

**Course:** “The brain in health and disease”

**Course Number** \_\_\_\_\_

Department:	Neurosurgery
Faculty Coordinator:	Bradley Lega
Asst. Fac. Coordinators:	
Hospital:	N/A, Remote, on line
Periods Offered:	Block 10...
Length:	4 weeks
Max # of Students:	30
First Day Contact:	Remote, on line
First Contact Time:	TBD
First Day Location:	Remote, on line
Prerequisites:	successful completion of Brain and Behavior

**Course Description:** This didactic course is designed to be an extension of brain and behavior, with a more in depth examination of functional brain anatomy and its relationship to disease.

**Course Objectives:**

1. The student will develop a basic understanding of brain networks underlying cognition, including memory and executive function.
2. The student will be able to define basic principles of pathological network activity as it relates to epilepsy, including the concept of the epileptogenic and symptomatogenic zone.
3. The student will be able to describe basic principles underlying tools for investigating brain physiology such as EEG, fMRI, and MEG.
4. The student will apply knowledge of cranial nerve anatomy to diseases affecting these structures.
5. The student will describe neurovascular anatomy including and apply that knowledge to pathological neurovascular conditions.

objectives	<i>describe activities that will support how objectives are to be achieved</i>	<i>Assessment methods (explain how student will be evaluated)</i>
<p><b>Medical knowledge:</b></p> <ol style="list-style-type: none"> <li>1. The student will develop a basic understanding of brain networks underlying cognition, including memory and executive function. (EPO 2.01)</li> <li>2. The student will be able to define basic principles of pathological network activity as it relates to epilepsy, including the concept of the epileptogenic and symptomatogenic zone. (EPO 2.01)</li> <li>3. The student will be able to describe basic principles underlying tools for investigating brain physiology such as EEG, fMRI, and MEG. (EPO 2.02)</li> <li>4. The student will apply knowledge of cranial nerve anatomy to diseases affecting these structures. (EPO 2.01)</li> <li>5. The student will describe neurovascular anatomy including and apply that knowledge to pathological neurovascular conditions. (EPO 2.01)</li> </ol>	<p>Lectures Case Conferences</p> <p>To be delivered remotely</p>	<p>Attendance at case conferences</p> <p>Students will identify an outstanding issue or controversy for one of the topics presented during the previous week. Write a specific aims page for a grant proposal seeking to investigate this question. Students will provide a separate sheet with at least five references and incorporate in text citations and include 2-3 aims in this case.</p>

<b>Interpersonal and communication skills:</b> Students will participate in online sessions. (EPO 3.01, 3.02)	.	Observations of faculty and staff
<b>Professionalism:</b> Students will complete all required assignments and maintain appropriate standards of etiquette when conferencing remotely. (EPO 4.01)		Observations of faculty and staff

#### Course schedule/structure

##### I. Brain networks in health

- A. Memory I - the hippocampus - LEGA/PFEIFFER
- B. Memory II - temporal and extra temporal memory systems (working memory, entorhinal cortex, temporal lobe anatomy) - LEGA
- C. Introduction to cognitive networks (fronto-parietal control network, salience network, cingula-opercular network - RUGG/HILL/
- D. What is the insula? PERVEN
- E. Reward systems, including SN, basal ganglia, OFC NOT SURE YET

Case conference - temporal lobe epilepsy - Lega  
Case conference - temporal lobe epilepsy 2 - Lega  
Case conference - TBD

##### II. Brain networks in disease

- A. What is neuropsychology and how employed in epilepsy? DENNEY/NEUROPSYCH
- B. Focal epilepsy with focus on semiology/the seizure network PERVEN
- C. Generalized epilepsy/genetics EPILEPTOLOGIST 2
- D. How do epilepsy drugs function? DR DAVE/DR HARVEY?
- E. Stimulation mapping in surgery DR ABDULLAH/PATEL/GARZON

Case conference - post surgical cognitive rehab - JASON SMITH – CONFIRMED!  
Case conference - Glioma - GARZON/ABDULLAH/PATEL  
Case conference - some kind of unusual epilepsy - DAVE/ALICK/FELLOW

### III. Techniques to better understand the brain

- A. EEG - MIKE BALL
- B. fMRI - DING
- C. MEG - DR DAVENPORT
- D. MRI beyond T<sub>1</sub> and T<sub>2</sub> - DR YETKIN
- E. DTI - DR ABDULLAH/PATEL/GARZON

Case conference - The utility of MEG - Davenport

Case conference - DTI for tumors - ABDULLAH/GARZON/PATEL

Case conference - – EPlanning a SEEG - LEGA

### IV. Cranial nerves in disease

- A. Vascular compression syndromes - DR WHITE/GARZON/BARNETT
- B. A closer look at the optic nerve including surgical approaches - GARZON/WHITE/BARNETT/WELCH/JUN
- C. Cochlear implants - KUTZ OR FELLOW
- D. The facial nerve including reanimation - GARZON/BARNETT
- E. Hydrocephalus, 6th nerve palsy, maybe including shunts and ETV - WHITTEMORE/WEPRIN/PRICE

Case conference - pediatric hydrocephalus case

Case conference - skull base tumor 1

Case conference - skull base tumor 2

### V. A closer look at blood vessels in the brain

- A. Vascular anatomy - what goes where to feed what beyond (MCA/ACA)? JUN/FELLOW
- B. Moya-Moya - WELCH/BATJER/WHITE/JUN
- C. What is an AVM? - BATJER/WHITE/WELCH
- D. What is an aneurysm? - WHITE/WELCH
- E. What is a cavernoma? - WHITE/WELCH

Case conference - approach to some vascular lesion 1

Case conference - approach to some vascular lesion 2

Case conference - approach to some vascular lesion 3

**Method of evaluation of students** Evaluation based on assessment methods listed above, grade is Pass/Fail

Completion of Group activity

Participation in the group discussion or presentations.