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CSD 331.01: Neuroanatomy and Physiology for Communication and Swallowing

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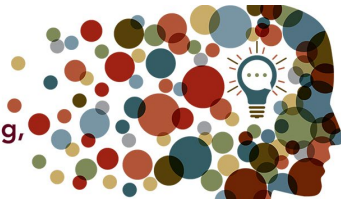
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CSD 331: Neuroanatomy and Physiology for Communication

Spring 2023 | 3 credits | 01 | F2F | CRN 31954

Contact Information

Professor's Name: Kim Ramsey, M.S., CCC-SLP (she/they)

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Office hours: None, please email me to set up time to meet

Course Catalogue Description

CSD 331 – Neuroanatomy and Physiology for Communication 3 cr. Focused study on the anatomy of the nervous system and how the nervous system supports behaviors inherent to communication. Students will be introduced to anatomical terms, structures, and functions. Clinical implications will be discussed as well.

Class Meeting Time: Wednesdays 9:00-11:50am (mountain time)

Course Format

This course is offered in a face-to-face format. I will have weekly content posted for you by Sunday nights. All course discussions, quizzes, and the midterm exam will be due on Sunday nights. The exceptions to this schedule are the final exam and cranial nerve assignment which are due on the final day of class which is a Friday. Staying on top of the readings, assignments, and course content is imperative to thoroughly digest and engage with the content and unpack it so that you can apply it and reference it in future studies and clinical scenarios. The overarching goal of this course is to prepare you with foundational knowledge of the neurological mechanisms important across the lifespan with direct application to working with individuals in the fields of speech-language pathology and audiology.

Course Objectives

The student will:

- Describe the subject matter of neuroscience and speech and hearing sciences
- Discuss and understand the relationship between neuroscience and speech and hearing sciences.
- Understand the scope of neuroscience; understand the rationale for and benefits of learning neuroscience; apply techniques for learning neuroscience.
- Explain the components of a neurological examination.
- Describe common neurologic diseases that have clinical relevance
- Explain the basic principles that govern human brain function
- Define technical terms used for directional reference, brain section planes, and anatomic structures.
- Differentiate between the central and peripheral nervous systems and describe the major structures and functions of the central and peripheral nervous systems.
- Outline the classificatory components that categorize the nervous system functions.
- Describe the architectural organization of the cerebral cortex.
- Discuss Brodmann areas with respect to their use in neurolinguistics.
- Demonstrate familiarity with clinically established diagnostic signs.
- Appreciate the rationale used for localizing lesions in the nervous system.
- Appreciate the challenge posed by the solving of pertinent neurogenic problems.
- List embryonic divisions of the brain and gross anatomic structures related to each division

- Identify and describe the functions of the internal structures of the cerebral cortex, thalamus, midbrain, pons, and medulla.
- Identify and explain the functions of the gross anatomic structures of the spinal cord; identify and describe internal structures of spinal cord; identify/recognize the shapes of the corticospinal fibers at various neuraxial levels.
- Identify and describe functions of ventricular cavities; recognize shapes of ventricular cavities at different neuraxial levels; describe the functions of cerebrospinal fluid (CSF), the circulation path of CSF, disorders of CSF, and diagnostic significance of CSF.
- Describe the meninges, their locations, and their functions.
- Understand the structural complexity and functional connectivity of the brain structures.
- List the cranial nerves, cite their anatomic locations, and describe their sensory and motor functions.
- Describe the anatomy and functions of the autonomic nervous system.
- Identify, describe and understand nerve cell structure and physiology.
- Describe and understand the cerebrovascular system and explain common types of cerebrovascular accidents.
- Understand and describe the auditory system and understand the vestibular system
- Understand and describe the somatosensory system.
- Understand and describe the visual system.
- Understand and describe the motor system (spinal cord, cerebellum, basal ganglia, motor cortex).
- Understand and describe the cerebral cortex and higher mental functions.

Course Guidelines and Policies

Required Textbooks

- Webb, W. G. (2017). *Neurology for the speech-language pathologist*, 6th ed. St. Louis, MO: Mosby Elsevier.
- LaPointe, L. L. (2018). *Atlas of Neuroanatomy for Communication Science and Disorders*, 2nd ed., Thieme, New York. ISBN 978-1-60406-649-4

Recommended Resource: Brain Coloring Book

- Diamond, M. C. & Scheibel A. B. (1985). *The human brain coloring book*. Oakville, CA: Coloring Concepts.

Additional readings and materials may be posted on the Moodle shell.

Procedures for what to do if an unexpected life event occurs leading to missing a due date for an assignment, quiz, or exam:

Your health and wellbeing are very important to me, and I will always strive to support you doing what you need to do to take care of yourself as well as staying on track with course content. If you have an unexpected event occur such as a personal or family medical emergency that will result in you missing a scheduled assignment, quiz, or exam, please contact me via email as soon as you are able. I will work with you on possible accommodations. Please be aware all possible accommodations will be determined at my discretion, and I may ask you to provide written verification of your circumstances. If you are not sure if your situation qualifies to receive a possible accommodation, please ask.

Independent Knowledge & Access to: Sufficient Internet speed/bandwidth, Word processing, Box, PDF converter, PPT, & Zoom. If you are having difficulties with technology Contact IT Help (406) 243-4357.

Technology Expectations

[Basic Minimum System Requirements for Moodle](#)

Academic Honesty

For several discussions in this course, you will be searching for information, perspectives, and ideas from external institutions and resources. Whenever an idea is not your own original idea, it is important to cite it as

such so the original author receives credit for their intellectual property, ideas, and any other type of work. Plagiarism is defined in the [University of Montana's Student Conduct Code](#) as "Representing another person's words, ideas, data, or materials as one's own." Before posting any information it is important to double check that it is very clear to someone reading your work which ideas and information are directly from you and which came from an outside source. This can be especially important to check when you are paraphrasing or summarizing a body of work. I recommend using the [The Purdue OWL](#) APA manual 7th ed. website for help formatting citations. If plagiarism occurs despite your best intentions, please be aware this could be considered an example of academic misconduct.

Academic misconduct, as defined by the UM Student Conduct Code, is defined as "all forms of academic dishonesty" and may result in disciplinary sanctions, suspension, or expulsion. Academic misconduct includes: (1) plagiarism, (2) misconduct during an examination or academic exercise, (3) unauthorized possession of examination or other course materials, (4) tampering with course materials, (5) submitting false information, (6) submitting work previously presented in another course, (7) improperly influencing conduct, (8) substituting, or arranging substitution, for another student during an examination or other academic exercise, (9) facilitating academic dishonesty, and (10) Altering transcripts, grades, examinations, or other academically related documents.

Disability Modifications

If you are a student with a disability and wish to request reasonable accommodations for this course, please contact the professor privately to discuss the specific modifications. Please be advised, I may request that you provide a verification letter from the Office for Disability Equity (formerly, Disability Student Services). If you have not yet registered with the ODE, located in Lommasson Center 154, please do so in order to coordinate your reasonable modifications. For more information, visit the ODE website (<https://www.umt.edu/disability/>).

COVID-19 Remote Attendance Accommodation

The following guidelines have been provided by the Dean of the College of Health to reduce the spread of COVID-19 and maintain the health and safety of all students, faculty, and staff.

- Mask use is recommended but not required within the classroom
- Please keep yourself comfortable as you need to by drinking liquids and eating food but be mindful of others in the class.
- **Please stay home if you feel sick and/or if exhibiting COVID-19 symptoms.**
 - If you are sick or displaying symptoms of COVID-19, please contact the Curry Health Center at (406) 243-4330
 - Up-to-Date COVID-19 Information from the University of Montana UM Coronavirus Website: <https://www.umt.edu/coronavirus> · UM COVID-19 Fall 2020 website: <https://www.umt.edu/coronavirus/fall2020.php>
- Please remain vigilant outside the classroom in mitigating the spread of COVID-19.

Diversity Statement

Your experience in this class is very important to me and I strive to create and uphold an inclusive, welcoming, and supportive class environment. I welcome individuals of all backgrounds, beliefs, ethnicities, races, national origins, gender identities and expressions, religious affiliations, sexual orientations, ages, abilities, and other visible and nonvisible differences. Please know that I will gladly honor your request to address you by an alternate name or gender pronoun. All members of this class are expected to contribute to a welcoming, respectful, and inclusive environment for every other member of this class.

Grades:

Course total out of 220 points

EXAMS & QUIZZES (170 points, 77%)

Quizzes (60 points)

There will be three open-book quizzes with two attempts allowed for each quiz. Quizzes will be taken on Moodle at the beginning of scheduled class periods.

Quiz details:

- Each quiz is worth 20 points.
- The quizzes will be delivered electronically on Moodle and will have a time- limit. The time limit will be liberal enough to allow plenty of time to think about each question, but it will not allow enough time to look up the answer to every question.
- You will have up to 20 minutes between your first and second attempt to discuss the quiz with others.
- The questions on the second attempt will be different than the first attempt- but the topics will remain the same.
- The final grade for each quiz will be the average of the two attempts.

Midterm and Final Exam (110 points)

The midterm and final exams will also be open book and taken on Moodle.

- Midterm: Taken during class
 - 50 points
- Final: Taken outside of class
 - 60 points

ASSIGNMENTS (50 pts, 23%)

Discussion Q&A (30 points). There will be six discussions (no discussions during weeks where there is a quiz or exam.) Each discussion is worth 5 points. You will be divided into discussion groups of approximately 4 students. Each week, there will be four discussion questions posted. Each group member will sign up for one of the four discussion questions and respond to it. To obtain full credit for the discussion post, you also need to post a resource that supports your explanation and read and respond to two other students' discussion posts each week. All discussion post components are due by Sundays at 11:59pm. *Posts or components of posts submitted after Sundays at 11:59pm will not be considered for a grade, unless special arrangements have been made with the professor for reasons such as an illness or family emergency.*

The following information needs to be included in each discussion post to earn the 5 points:

- Answer the question in detail based on the lectures and chapter readings.
- Post at least one relevant resource (along with its citation) that contributes to the understanding of the topic.
 - Resources need to be from a reputable scientific source.
 - You are not permitted to use Wikipedia (or other similar websites), blogs, etc.
 - A list of reputable websites on neurology is provided below. This is not an exhaustive list. You may also post information from other textbooks or peer-reviewed journal articles.
- Post a response to at least two other students in your discussion group.

Discussion Post Grading Rubric

<u>Component</u>	<u>5 Points Possible</u>
<u>Answer</u>	<p><u>3 points</u>= All components of the answer are accurate and complete, reflect information presented in course lectures and readings, and the information provided is sufficient to understand the concept.</p> <p><u>2 points</u>= Most components of the answer are accurate and reflect information in course lectures and readings; however, some information provided may be inaccurate or insufficient to completely understand the concept.</p> <p><u>1 point</u>= Over half of the information provided is incorrect, or insufficient to fully understand the concept.</p> <p><u>0 points</u>= No response, or response is completely incorrect.</p>
<u>Resource</u>	<p><u>1 point</u>= Resource is from reputable scientific source, relevant to topic, and citation is included.</p> <p><u>0 points</u>= Resource not included or is included but is not from reputable source.</p>
<u>Responses (x2)</u>	<p><u>1 point</u>= Students respond to at least two other classmates' posts and include something in each response that shows they read the post (e.g., "Kay, I really liked how you described the function of the cranial nerves as the 'communication link' between the muscle and the brain. I understand the Vagus nerve better after seeing the diagram you posted.")</p> <p><u>0 points</u>= Less than two responses, or responses do not reflect that student has read post (e.g. saying "good job" does not reflect that you have read or taken away anything specific from that classmate's post.)</p>

List of neurology websites (not exhaustive).

1. <http://www.strokecenter.org/prof>
2. <http://www.ninds.nih.gov/>
3. <http://nimh.nih.gov/>
4. <http://www.asha.org/>
5. <http://www.ancds.org>
6. <http://www.neuroanatomy.org/>
7. <http://pathology.mc.duke.edu/neuropath/nawr/cranial-set.html#cranial>
8. <http://library.med.utah.edu/neurologicexam>
9. Kahn Academy
10. Or, type key words such as neuroscience, neuroanatomy, and neurophysiology in search engines

Cranial Nerve Examination Assignment (20 pts): You will create a short video of you performing components of a clinical cranial nerve examination. You will sign up for one of three groups. Each group has two cranial nerves assigned. You will demonstrate clinical evaluation of two cranial nerves important for speech, hearing, and swallowing (i.e., V, VII, VIII, IX, X, XII) working with another person (does not need to be another student, but can be). Assessment and description should be tailored to functions that are related to speech, swallowing, hearing, and voice production as appropriate.

Your video needs to include the following information for each of your nerves (see rubrics below for each group):

- General description of nerve

- Description of what normal function should look like with inclusion of motor and sensory components*
- Demonstration of basic assessment of the motor and sensory components* of each cranial nerve performed on another person.
- Description of what a potential symptom of abnormal function for motor and sensory components would be (e.g., tongue deviation, altered taste)
- Description of how to tell if the abnormality indicates an upper or lower motor neuron lesion (CNs VII and XII)
- Description of potential impact on function (see rubric for details)

*CN VIII is sensory for hearing and balance and will not include motor components. CN XII is motor only therefore you will not include sensory component in descriptions of evaluation of this nerve.

Cranial Nerve Video Grading Rubric Group 1 (CNs V and VII):

CN V	<u>Description of nerve</u>		<u>Description of normal function</u>		<u>Demonstrate assessment</u>		<u>Description of abnormal/impaired function</u>		<u>Description of impact due to damage</u>	
	What general functions is nerve involved in? e.g. speech, swallow, voice, hearing, balance	1	Sensory	1	Sensory	1	Sensory	1	Give example of functional impact on eating/swallowing if damage occurs.	1
		Motor	1	Motor	1	Motor	1			
CN VII	<u>Description of nerve</u>		<u>Description of normal function</u>		<u>Demonstrate assessment</u>		<u>Description of abnormal/impaired function</u>		<u>Description of impact due to damage</u>	
	What general functions is nerve involved in? e.g. speech, swallow, voice, hearing, balance	1	Sensory	1	Sensory	1	Sensory	1	What functions are at risk of being impaired if this nerve is damaged? E.g. speech, swallow, voice, hearing/balance	1
			Motor	1	Motor	1	Motor-UMN	1		
Motor-LMN	1									
Post 3 replies to other videos: Groups 1, 2, and 3									3	

Cranial Nerve Video Grading Rubric Group 2 (CNs VIII and IX):

CN VIII	<u>Description of nerve</u>		<u>Description of normal function</u>		<u>Demonstrate assessment</u>		<u>Description of abnormal/impaired function</u>		<u>Description of impact due to damage</u>	
	What general functions is nerve involved in? e.g. speech, swallow, voice, hearing, balance	1	Sensory-Hearing	1	Sensory-Hearing	1	Sensory-Hearing	1	Description of other professionals who should be involved in assessment/management of damage to this nerve.	1
		Sensory-Balance	1	Sensory-Balance	1	Sensory-Balance	1			

	<u>Description of nerve</u>		<u>Description of normal function</u>		<u>Demonstrate assessment</u>		<u>Description of abnormal/impaired function</u>		<u>Description of impact due to damage</u>	
<u>CN IX</u>	What general functions is nerve involved in? e.g. speech, swallow, voice, hearing, balance	1	Sensory	1	Sensory	1	Sensory	1	Example of potential impact on swallowing if damaged.	1
			Motor	1	Motor	1	Motor	1	What other nerve is this typically assessed with?	1
Post 3 replies to other videos: Groups 1, 2, and 3										3

Cranial Nerve Video Grading Rubric Group 3 (CNs X and XII):

	<u>Description of nerve</u>		<u>Description of normal function</u>		<u>Demonstrate assessment</u>		<u>Description of abnormal/impaired function</u>		<u>Description of impact due to damage</u>	
<u>CN X</u>	What general functions is nerve involved in? e.g. speech, swallow, voice, hearing, balance	1	Sensory	1	Sensory	1	Sensory	1	Example of potential impact on swallowing if damaged.	1
			Motor	1	Motor	1	Motor	1	Example of potential impact on voice if damaged.	1
<u>CN XII</u>	What general functions is nerve involved in? e.g. speech, swallow, voice, hearing, balance	1	Motor	1	Range of motion	1	Motor-UMN	1	Example of potential impact on speech	1
					Strength	1	Motor-LMN	1	Example of potential impact on swallowing	1
					Post 3 replies to other videos: Groups 1, 2, and 3					

STUDENT LOUNGE

Student lounge: You will notice a Moodle discussion forum entitled “STUDENT LOUNGE.” You may use this forum to communicate with your classmates. This is a great space to organize study groups, share resources, and share relevant or interesting information or links or current events related to class topics. The instructor will not monitor this forum.

GRADING CRITERIA

This course offers a traditional grading option only. Final grades will be assigned as follows:

- A 93% or higher
- A- 90-92%
- B+ 87-89%

- B 83-86%
- B- 80-82%
- C+ 77-79%
- C 73-76%
- C- 70-72%
- D+ 67-69%
- D 63-66%
- D- 60-62%
- F 59% or lower

Participation consideration: If, at the end of the semester, a student's final grade is within .9% of the next letter grade, the instructor will review the student's contributions to the weekly discussion forums. Students, who went above and beyond the minimum requirements at least 3 times during the 6 discussions will be rounded up to the next letter grade (e.g. 89.01% rounded to 90%).

Course Calendar:

Please see the following table for an overview of course sessions, topics, and deadlines. *The course calendar is subject to change at the determination of the professor.*

Week	Date	Topic & Readings	Lecture	Assignment
01	01/18/2023	<p><i>Welcome and course overview</i></p> <p><i>Introduction to neurology and orientation terms:</i></p> <ul style="list-style-type: none"> • <i>Webb Ch 1</i> • <i>LaPointe p. 11-13</i> <p><i>Main divisions of the nervous system:</i></p> <ul style="list-style-type: none"> • <i>Webb Ch 3, p. 44-49</i> 	01	
02	01/25/2023	<p><i>Primary components of the CNS:</i></p> <ul style="list-style-type: none"> • <i>Webb Ch 2, p. 13-38</i> • <i>LaPointe p. 36, 37, 56, 67-70</i> 	02, 03	Discussion 1: Due by 11:59pm Sunday
03	02/01/2023	<p>Quiz 1 (Topics 1-3)</p> <p><i>Protection and nourishment of the brain:</i></p> <ul style="list-style-type: none"> • <i>Webb Ch 3 p. 50-58</i> 	04, 05	Quiz 1: Taken in class

		<ul style="list-style-type: none"> · LaPointe p. 44-54, 153-167 <p><i>General principles of neurological organization for motor control</i></p> <ul style="list-style-type: none"> · Webb Ch 3 p. 60-63 		
04	02/08/2023	<p>NO IN PERSON CLASS THIS WEEK!</p> <p><i>Neuroimaging</i></p> <ul style="list-style-type: none"> · Webb Ch 3, p. 63-70 <p><i>The neuron and neuronal function</i></p> <ul style="list-style-type: none"> · Webb Ch 4 · LaPointe 18-21 	06, 07 (recorded and posted on Moodle)	Discussion Post 2: Due by 11:59pm Sunday
05	02/15/2023	<p><i>The spinal cord and spinal nerves</i></p> <ul style="list-style-type: none"> · Webb Ch 2, p. 39-41 · LaPointe p. 105-111 <p><i>Neurology for general (somatic) sensation</i></p> <ul style="list-style-type: none"> · Webb Ch 5, p. 94 & 100-104 · LaPointe p. 178-182 	08	Discussion post 3: Due by 11:59pm Sunday
06	02/22/2023	<p>Quiz 2: Taken in class</p> <p><i>Sensory Organization</i></p>	09	Quiz 2: Taken in class
07	03/01/2023	Midterm Exam (Topics 1-9)		Midterm: Taken in class
08	03/08/2023	<p><i>Neuro of hearing and balance</i></p> <ul style="list-style-type: none"> · Webb, Ch 5, p. 95-99 · LaPointe p. 194-198 <p><i>Neuro of Vision</i></p> <p>Webb Ch. 5, p. 104 – 108</p>	10, 11, 12	Discussion 3: Due by 11:59pm Sunday
09	03/15/2023	<i>Neurology of motor control</i>	13, 14, 15	Discussion 4: Due by 11:59pm Sunday

		<ul style="list-style-type: none"> · Webb Ch 6 up to p. 130 <p><i>LaPointe p. 183-191</i></p> <p><i>General function of the basal ganglia and cerebellum</i></p> <ul style="list-style-type: none"> · Webb Ch 6, p. 130-134 <p><i>LaPointe p. 81-83 & p. 97-101</i></p>		
10	03/22/2023.	NO CLASS SPRING BREAK! 😊		
11	03/29/2023	<p><i>Cranial Nerves</i></p> <ul style="list-style-type: none"> · Webb Ch. 7 p. 141-152 <p><i>LaPointe p. 112-133</i></p>	16	Discussion 5: Due by 11:59pm Sunday 4/3
12	04/05/2023	<p>Quiz 3 (Topics 13-16)</p> <p><i>Motor speech disorders</i></p> <ul style="list-style-type: none"> · Webb Ch 8 	17	Quiz 3: Taken in class
13	04/12/2023	<p><i>Neurology of swallowing</i></p> <ul style="list-style-type: none"> · Webb Ch 7, p. 152-158 	18	Cranial Nerve Assignment due by 11:59pm Sunday 4/16
14	04/19/2023	<p><i>Neurology of language and learning</i></p> <ul style="list-style-type: none"> · Webb Ch 9, p. 186 - 202 	19	Discussion 6: Due by 11:59pm Sunday
15	04/26/2023	<p><i>Development of the nervous system and primitive reflexes</i></p> <ul style="list-style-type: none"> · Webb Ch 11 	20	(Nothing due- review for Final)
16	05/03/2023	<p><i>Review day (attendance optional)</i></p> <p>Final Exam opens</p>		Final Exam opens 12:00pm on Wednesday 5/3/22
17	05/10/2023 Finals Week	<p>Final Exam closes</p> <p><i>(Can take exam any time while it is available.)</i></p>		Final Exam closes 11:59pm on Wednesday 5/10/22

Student Resources

Please see the Moodle course shell for a list of campus resources available to help students be successful across UM courses. UM provides a wide range of supports for tutoring, financial, and personal development.

Place of Course in Program

Purpose

The purpose of this course is to provide a foundation in neuroanatomy and physiology relative to communication science and disorders. This course will explore the anatomy and physiology of the nervous system, and how the nervous system supports the behaviors inherent to communication. Students will be introduced to anatomical terms, structures, and functions. Clinical implications will be discussed as well. This foundational knowledge is essential for all students in the field of speech and hearing sciences. The course fulfills a departmental requirement for an undergraduate degree in Communicative Sciences and Disorders.

Conceptual Framework for Learning Community and Diversity

This course provides a learning community that a) integrates ideas, b) encourages cooperative endeavors, and c) respects diversity and individual worth. These goals will be demonstrated through the following course-specific experiences: a) weekly group discussion forums that foster cooperation and collaboration with your classmates. Cultural and individual diversity will be considered on all assignments, discussions, and lectures.

Mission of Communicative Sciences and Disorders Program

The mission of the Department of Communicative Sciences and Disorders is to prepare students for progressive, collaborative, and research-minded careers in speech-language pathology, audiology, and related fields through rigorous academic and clinical training. We strive to be innovative in the use of technology and program delivery to provide services to traditionally underserved regions and populations. Through our emphasis on typical and atypical speech, language, cognition, swallowing, and hearing function, students gain knowledge and skills along with ethical and culturally competent values that foster a commitment to lifelong learning and civic engagement.