on these fields necessary to understand the subsequent material. An overview of neuroanatomy will present topics in comparative primate brain morphology. The evolutionary endocranial changes in hominids (particularly fossil human species) will be discussed, taking into account the main cerebral districts and the principal hominid taxa. Apart from general endocranial form and shape, specific traits such as circumvolutions and the vascular system (middle meningeal artery and venous sinuses) will be also considered. Endocranial variations will be discussed in terms of structural and functional relationships with the facial and basal cranial elements. The paleoneurological changes associated with ontological patterns, brain metabolism, and the ecological and behavioral evidence will also be discussed. Anatomical variations will be also be interpreted by using current neuropsychological hypotheses and functional brain imaging data. The course will be concluded with a general overview of the computed tools currently used to reconstruct the endocranial anatomy in fossil specimens, namely computed tomography and digital morphology.

Reading Material

The primary reading material is 15 short online overview lectures and an additional 1–3 papers that expand on the week's subject matter. You are expected to review this material as it applies to your weekly lesson. After each unit, you will be expected to complete an online exam, a series of multiple choice questions.

Discussion Forum Participation

The lectures and the required reading material only give the information. The Discussion Forum is the tool to discuss such information, transforming information in knowledge. Because of the

multidisciplinary and heterogeneous contents of this course, an active participation to the forum (with questions, notes, or comments) is highly recommended—and necessary—to avoid misunderstandings or insufficient preparation to the tests.

Required Text

This course is not associated with a specific textbook. Papers within each assignment *are* the textbook. However, taking into account the multidisciplinary nature of this course, I can suggest some books which may be helpful as general references.

A very comprehensive text, with information on morphology, anthropology, primatology, and paleontology is:

- Whitehead, P. F., Sacco, W. K., & Hochgraf, S. B. (2005). *A photographic atlas for physical anthropology*. Morton Publishing Company.

Other very good textbooks are:

- Aiello, L., & Dean, C. (2004). *An introduction to human evolutionary anatomy*. Academic Press.
- Fleagle, J. G. (1998). *Primate adaptation and evolution*. Academic Press.

Good atlas and manuals:

- Holloway, R. L., Broadfield, D. C., & Yuan, M. S. (2004). *The human fossil record volume 3: Brain endocasts: the paleoneurological evidence*. Schwartz, J. H. & Tattersall, I., eds. Wiley-Liss.
- Rohen, J. W., Lütjen-Drecoll, E., & Yokochi, C. (2006). *Color atlas of anatomy*. Lippincott Williams & Wilkins.
- White, T. D., Black, M. T., & Folkens, P.A. (2011). *Human osteology*. Academic Press.

Good reading:

- Allen, J. S. (2009). *The lives of the brain: Human evolution and the organ of mind*. Belknap Press.
- Bradshaw, J. L. (1998). *Human evolution: a neuropsychological perspective*. Psychology Press.
- Coolidge, F. L., & Wynn, T. (2009). *The rise of Homo sapiens: the evolution of modern thinking*. Wiley-Blackwell.

Exams

Fifteen multiple-choice tests, one test after each lesson, beginning with Unit 1. Each test varies in length from about 12–15 multiple choice questions. Each question is worth 1 point; thus, a 15-point test counts as a 15-point unit. Exams do not have a time limit, and you may save an incomplete exam before returning to complete and submit the exam for grading.

Grading Policy, Criteria, and Scale

Your grade in this course will be based on 15 tests (from 12 to 15 points each), valued as shown in the following table.

Test	Topic	Points
1	Introduction to Paleoneurology	12
2	Cranium and Endocranium Anatomy	12
3	Morphogenesis	12
4	Primate Evolution	12
5	Primate Neuroanatomy	12
6	Introduction to Human Evolution	15
7	Cranial Capacity	15
8	Human Neuroanatomy	15
9	Frontal Lobes	15
10	Parietal Lobes	15
11	Other Cortical Neuroanatomies and Asymmetries	15
12	Vascular Systems and Venous Sinuses	15
13	The Meningeal Arteries	15
14	Neural Networks	15
15	Digital Anatomy and Morphometrics	15
	<i>Graduate Student Term Paper</i>	70
TOTAL		210/280

As an **undergraduate** student, your final grade will be determined by the number of points that you receive out of a possible 210:

- A 189–210 Points
- B 168–188 Points
- C 147–167 Points
- D 126–146 Points
- F 000–125 Points

As a **graduate** student, your final grade will be determined by the number of points that you receive out of a possible 280:

- A 252–280 Points
- B 224–252 Points
- C 196–223 Points
- D 168–195 Points
- F 000–167 Points

Graduate Requirements

Research and write a short (3000–4000 word) paper on a topic related to Paleoneurology. Your specific topic should be developed through consultation with Professor Bruner (by email). Plan to use standard APA format, unless you negotiate a different format with Professor Bruner. We expect that you will consult at least 15 sources in addition to the regular course reading assignments.

The graduate paper is a short review article on a topic. This can be a specific fossil, or a general issue in paleoneurology. A brief exchange of information with the teacher can help you to orientate the choice. Some general guidelines and suggestions:

- This is a course in paleoneurology. Hence, the grad paper must be in paleoneurology. This is not a course in paleontology or archaeology. Therefore, paleontology and archaeology must only represent a general frame for your grad paper, not the main issues. The paper must be centered on endocranial anatomy, endocranial traits, functional craniology, and brain evolution.
- The teacher can help you to find references and literature, and to give a proper importance to the information that you find. Don't do everything by yourself!
- The final paper, possibly as a pdf file, should be organized according to a general structure: 1) An introduction to the issue; 2) Analytical or experimental evidences; 3) Hypotheses and perspectives; 4) References. The text should be approximately 10 pages, Times New Roman 11, interline spacing 1.5.

Extra Credit

Extra credit is not offered in this course.

Due Dates and Deadlines

The syllabus contains the deadline for each unit and specifies the dates by which the test must be completed. For each deadline, you have until 11:59 PM on the deadline day. Remember, these are DEADLINES. You are encouraged to stay well ahead of these deadlines. The sooner you complete the work, the sooner you'll be done with the course.

You must complete each unit by the specific date linked in the table above to the syllabus. Once that date has passed, you can still access the material in the unit, but you can no longer take the test associated with that unit. For example, if Unit 3 must be completed by Thursday, September 16, if you don't take Test 3 by 11:59 PM on September 16, you will receive a 0 for that test.

Dr. Bruner's Expectations of You

During completion of this course, you must abide by the UCCS Student Conduct Code. This code specifies what is considered proper and improper student conduct, including matters such as cheating and inappropriate behavior. Students who do not abide by the code can receive sanctions ranging up to expulsion from the university.

Remember that this is a 3 credit-hour course. Please plan on spending a lot of time working on just this class. This time will include reviewing lesson plans, completing online lectures, reading from your textbook, answering practice problems, verifying your work, and completing test. I suggest that you plan to spend at least 10 hours per week on average.

Of course, the amount of time spent does not guarantee you any particular grade. Your letter grade will reflect the amount of material that you learned, as reflected in your test scores and the overall quality of your contributions to the course.

Solving Technical Difficulties

When you're having technical difficulties (pages not loading, connectivity problems, not able to view images, things not working as they should, etc.), please contact the Blackboard Helpdesk toll-free at 877.654.8309 or online at the UCCS Blackboard Support page. The Blackboard Helpdesk is available 24 hours a day, 7 days a week. Please note this service is separate from the UCCS IT Helpdesk.

Help Understanding Course Material

When you have questions regarding course policies, grading criteria, test administration, etc., please post a question to the discussion forum or email your professor for assistance.