

**Human Brain Imaging
EDP 382E (10940)**

Spring 2017
SZB 444, Friday 9:00 a.m. – 12:00 p.m.

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Course Description

This course is designed to provide a foundation in the brain imaging basics necessary to enable neuropsychologists to more competently interpret and use brain imaging information in clinical practice. It will provide an understanding of what brain imaging can and cannot provide to clinicians. The course will gradually build on a basic clinical and anatomical foundation and then progress to more technical knowledge regarding specific brain imaging techniques. We will ultimately review the application of brain imaging within a variety of traumatic and non-traumatic clinical contexts. The course is roughly divided into three sections. The first section will provide an overview of general issues related to brain imaging and strategies for viewing and interpreting images of the brain, as well as a review of neuroanatomy within a neuroimaging context. The second section will cover specific brain imaging techniques and methods, including structural, functional, and “hybrid” approaches to imaging the human brain. The emphasis of the third section will be the clinical application of brain imaging as it relates to a variety of brain pathologies and conditions. This will include descriptions of the type and severity of brain pathology, functional deficits or limitations exhibited by the patients, and outcomes following treatment. Class time will be devoted to lecture and discussion of assigned readings and student presentations. It is expected that you will complete assigned readings prior to class and be prepared to discuss relevant topics.

Course Objectives

Full participation in this course will achieve the following goals:

- Students will develop an understanding of the basic differences between the various types of brain scans.
- Students will develop skills in viewing and interpreting brain images.
- Students will learn to differentiate features on an image that are clinically meaningful from those that are irrelevant or artifact.
- Students will build on existing knowledge of brain anatomy to understand how to identify key anatomical features in brain images.

- Students will develop an understanding of how various brain pathologies and conditions appear in structural, functional, and hybrid brain images.

Required Textbook and Materials

1. Lebbby, Paul C. (2013). *Brain Imaging: A Guide for Clinicians*. Oxford University Press.
2. Additional articles and readings will also be assigned. Copies of these articles will be made available on Canvas.

Activities and Expectations

1. *Professionalism, Punctuality, and Participation*

Professionalism. Professionalism includes such things as: establishing and maintaining positive relationships and interactions with peers, colleagues, instructors, and patients; attending respectfully to others who are sharing information with the class; being flexible and understanding in response to changes in the class syllabus, etc. Examples of behaviors likely to result in a loss of professionalism points might include: sleeping in class, doing work that is unrelated to the course in class, talking excessively to your neighbor during lectures, presentations, or when a classmate is asking a question, and making negative or derogatory comments about others. Please ensure that cell phones are turned off prior to entering the classroom, as phone calls during class are generally disruptive to the instructional activities of the class. The use of laptop computers in class should be restricted to taking notes or other class-related uses only.

Punctuality. Attendance and punctuality are key components of overall professionalism. Despite the challenges of traffic and the juggling of personal and professional schedules, it is an expectation for this course that students will attend every class meeting and will arrive to class on time. Attendance in this class is particularly critical to mastering the course objectives. If an absence is expected, students should inform the professor *in advance* of the reason for the absence.

Participation. Students are expected to fully participate in all class activities, including lectures, discussions, and collaborative learning activities. Student participation and discussion is a critical element of the course. Students are expected to come to class well prepared to engage in scholarly discourse about the day's scheduled subject matter.

2. *Student Presentations*

In select weeks through the semester, students will be responsible for a portion of the lecture and will lead discussion of their assigned topic. The student will assign an additional class reading for the day and lead discussion of the reading.

3. *Examination*

In order to ensure an understanding of course materials, a mid-term examination will be administered.

4. *Clinical Research Study Proposal*

At the end of the course, each student will propose a brain imaging clinical research study of a disease/disorder/condition of interest. Students will write a paper describing the study and they will present the study proposal on the final day of class.

Grading Procedures

<u>Activity</u>	<u>Points</u>
Punctuality, Participation, & Professionalism	20
Mid-term Examination	20
Class Presentation.....	20
Study Proposal Paper	20
Study Proposal Presentation.....	20
TOTAL	100

Grade Assignment

93 – 100%	A	77 – 79%	C+
90 – 92%	A-	73 – 76%	C
87 – 89%	B+	70 – 72%	C-
83 – 86%	B	60 – 69%	D
80 – 82%	B-	Below 60%	F

Course Schedule: This represents current plans. As we go through the semester, these plans may change. Any such changes will be communicated clearly.

<u>Date</u>	<u>Class Topic</u>	<u>Readings</u>
1/20	Course Overview	
1/27	The Clinical Application of Brain Imaging	Chapter 1
2/3	NO CLASS (International Neuropsychological Society Meeting & School Psychology Interview Day)	
2/10	Viewing and Interpreting Brain Scans	Chapter 2
2/17	Imaging-Based Neuroanatomy	Chapter 3
2/24	Static and Hybrid Brain Imaging Approaches	Chapter 4
3/3	Functional Brain Imaging	Chapter 4
3/10	<i>Mid-term Examination</i>	
3/17	SPRING BREAK	
3/24	Traumatic Brain Injury	Chapter 5
3/31	Stroke	Chapter 6
4/7	Tumor	Chapter 6
4/14	Degenerative and Demyelinating Diseases	Chapter 6
4/21	Neurodevelopmental Disorders	Chapter 6
4/28	TBA	
5/5	<i>Study Proposal Presentations</i>	