**SLPA 856: Neuroimaging & Language Development**

**Fall/2022**

**Program Affiliation:** Special Education and Communication Disorders

**Class Meetings:** Monday 5 – 6:40 P.M., in B60 suite of CB3 (City Campus)

**Credit:** 2 – 3 credits

**Instructor:**  Yingying Wang, Ph.D. (cell: 531-289-8089)

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Office hours by appointment, schedule via email

Office: C67 East Stadium, 402-472-0106

**Course Description**

1. Understand the characteristics of different brain techniques.
2. Provide hands-on experience with analyzing various brain imaging data.
3. Demonstrate critical thinking through evaluating current literature on neuroscience research related to reading impairments.
4. Formulate hypotheses of a research topic by choice and develop research strategies to test hypotheses.
5. Master research design and methods in the context of brain imaging research.

**Course Prerequisites**

None. Graduate students not from SLP, Psychology, Educational Psychology, or related fields shall check with me before enrolling in the course.

**Course Objectives**

This course is a graduate-level seminar course and is designed to train students from diverse backgrounds to understand the characteristics of various types of brain imaging techniques and their applications in the field of communication disorders. This seminar course aims to introduce six neuroimaging techniques, including functional Magnetic Resonance Imaging (fMRI), MRI, functional Near-InfraRed spectroscopy (fNIRS), Magnetoencephalography (MEG), Electroencephalogram (EEG), and Diffusion-Weighted Imaging (DWI). Students will have hands-on experience with some brain imaging data and learn how to analyze different types of brain imaging data. Through interactive discussion and literature review, students will practice how to generate neuroscience questions in their research fields of interest and apply appropriate brain imaging techniques to answer their research questions. The overall goal is to broaden graduate students’ interests in brain research and encourage them to apply brain imaging techniques to research in their fields of interest.

**Rationale Statement**

This course is an elective course in the speech-language pathology (SLP) graduate degree to broaden those who are interested in both language and literacy to have foundation knowledge about language and reading development. It is also listed in the course list for [educational neuroscience certification](https://www.unl.edu/gradstudies/academics/programs/EDNR-GCER). Thus, it is also open to students from other graduate degrees such as Psychology, Educational Psychology, or related fields, who are interested in obtaining their [educational neuroscience certification](https://www.unl.edu/gradstudies/academics/programs/EDNR-GCER).

# 2 or 3 Credit Hours

This course offers 2 or 3 credits. Those students who choose three credits will be assigned some additional reading materials and complete additional three quizzes. I will provide direct instructions on how to use additional reading materials and debrief each quiz. Each quiz is worth 50 points. The quizzes will be timed and open-book quizzes that test students’ critical thinking skills related to the additional assigned reading materials.

**Competency Assignment for Professional Organization (ASHA)**

This course is an elective course for SLP graduate students and is also open to other graduate students who have interests in brain imaging techniques. Therefore, the core competencies for ASHA are not tracked for this course. However, SLP graduate students will be engaged with knowledge competencies related to integrating research principles into evidence-based clinical practice.

**Teaching/Learning Methods**

The format of this class will be a mix of lectures, discussions, and labs.

**Readings Assignments**

There is no required text for this course. However, you are encouraged to own some books from the list of recommended reading materials and read journal articles from this list of recommended professional journals.

**Recommended Reading Materials**

* Penny, W. D., Friston, K. J., Ashburner, J. T., Kiebel, S. J., & Nichols, T. E. (Eds.). (2011). *Statistical parametric mapping: the analysis of functional brain images*. Elsevier. ISBN-13: 978-0123725608.
* Carter, M., Shieh, J., (Eds.). (2015). *Guide to Research Techniques in Neuroscience*. Second Edition, Elsevier, ISBN-13: 978-0128005118.
* Passingham, R. E., & Rowe, J. B. (2016). *A short guide to brain imaging: The neuroscience of human cognition*. Oxford University Press, USA. ISBN-13: 978-0198709138.

**Recommended Professional Journals**

* Brain
* Brain Research
* Cerebral Cortex
* Human Brain Mapping
* NeuroImage

**Technology/Material/Equipment Requirements**

MATLAB Installation on your laptop. If you don’t have MATLAB installed on your computer, I highly encourage you to get MATLAB installed.

**Course Requirements**

1. Class Discussions (total points: 10 x 8 = 80)

For each class discussion, you may work in a team or on your own based on the class enrollment. You or your team will be assigned to a peer-reviewed journal article. You or your team will read the article and prepare to lead the discussion. There will be eight in-class discussion sessions. Each discussion is worth 10 points. You will be graded based on your participation and responses to the in-class discussions.

1. Neuroimaging Lab Sessions (total points: 50 x 4 = 200)

You will watch pre-recorded instructions for each lab. During the lab session, you are expected to complete the lab on your own. I will be there to answer any questions. You will be graded based on your preparation and completion of the hands-on lab sessions. There will be four lab sessions. There are 50 points for each session and a total of 200 points.

1. Take-home Mid-term Exam (points: 100)

You will take a timed quiz for the mid-term exam. The exam will evaluate your foundational knowledge learned from the class. This is a timed and open-book exam.

1. Final written product (points: 200)

The student will pick a research topic on their own and write a research proposal to lay out the research hypotheses and plan (minimum page requirement: 4).

1. Classroom participation (points: 10 x 4 = 40)

Classroom participation is not only attendance but also engagement. Students are expected to attend all classes and participate in the in-class discussions. Attendance will be taken each week, and attendance records will be considered when assigning a final course grade. Perfect attendance and actively participating in class discussions will get 40 points. Absence without 24-hour advance written notice will result in a point deduction.

1. Quizzes (points: 50 x 3 = 150)

This item is only applied to those students who choose the 3-credit hours for this class. The three quizzes will be timed and open-book quizzes aiming to test students’ critical thinking skills related to the additional assigned reading materials.

The grading scale is as follows:

Grading Criteria

|  |  |  |  |
| --- | --- | --- | --- |
| Grade | Grade (%) | Total points (620)  For 2-credit students | Total points (770)  For 3-credit hours |
| A | 92.50-100% | 573.5 – 620.0 | 712.3 – 770.0 |
| A- | 90.00-92.49% | 558.0 – 573.4 | 693.0 – 712.2 |
| B+ | 87.50-89.99% | 542.5 – 557.9 | 673.8 – 692.9 |
| B | 82.50-87.49% | 511.5 – 542.4 | 635.3 – 673.7 |
| B- | 80.00-82.49% | 496.0 – 511.4 | 616.0 – 635.2 |
| C+ | 77.50-79.99% | 480.5 – 495.9 | 581.3 – 615.9 |
| C | 72.50-77.49% | 449.5 – 480.4 | 596.8 – 581.2 |
| C- | 70.00-72.49% | 434.0 – 449.4 | 539.0 – 596.7 |
| D+ | 67.50-69.99% | 418.5 – 433.9 | 519.8 – 538.9 |
| D | 62.50-67.49% | 387.5 – 418.4 | 481.3 – 519.7 |
| D- | 60.00-62.49% | 372.0 – 387.4 | 462.0 – 481.2 |
| F | Below 60.00% | Below 372.0 | Below 462.0 |

**Class Expectations**

1. Students are responsible for all information presented in class as well as independent analysis of information from the readings directly.
2. Learning outside the classroom is essential to enhance your in-class learning experience. Plan to work 4-9 hours per week outside of class to read texts. Readings will not always be discussed in class. However, you are responsible for knowing the information contained in the readings and class lectures.
3. Examinations, course handouts, and course PowerPoint slides will be in electronic form on Canvas.
4. All written assignments will follow the guidelines contained in the publication manual of the American Psychological Association (APA): <http://www.apa.org/books/4200061.html>
5. If you need extra help communicating your thoughts in written form (i.e., writing a paper), you may wish to consult the writing center on campus. The University of Nebraska-Lincoln Writing Center can provide you with meaningful support as you write for this class as well as for every course in which you enroll. Trained peer consultants can talk with you as you plan, draft, and revise your writing. Please check the [Writing Center website](http://www.unl.edu/writing) for locations, hours, and information about scheduling appointments.

**Tentative Schedule of Course Topics and Readings**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Week** | **Topic** | **Readings** | **Due** |
| 8/22 | 1 | Introduction, Brain, and MRI | Syllabus | **Please complete this online form by 8/24**: <https://forms.gle/73ZoTsjgf77k3uCr8> |
| 8/29 | 2 | MRI and DWI | Assigned | N/A |
| 9/5 | 3 | No Class | | |
| 9/12 | 4 | Lab #1 | Assigned | Quiz #1 Due 9/12 11:59 P.M. |
| 9/19 | 5 | fMRI and fNIRS | Assigned | N/A |
| 9/26 | 6 | Lab #2 | Assigned | Quiz #2 Due 10/4 11:59 P.M. |
| 10/3 | 7 | EEG and MEG | Assigned | N/A |
| 10/10 | 8 | Lab #3 | Assigned | **Mid-term Exam (take-home)**  **Due by 10/11 5 p.m. (Central Time)** |
| 10/17 | 9 | No Class | | |
| 10/24 | 10 | Lab #4 | Assigned | N/A |
| 10/31 | 11 | Research Design | Assigned | Quiz #3 Due 10/31 11:59 P.M. |
| 11/7 | 12 | In-class discussion | Assigned | N/A |
| 11/14 | 13 | Research Methods | Assigned | N/A |
| 11/21 | 14 | In-class discussion | Assigned | N/A |
| 11/28 | 15 | Research Proposal | Assigned | N/A |
| 12/5 | 16 | In-class discussion | Assigned | **Please complete this online form by**  **12/9:**  <https://forms.gle/RMwK92c3nvKY1P599>  **Final Due: 12/14 5 p.m. (Central Time)** |

***Readings:*** Assigned: this means there will be assigned reading materials on canvas. Students who choose 3-credit hours will have additional assigned reading materials.

**Use of Cell phone and Laptop During Class**

Cell phones must be turned off or in silent mode during class. Students are not allowed to call, text, or surf during class. If you need to take an emergency call or text, you need to leave the class and return when finished. Laptops must be turned off or in silent mode during class. Laptops can only be used to take notes.

**Copies of Work**

It is recommended that students make a copy of any submitted assignments they turn in to the instructor as a record and a backup of their work.

**Sharing Course Materials**

Examinations, course handouts, and course PowerPoint slides may not be posted on electronic websites or shared with other people without the written consent of the instructor. Posting or otherwise sharing copies of examinations from this class is not permitted.

**Class Attendance Policy**

You are expected to attend all classes in person and keep up with the class information if absent. Attendance will be taken in each class. If you can’t make it to the class, you should contact the instructor 24 hours in advance to get written permission. If 24-hour notice is not given, you will get a four-point reduction for your attendance. If there is a medical or another significant emergency which keeps you from attending the class without 24-hour notice, I may ask for documentation (e.g., doctor’s note, police report).

If you believe you have been exposed to the coronavirus or feel sick with any of the symptoms of COVID-19, [get tested](https://covid19.unl.edu/saliva-testing). Visit <https://covid19.unl.edu/health-safety> for more information. Follow [quarantine protocols](https://covid19.unl.edu/quarantine-information-students) to prevent spreading any potential illness to others. You should contact me and discuss any needs you may have during the self-quarantining period. I will provide you with course recordings. You will not get the point reduction for your attendance during this period.

**Academic Honesty Policy**

As a student at the University of Nebraska, you are a member of an academic community in which academic integrity and responsible conduct are essential for the community to function. To ensure that students know what is expected of them, the University has adopted Standards of Academic Integrity and Responsible Conduct. [You can find the University-wide standards for academic integrity and responsible conduct online.](https://studentconduct.unl.edu/student-code-conduct#sectionii) Your instructor may have specified on their syllabus additional expectations and consequences for academic dishonesty that apply to their class.

**Services for Students with Disabilities**

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience barriers based on your disability (including mental health, chronic or temporary medical conditions), please let your instructor know immediately so that you can discuss options privately. To establish reasonable accommodations, your instructor may request that you register with [Services for Students with Disabilities](https://www.unl.edu/ssd/). If you are eligible for services and register with the office, make arrangements with your instructor as soon as possible to discuss your accommodations so they can be implemented in a timely manner. SSD is located in 117 Louise Pound Hall and can be reached at 402-472-3787.

If you are a student on the UNO campus, you may register for accommodations at the [Accessibility Services Center](https://www.unomaha.edu/student-life/accessibility/index.php), which is located at 104 H&K Building and can be reached by calling 402-554-2872.

**Mental Health and Well-Being Resources**

UNL offers a variety of options to students to aid in dealing with stress and adversity. [Counseling and Psychological & Services](https://caps.unl.edu/) is a multidisciplinary team of psychologists and counselors that works collaboratively to help you explore your feelings and thoughts and learn helpful ways to improve your mental, psychological and emotional well-being when issues arise. CAPS can be reached at 402-472-7450.

[Big Red Resilience & Well-Being](https://resilience.unl.edu/) provides one-on-one coaching to any student who wants to enhance their well-being. Trained well-being coaches help students create and be grateful for positive experiences, practice resilience and self-compassion, and find support as they need it. BRRWB can be reached at 402-472-8770

On the UNO campus, the [Counseling and Psychological Services](https://www.unomaha.edu/student-life/wellness/counseling-and-psychological-services/index.php) (CAPS) office can be reached at 402-554-2409. The [UNO Wellness Center](https://www.unomaha.edu/student-life/wellness/index.php) provides a variety of wellness resources and can be reached by calling 402-554-2539.

**Final Exam Schedule (15th Week Policy)**

Final examinations for full semester classes are to be given ONLY at the regularly scheduled time as listed on the [Final Exam Schedule webpage](https://registrar.unl.edu/academic-calendar/final-exam/) or at another time DURING FINALS WEEK mutually agreeable to all concerned — i.e., the professor(s)/instructor(s) for a given course/course section as well as all students enrolled in that course/course section.

The only examinations that may be given during the last week (15th week) of classes are: laboratory practical examinations; make-up or repeat examinations; or self-paced examinations. However, the following must be applied: Projects, papers, and speeches scheduled for completion during the last week (15th week) of classes must have been assigned in writing by the end of the eighth week and must be completed no later than Wednesday of the 15th week. This stipulation refers to the project and its scope, but not the topic. Furthermore, ALL requirements, except for the final exam, must be completed no later than Wednesday of the 15th week. However, if the instructor is replacing the final exam with either a project, paper, or speech, the due date for the assignment can be any time during the 15th week or during finals week (providing that the assignment has been given by the eighth week). The exception to this is a class meeting one day a week on a Thursday or Friday for which all policies/requirements are shifted to either a Thursday or Friday, respectively. You can find the full [15th Week Policy](https://registrar.unl.edu/academic-standards/policies/fifteenth-week-policy/) online.

Complaints about failure to follow the above outlined procedures should be made immediately. Complaints should first be made directly to the instructor of the course in which the violation has occurred or is likely to occur. This could be done by simply directing the instructor's attention to the 15th Week policy statement. If the problem cannot be worked out, the student may inform the President of the Association of Students of the University of Nebraska of the progress of the complaint and request aid in correcting the problem. If corrective actions are not taken within two days, the complaint should be submitted to the department chair or head by the student or the ASUN representative on behalf of the student. If the chair/head is unable or unwilling to resolve the complaint within two days, the complaint should be submitted to the College Dean, and if the Dean is unable or unwilling to resolve the problem within two days, the student, or the ASUN representative on behalf of the student should appeal to the Director of Undergraduate Education Programs within the Office of the Executive Vice Chancellor. Resolving the complaint should in no case take longer than eight working days.

**Emergency Procedures (On Campus)**

Stay connected by registering for safety alerts on the UNL Campus at [unlalert.unl.edu](https://unlalert.unl.edu/) and on the UNO campus by texting "unoalert" to 79516.

Call 911 for fire or medical emergencies. UNL Campus Police can be reached at 402-472-2222 and UNO Campus Police at 402-554-2911.

Consult the UNL Emergency Preparedness Resources website at [emergency.unl.edu](https://emergency.unl.edu/) for measures to be taken in emergency situations.

**Diversity & Inclusiveness**

UNL values diversity in the broadest sense – gender, age, race, ethnicity, sexual orientation, economic status, physical and intellectual ability, religion, education and geography. We believe that acknowledging, building understanding and incorporating diversity throughout the curriculum will best prepare you for a career in a global society. The inclusive learning environment we seek to foster is one where diverse perspectives are recognized and respected, and therefore conversations within your course must be civil and respectful of individual ideas, experiences, and beliefs that may be different from your own. To challenge ideas or beliefs in a manner that is considerate of the individual expressing them is encouraged, but disrespect or hostility toward any person is not acceptable behavior in the classroom. According to our [Student Code of Conduct](https://studentconduct.unl.edu/student-code-conduct), speech that is abusive, harassing, intimidating, or coercive is prohibited. Students who engage in such speech will be asked to leave the classroom and further disciplinary actions may be taken.

**Title IX Policy**

Any unwanted conduct of a sexual nature, whether verbal, physical, written, or pictorial, which has the purpose or effect of creating a hostile environment for the person subjected to the conduct, or any solicitation of sexual conduct of any nature when submission to or rejection of such contact is used as the basis for either implicitly or explicitly imposing favorable or adverse terms and conditions of academic standing constitutes sexual harassment and will not be condoned or tolerated. Moreover, sexual misconduct including stalking, dating or domestic violence and sexual assault is prohibited.

Appropriate corrective action will be taken toward any student or employee who is found to have violated UNL's non-discrimination, sexual harassment and/or sexual misconduct policies. Further, UNL commits itself toward the assurance of non-retaliation toward any person who reports harassment, sexual misconduct or discrimination or who participates in an investigation of such conduct.

If you suspect or experience discrimination, sexual harassment, or retaliation toward yourself or others, please keep records or other evidence of specifics and report the conduct. If you do not feel comfortable telling a person to stop inappropriate behavior, or if the behavior does not cease once you have made the request that it do so, you may seek assistance from an administrator, professor or counselor. Persons designated by the University as Responsible Employees are required to report sexual discrimination, harassment and misconduct reported to them. Other employees are encouraged to provide assistance and/or report.

Detailed information about support and resources, and how to report an incident of sexual discrimination, harassment or misconduct, is available on the Institutional Equity and Compliance [Title IX website](https://www.unl.edu/equity/title-ix). You can contact the office directly at 402-472-3417.

**Caveat**

This syllabus represents a written contractual agreement between us. Occasionally, it may be necessary to revise the syllabus to meet students’ or university needs. The instructor reserves the right to revise this syllabus if the need arises. Advance notification will be provided to you.