ANTH 362: HUMAN BIOLOGICAL VARIATION
Spring Quarter 2015
300 Villard MW 8:30-9:50 am
(4 Credit Hours; Satisfies SC & IP requirements)

Instructor: Dr. Josh Snodgrass (http://www.pinniped.net/snodgrass.html)
Office: 354 Condon (But, regular office hours @ Espresso Roma coffee shop on 13th)
Office Hours: Mon. & Wed. 10-11 & by appointment (@ Espresso Roma coffee shop on 13th)
Phone: 346-4823
E-mail: jjosh@uoregon.edu

Graduate Teaching Fellow (GTF): Josh Schrock
Office: Condon 366, cubicle white
Office Hours: TBA
E-mail: jschroc2@uoregon.edu

Prerequisite: ANTH 270, BI 213, BI 283H, or permission of the instructor

Course Description: Genetic and biological structure of human populations; population dynamics and causes of diversity; analysis of genetically differentiated human populations and their geographic distribution.

Extended Course Description: This is a science group satisfying course that examines key issues related to human biological variation with a focus on human adaptation and adaptability. This course examines genetic and phenotypic variation in contemporary human populations. It uses an evolutionary biocultural framework to understand how adaptation to various ecological stressors (e.g., temperature, solar radiation, altitude, and nutrition) promotes human biological diversity. In addition, the course focuses on how recent cultural changes (e.g., agriculture, industrialization, and urbanization) shape human variation and health, with an emphasis on chronic diseases such as obesity, cardiovascular disease, and diabetes. This course uses a scientific approach, drawing on the methods, theories, and bodies of knowledge from various scientific disciplines, including anthropology, evolutionary biology, human physiology, nutritional science, medicine, and epidemiology.

This course has three main sections:

Section 1 concentrates on describing human biological variation. This section begins with an historical overview of approaches to classifying human biological diversity. This includes a discussion of the rise and fall of the concept of "race" in anthropology, as well as the complex topic of racial differences in health. This section of the course also describes how genetic and environmental factors shape human skeletal variation, and discusses how knowledge of skeletal variation is used in applied fields such as forensic anthropology.

Section 2 focuses on understanding the factors that shape biological variation in contemporary human populations. This section of the course uses an evolutionary approach and, in particular, relies on life history theory and biocultural theory to understand the forces that shape variation within and between contemporary human groups. This section of the course also describes how genetic tools allow us to document evolutionary change and detect recent selection in human populations. Further, this section of

the course describes how specific environmental stressors, such as temperature, solar radiation, and hypoxia, shape contemporary human biological variation.

Section 3 focuses on selected topics in human biology research. This section of the course will examine the health effects of chronic psychosocial stress and human nutritional evolution.

Course Format: Lecture, in-class discussion, and required weekly laboratory sections.

Required Readings:
Assorted articles and book chapters (see below)

Expectations and Grading: Regular attendance at lectures and participation in discussions is required, as is attendance of laboratory sections. Grades are based on a midterm exam, final exam, in-class discussion participation, weekly lab exercises, lab section attendance, and submission of two short (2-3 page) response papers on discussion topics. ***Required readings are essential to passing exams, completing lab assignments, and participating in lab section activities. Further, the readings will help you get the most out of the course.***

Midterm Exam **(Wednesday, 4/29)**	25%
Final Exam **(Wednesday, 6/10 @ 10:15am)**	25%
In-Class Discussion Participation	10%
Response Papers for In Class Discussion Topics (2 @ 5% each)	10%
Lab Exercises (***Short*** lab write-ups of each lab)	20%
Lab Section Attendance	10%

Grades will be assigned as follows: A = 90-100%, B = 80-89%, C = 70-69%, D = 60-69%, F < 60% (with minus and plus grades assigned at appropriate cutoffs).

The grading system used in this course is as follows:

A – Outstanding performance relative to that required to meet course requirements; demonstrates a mastery of course content at the highest level.

B – Performance that is significantly above that required to meet course requirements; demonstrates a mastery of course content at a high level.

C – Performance that meets the course requirements in every respect; demonstrates an adequate understanding of course content.

D – Performance that is at the minimal level necessary to pass the course but does not fully meet the course requirements; demonstrates a marginal understanding of course content.

F – Performance in the course, for whatever reason, is unacceptable and does not meet the course requirements; demonstrates an inadequate understanding of the course content.

Exams and assignments must be taken/turned in at the scheduled time—**under no circumstances will make-up exams or assignment extensions be given without a documented excuse** (e.g., note from your doctor). If you will not be able to take an exam or turn in an assignment, you **must** notify me in advance (preferably by e-mail).

Midterm & Final Exams: The midterm and final exams will be based on lectures, readings, videos, and discussions, and will include objective (multiple choice & matching), fill-in-the-blank, short answer (2-3 sentences), and short essay sections (4-5 sentences). ***The final exam is cumulative***.

Lab Exercises: During the quarter, each student will write eight short (1-2 page) lab write-ups based on the exercises and questions from lab activities. Lab exercise write-ups are due in lab the following week. ***All lab sections are held on Wednesdays in Condon 368 and will be run by GTF Josh Schrock.***

Response Papers: During the quarter, each student will write **two** short (2-3 page) response papers on the discussion topic of the week (out of 4 choices—weeks 3, 5, 8, and 10). These response papers provide opportunities for discussion and critical analysis. These papers are only 2-3 pages long so writing should be concise and focused around a couple of main points. Response papers are due in class on the day of discussion. ***Whether you write a response paper for the week or not, your participation in the in-class discussions is an essential component of this course.***

Accommodations: Appropriate accommodations will be provided for students with documented disabilities. If you anticipate needing accommodations in this course, please make arrangements to meet with me soon.

Learning Objectives: After successful completion of this course, students will have an understanding of the following key issues:

- The history of the use of the term "race" in biological anthropology
- Why race is not a useful term for describing contemporary human biological variation
- How race is a sociocultural phenomenon that has biological consequences including for health
- How genetic and environmental factors shape human skeletal variation
- How knowledge of skeletal variation is used in applied fields such as bioarchaeology and forensic anthropology
- The difference between sex and gender, and an appreciation for how cultural factors contribute to gender diversity cross-culturally
- The pattern of global human genetic variation and how genomics provides us with the ability to document evolutionary change and detect recent selection in human populations
- How environmental stressors such as temperature, solar radiation, and hypoxia shape contemporary human biological variation
- The links between chronic psychosocial stress and disease, including the specific factors that influence how stress 'gets under the skin' to affect health
- How a political economy perspective helps explain the impact of social stratification on health
- The evolution of the human diet and how contemporary health problems are in part a consequence of the discrepancy between what we eat now and what our ancestors ate

Schedule & Readings:

Week	Date	Topics	Required Readings
1	3/30	**Course Overview & Requirements** **Setting the Stage**: Human Evolutionary Biology; Are Humans Still Evolving?	For Monday: 1) Stinson et al. 2012 2) Gibbons 2010 3) Tyson 2009
	4/1	**Historical Perspectives on Human Variation:** The Rise and Fall of the Race Concept **Lab 1: An Introduction to Craniometry, Anthropometry, & the Methods of Physical Anthropology** ***--Due in lab on 4/8--***	For Wednesday: Mielke et al. 2011 Ch. 1 **Lab resource:** **Antón & Snodgrass 2009**
2	4/6	**Human Skeletal Variation I**: Age, Sex, Stature, Identification of the Individual	For Monday: White 2005
	4/8	**Sex and Gender:** Sex vs. Gender—Vive la Différence; Sex, gender, & health; The sicker sex; Gender, performance, and sports; Gender diversity **Lab 2 (Video): *BBC Horizon—Are We Still Evolving?*** ***--Video questions do NOT get turned in--***	For Wednesday: 1) Sobo 2013 Ch. 11 2) Zuk 2007
3	4/13	**Human Skeletal Variation II**: Applied Skeletal Variation and the Concept of Race	For Monday: 1) Kennedy 1995 2) Ousley et al. 2009
	4/15	**Discussion: Describing human variation & Interpreting human skeletal variation** **Lab 3: Human Skeletal Variation (Age, Sex, and Stature); Applied Human Variation (Forensic Anthropology)** ***--Due in lab on 4/22--***	**For Wednesday's Discussion:** **Review week 1 & 2 readings;** **Optional Reading: Levy 2009**
4	4/20	**Human Evolutionary Biology Today**: Population Thinking & Biological Anthropology; Human Adaptation & Adaptability; Revisiting Race—Untangling Biology & Genetics	For Monday: 1) Frisancho 2010 2) Gravlee 2009 3) Kuzawa & Thayer 2013 + Optional Reading: Pitts 2014
	4/22	**Human Genetic Variation**: Genetics in Human Population Biology; Classic Markers & DNA Markers of Human Variation **Lab 4: Human Skeletal Variation (Race/Ancestry); Applied Human Variation (Forensic Anthropology)** ***--Due in lab on 4/29—***	For Wednesday: 1) Meier & Raff 2010 2) Steiper 2010

Week	Date	Topics	Required Readings
5	4/27 4/29 Lab 5: Video: *NOVA—Cracking Your Genetic Code* *--Video questions do NOT get turned in--*	**Discussion & Review—Revisiting Race—Untangling Biology & Genetics; Stress & Health; Developmental Origins of Health and Disease (DOHaD)** **Midterm Exam**	**For Monday's Discussion** **Review week 4 readings** **& Hartigan 2013** **No new readings for Wednesday**
6	5/4 5/6 Lab 6: Population Genetics *–Due in lab on 5/13—*	**Human Genetic Variation**: Genetics and the Concept of Race; Detecting Selection & How Humans Have Adapted; What Makes Humans Unique? **Heat Adaptation**: Heat Adaptation & Acclimatization; Hot-Dry vs. Warm-Humid Adaptations	For Monday: 1) Long 2013 2) Lee 2013 For Wednesday: 1) Brown 2010 2) Leonard & Katzmarzyk 2010
7	5/11 5/13 Lab 7: Body Size/Proportions; Cold Stress; Oxygen Saturation *--Due in lab on 5/20--*	**Climatic Adaptation:** Cold Stress; Conservation vs. Metabolic Strategies **Climatic Adaptation**: High Altitude; Hypoxia	For Monday: Snodgrass et al. 2007 For Wednesday: Brutsaert 2010
8	5/18 5/20 Lab 8: Symmetry, Strength, and Skin Reflectometry *--Due in lab on 5/27--*	**Climatic Adaptation**: Solar Radiation; Selection in High vs. Low Sunlight Environments **Discussion: Climatic Adaptation & Conducting Research on Human Population Biology**	For Monday: Mielke et al. 2011 (Ch. 12) **For Wednesday's Discussion:** **Leonard et al. 2009**
9	5/25 5/27 Lab 9: Biomarkers*--Due in lab on 6/3--*	**No Class—Memorial Day** **Psychosocial Stress:** What is Stress?; Acute vs. Chronic Stress; Adverse Social Environments; Biomarkers; Allostatic Load	For the week: 1) Ice & James 2012 2) Murray et al. 2006 3) Sobo 2013 Ch. 9
10	6/1 6/3 Lab 10: Human Energetics (Diet & Physical Activity) *--Due on date of the final--*	**Human Energetics:** Human Ecology & Nutritional Evolution; Paleolithic Nutrition; Economic Development and the Obesogenic Environment **Discussion: Energetics & Ecology; Stress**	For Monday: 1) Snodgrass 2012 **For Wednesday's Discussion:** **Review week 9 & 10 readings**
	6/10	**Final Exam (cumulative)** **Wednesday, June 10, 10:15-12:15am**	

Anthropology 362: Human Biological Variation (Spring 2015)

Required Course Readings

WEEK 1

For Monday:

- Stinson S et al. 2012. Human biology: An evolutionary and biocultural perspective (Ch. 1). In: Stinson S et al. (eds.) Human Biology: An Evolutionary and Biocultural Perspective. Wiley, pp. 3-22.
- Gibbons A. 2010. Tracing evolution's recent fingerprints. *Science* 329: 740-742.
- Tyson P. 2009. Are we still evolving? *Nova Online* (5 pages); http://www.pbs.org/wgbh/nova/evolution/are-we-still-evolving.html

For Wednesday:

- Mielke JH et al. 2011. Comprehending human biological diversity (Ch1) In: Human Biological Variation (2nd edition). Oxford U Press, pp. 3-22.

Lab resource:

- **Antón SC and Snodgrass JJ. 2009. Integrative Measurement Protocol for Morphological and Behavioral Research in Human and Non-Human Primates (Version 1.0). Available online from the Center for the Study of Human Origins, New York University and the Bones and Behavior Working Group Website (http://www.bonesandbehavior.org/protocol.pdf).**

WEEK 2

For Monday:

- White TD, Folkens PA. 2005. The skeletal biology of individuals and populations. In: The Human Bone Manual. Academic Press, pp. 360-418.

For Wednesday:

- Sobo EJ. 2013. Gender diversity (Ch. 11). In: Dynamics of Human Biocultural Diversity: A Unified Approach. Walnut Creek, CA: Left Coast Press, pp. 233-262.
- Zuk M. 2007. The sicker sex (Chapter 6). In: Riddled with Life: Friendly Worms, Ladybug Sex, and the Parasites that Make Us Who We Are. Harcourt Press. pp. 123-141.

WEEK 3

For Monday:

- Kennedy KAR. 1995. But professor, why teach race identification if races don't exist? *J Forensic Sci* 40: 797-800.
- Ousley S et al. 2009. Understanding race and human variation: Why forensic anthropologists are good at identifying race. *American Journal of Physical Anthropology* 139: 68-76.

For Wednesday's Discussion:
Review week 1 & 2 readings

Optional Reading:
Levy A. 2009. Either/Or: Sports, sex, and the case of Caster Semenya. The New Yorker, Nov. 30.

WEEK 4

For Monday:

- Frisancho AR. 2010. The study of human adaptation (Ch. 2). In: Muehlenbein MP (ed.) Human Evolutionary Biology. Cambridge. pp. 17-28.
- Gravlee CC. 2009. How race becomes biology: Embodiment of social inequality. *American Journal of Physical Anthropology* 139: 47-57.
- Kuzawa CW, Thayer ZM. 2013. Toppling typologies: Developmental plasticity and the environmental origins of human biological variation. In: Hartigan J (ed.) Anthropology of Race: Genes, Biology, and Culture. Santa Fe: School of Advanced Research, pp. 43-56.

  Optional Reading:
  Pitts L. 2014. White poverty exists, ignored. *Miami Herald*, Oct. 5.

For Wednesday:

- Meier RJ, Raff JA. 2010. Genetics in human biology (Ch. 4). In: Muehlenbein MP (ed.) Human Evolutionary Biology. Cambridge. pp. 48-73.
- Steiper ME. 2010. DNA markers of human variation (Ch. 14). In: Muehlenbein MP (ed.) Human Evolutionary Biology. Cambridge. pp. 238-264.

WEEK 5

For Monday's Discussion
Review week 4 readings

Optional Reading:
Hartigan J. 2013. Conclusion: Anthropology of race. In: Hartigan J (ed.) Anthropology of Race: Genes, Biology, and Culture. Santa Fe: School of Advanced Research, pp. 187-198.

No new readings for Wednesday—Midterm Exam

WEEK 6

For Monday:

- Long JC. 2013. The aimless genome. In: Hartigan J (ed.) Anthropology of Race: Genes, Biology, and Culture. Santa Fe: School of Advanced Research, pp. 169-186.
- Lee SS. 2013. The political economy of personalized medicine, health disparities, and race. In: Hartigan J (ed.) Anthropology of Race: Genes, Biology, and Culture. Santa Fe: School of Advanced Research, pp. 151-168.

For Wednesday:

- Brown DE. 2010. Human adaptability to physical stressors (Ch. 11). In: Human Biological Diversity. Pearson. pp. 201-225.
- Leonard WR, Katzmarzyk PT. 2010. Body size and shape: Climatic and nutritional influences on human body morphology (Ch. 10). In: Muehlenbein MP (ed.) Human Evolutionary Biology. Cambridge: Cambridge University Press, pp 157-169.

WEEK 7

For Monday:

- Snodgrass JJ, MV Sorensen, LA Tarskaia, WR Leonard. 2007. Adaptive dimensions of health research among indigenous Siberians. *American Journal of Human Biology* 19: 165-180.

For Wednesday:

- Brutsaert TD. 2010. Human adaptation to high altitude (Ch. 11). In: Muehlenbein MP (ed.) Human Evolutionary Biology. Cambridge: Cambridge University Press, pp 170-191.

WEEK 8

For Monday:

- Mielke JH et al. 2011. Pigmentation (Ch. 12). In: Human Biological Variation (2nd Edition). Oxford U Press: Oxford, p. 291-313.

For Wednesday's Discussion:
Review week 6-8 readings AND read:

- **Leonard WR et al. 2009. Health consequences of social and ecological adversity among indigenous Siberian populations: Biocultural and evolutionary interactions. In: C. Panter-Brick & A. Fuentes (eds.) Health, Risk, and Adversity: A New Synthesis from Biological Anthropology. Berghahn Books. pp. 26-51.**

WEEK 9

For the week:

- Ice GH and James GD. 2012. Stress and human biology (Ch. 10). In: Stinson S et al. (eds.) Human Biology: An Evolutionary and Biocultural Perspective. Wiley, pp. 459-511.
- Murray CJL, Kulkarni SC, Michaud C, Tomijima N, Bulzacchelli MT, Iandiorio TJ, Ezzati M. 2006. Eight Americas: Investigating mortality disparities across races, counties, and race--Counties in the United States. *PLoS Medicine* 3(9): e260. DOI: 10.1371/journal.pmed.0030260.
- Sobo EJ. 2013. Political economy of variation in human health (Ch. 9). In: Dynamics of Human Biocultural Diversity: A Unified Approach. Walnut Creek, CA: Left Coast Press, pp. 185-205.

WEEK 10

For Monday:

- Snodgrass JJ. 2012. Human energetics. In: Stinson et al. (eds.) Human Biology: An Evolutionary and Biocultural Approach (2nd Edition). New York: Wiley. pp. 327-386.

For Wednesday's Discussion:
Review week 9 & 10 readings