

Advanced Topics in Educational Neuroscience (BEP-671)

College of Education, The University of Alabama

Instructor: Firat Soylu

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Room: Carmichael Hall 109

Meeting Time: Thursdays, 3:00pm – 5:50pm

Office hours: By appointment

Office: Carmichael Hall 307B

Course Description

The purpose of this course is to explore advanced topics in educational and cognitive neuroscience and to provide students with a deeper understanding of how cognition emerges from the interaction of the body, the brain and the environment. Topics covered include brain evolution, development, genetics, plasticity and connectivity.

Course Objectives

- Students will explore the advanced topics in educational and cognitive neuroscience
- Students will compare and contrast various cognitive neuroscience research methodologies.
- Students will discuss implications of empirical work on brain function, structure, connectivity, and evolution for learning, and educational research and practice.
- Students will synthesize, criticize and interpret empirical work and theoretical perspectives in a specific domain of their choice that relate to their research interests and future research agenda.
- Students will formulate ideas for future empirical research in their field of study that incorporate findings, perspectives and methodology covered in the course.

Prerequisites

BEP 570 - Foundations of Educational Neuroscience is a prerequisite for this course. Students who have a background in cognitive neuroscience or educational neuroscience can take this course without taking BEP 570 with the instructor's approval.

Overview of Weekly Themes

1. Evolution of Brain and Cognition
2. Embodied, Grounded, and Enactive Cognition
3. Simulation Theories of Cognition
4. Sensory-Motor Integration
5. Vision and Brain
6. Neuroplasticity and learning
7. Development & the Brain
8. Genetics for education
9. Introduction to Connectivity and Brain Networks
10. Networks Measures and Architectures
11. Brain Networks: Structure and Dynamics
12. Networks for Cognition
13. The Default-Mode Network
14. Brain, Body and Environment
15. Human Connectome

Course Activities

Weekly Readings & Reflections

You are expected to read all weekly readings. There are also some optional recommended readings. Most of the weekly readings will be chapters from the textbooks, which are all available as pdf ebooks from the library. We will also read some select review and primary research articles.

You will write a reflection about each week's readings that will synthesize ideas readings for the week and post these on the forum for that week in Blackboard. You are expected to submit your reflections by 6 pm the day before the class (Wednesday). The title of your reflection should be concise and should summarize the main theme of your reflection (e.g., Language evolution parallels changes in brain structure). At the end of your reflection you will pose two discussion questions to be covered in class. The discussion questions should be in a separate paragraph and in bold-text, so that viewers of your post can quickly spot your questions for the week.

Discussion Leader

Every week one student will act as a discussion leader. The discussion leader will organize and refine the discussion questions posted on Blackboard. At the beginning of each class the discussion leader will provide an overview of the readings for the week, will lead the discussion based on the discussion questions posted. It is imperative that the discussion questions are posted by 6pm the day before the class so that the discussion leader has enough time before the class to prepare the discussion questions.

Project

The project is an opportunity to delve deeper into a topic you are interested in. You will (1) synthesize the literature about a specific cognitive phenomenon, brain mechanism,

disorder, or area of research of your choice, (2) provide a reflection on the implications of the research covered for educational theory and learning design practice, and (3) formulate ideas for future educational research. The final paper for the project can be structured as a literature synthesis, opinion paper, theoretical paper, or a research grant proposal.

There are four deliverables for the course project:

(a) Proposal: By the fourth week of the class you will submit a proposal for your project that explains the topic you will focus on, why this topic is important and the format you would like to use (e.g., theoretical paper). We will have a one-to-one meeting to discuss your project ideas. The proposal will also have a tentative bibliography showing the body of work you will cover in your paper.

(b) Proposal presentation: You will give a 15-min presentation to introduce your project and to get feedback from the class.

(c) Poster session: We will have a poster session at the end of the semester where students present their projects to the educational neuroscience community in the campus.

(d) Final paper: You will submit a 5000 to 8000 words paper based on your proposal.

Grading	
Readings and reflections 4 pts each week (1 pt for the reflection title, 2 pts for the reflection, 1 pt for the discussion question). You can miss up to two reflections without losing points.	4 x 13 = 52 pts
Proposal	10 pts
Proposal presentation	5 pts
Poster Presentation	5 pts
Final paper	30 pts
Total	102 pts

Grading scale: A: 90 - 100, B: 80 - 89, C: 70 - 79, D: 60 - 69, F: 0 - 59

Textbooks

The textbooks are available full-text as ebooks from the library.

Sporns, O. (2011). *Networks of the brain*. MIT press.

Glickstein, M. (2014). *Neuroscience: A Historical Introduction*. MIT Press.

Disability Statement

If you are registered with the Office of Disability Services, please make an appointment with me as soon as possible to discuss any course accommodations that may be necessary.

If you have a disability, but have not contacted the Office of Disability Services, please call (205) 348-4285 (Voice) or (205) 348-3081 (TTY) or visit 133-B Martha Parham Hall East to register for services. Students who may need course adaptations because of a disability are welcome to make an appointment to see me during office hours. Students with disabilities must be registered with the Office of Disability Services, 133-B Martha Parham Hall East, before receiving academic adjustments.

The Code of Academic Conduct

All students in attendance at the University of Alabama are expected to be honorable and to observe standards of conduct appropriate to a community of scholars. The University expects from its students a higher standard of conduct than the minimum required to avoid discipline. Academic misconduct includes all acts of dishonesty in any academically related matter and any knowing or intentional help or attempt to help, or conspiracy to help, another student. The Academic Misconduct Disciplinary Policy will be followed in the event of academic misconduct.