



School of Molecular & Cellular Biology

MCB/NEUR 314, Fall 2024

Introduction to Neurobiology, 3 credit hours

Instructor/Instructional Team

Main Lecturer: Dr. Daniel Llano

Contact Information: d-llano@illinois.edu

Assistant Lecturer: Dr. Baher Ibrahim

Contact Information: bibrahim@illinois.edu

Teaching assistant: Dajin Cho

Contact Information: dajinc2@illinois.edu

Class Meeting Schedule

Scheduled Class Time: MWF 3-3:50pm

Office Hours (Llano)

- Mondays noon-2PM
- <https://illinois.zoom.us/j/87647236241?pwd=vYxzvtDagbzzONpAfWcEBwqODqK28F.1>
- (also by appt. -- send email)

Office Hours (Cho)

- Tuesdays 12-2p
- <https://illinois.zoom.us/j/85285503754?pwd=5g54VB4K2Ttucv6qumD2JDASYBSynW.1>
- (also by appt. -- send email)

Course Overview and Description

In MCB 314, we cover a range of neuroscience topics, beginning with the biophysics of neuronal excitation, neuroanatomical structures, cellular neurobiology and synaptic transmission and ending with higher cognitive processes, such as emotion, memory and language. Along the way, we cover sensory, motor and autonomic systems. There is extensive discussion in the classroom of clinical correlates of the basic neurophysiological principles being discussed. Specifically, we describe the underlying biology and treatment modalities for Parkinson's Disease, Alzheimer's Disease, multiple sclerosis, myasthenia gravis and other disorders. The course moves fast and covers a lot of ground. To be successful in this course, students must keep up with a large volume of material and know the detailed mechanisms underlying multiple neurophysiological processes.

Course Prerequisites, Requirements met: Junior or senior standing

Student Learning Outcomes

At the end of the course, through assignments, discussions, activities and assessments, students will be able to:

- Understand how neurons communicate
- Understand the organization of human sensory and motor neural systems
- Understand the organization of integrative and cognitive neural systems

Course Text/Materials Information (recommended)

Neuroscience: Exploring the Brain, Enhanced Fourth Edition

Bear, Connors and Paradiso 2020

This book is great and offers excellent explanations and illustrations. The exam material, however, will come from what is covered in class.

Course Website: See Moodle (<https://learn.illinois.edu>) site or Canvas

Grading Information and Breakdown (IMPORTANT)

- There is a fixed scale in the course (i.e., there is no “curve”) so you will know your letter grade exactly once you have your numerical scores (except A+, top 5% of class)
- There are six exams given in the course. The first four exams (50 min each) are given during class time during the semester and will test you on the material covered since the last exam.
- Exams 5 and 6 are considered **improvement or make-up** exams. These exams are given back-to-back during finals week (each exam = 50 min), both during the 3-hour block allotted for the final exam. **These exams are the only opportunity to make up a missed exam.**
- Exam 5 will cover the first half of the course (the same material covered by exams 1 and 2).
- Exam 6 will cover the second half of the course (the same material covered by exams 3 and 4).
- For the material covered during the first half of the course, we will automatically drop your lowest score from exams 1, 2 and 5.
- For the material covered during the second half of the course, we will automatically drop your lowest score from exams 3, 4 and 6.
- If you have taken the first four exams and have scored to your satisfaction (you will know your letter score based on the fixed scale), you do not have to take exam 5 or 6. These exams can only enhance your score. If you missed an exam during the semester or scored poorly, exams 5 and 6 provide an opportunity to raise your score.
- **If you miss an exam for any reason other than the exceptions outlined in the policy positions outlined below, your mechanism for making up this exam is by taking the corresponding exam (exam 5 or 6) during finals week.**
- **Extra credit:**
 - **For 20 extra points (3.4% of your grade), please:**
 - Generate 2 high-quality questions per lecture
 - Email them to me (d-llano@illinois.edu)
 - At least 75% should be multiple-choice questions (with choices A-E)
 - The rest can be true/false
 - There are 31 content-based lectures
 - Therefore you would need to turn in 62 questions
 - Must be turned in for corresponding lectures before each exam
 - If the quality is sub-standard, you will get 5 points
 - If the effort is very lackluster, you will get 0-4 points

- **Grading scale:**

Grade	Point Range	%
A+	top 5% of class	
A	>= 545	90.8%
A-	525-544	87.5%
B+	505-524	84.2%
B	485-504	80.8%
B-	465-484	77.5%
C+	445-464	74.2%
C	425-444	70.8%
C-	405-424	67.5%
D+	385-404	64.2%
D	365-384	60.8%
D-	345-364	57.5%
F	<= 344	57.3%

Course Calendar with Daily Schedule of Topics

Lecture #	Day	Date	Topic
1	Mon	8/26/2024	Introduction to the course
2	Wed	8/28/2024	Neurons and Glia
3	Fri	8/30/2024	Neuroanatomy I
	Mon	9/2/2024	LABOR DAY
4	Wed	9/4/2024	Neuroanatomy II
5	Fri	9/6/2024	Neuroanatomy III
6	Mon	9/9/2024	Resting membrane potential
7	Wed	9/11/2024	The action potential
8	Fri	9/13/2024	Synaptic transmission I
9	Mon	9/16/2024	Synaptic transmission II
10	Wed	9/18/2024	Neurotransmitters
11	Fri	9/20/2024	Review for Exam I
	Mon	9/23/2024	EXAM I
12	Wed	9/25/2024	Chemical senses I
13	Fri	9/27/2024	Chemical senses II
14	Mon	9/30/2024	Eye and retina
15	Wed	10/2/2024	Central vision I
	Fri	10/4/2024	NO CLASS - SfN
	Mon	10/7/2024	NO CLASS - SfN
16	Wed	10/9/2024	Central vision II
17	Fri	10/11/2024	Auditory/vestibular I
18	Mon	10/14/2024	Auditory/vestibular II
19	Wed	10/16/2024	Somatosensory
20	Fri	10/18/2024	Review for Exam II
	Mon	10/21/2024	EXAM II

Lecture #	Day	Date	Topic
21	Wed	10/23/2024	Spinal control of movement I
22	Fri	10/25/2024	Spinal control of movement II
23	Mon	10/28/2024	Central motor I
24	Wed	10/30/2024	Central motor II
25	Fri	11/1/2024	Emotions and the brain
26	Mon	11/4/2024	Endocrine, autonomic, neuromod
27	Wed	11/6/2024	Brain rhythms and sleep
28	Fri	11/8/2024	Review for exam III
	Mon	11/11/2024	EXAM III
31	Wed	11/13/2024	Memory systems
32	Fri	11/15/2024	Memory mechanisms
33	Mon	11/18/2024	Language
34	Wed	11/20/2024	Feeding and motivation
35	Fri	11/22/2024	Attention
36	Mon	11/25/2024	FALL BREAK - NO CLASS
37	Wed	11/27/2024	FALL BREAK - NO CLASS
38	Fri	11/29/2024	FALL BREAK - NO CLASS
39	Mon	12/2/2024	Arousal and consciousness
40	Wed	12/4/2024	Mental Illness
41	Fri	12/6/2024	Review for Exam IV
	Mon	12/9/2024	EXAM IV
		TBD	EXAM V and VI

EXAMS V AND VI during finals week

Policies:

Attendance is expected and encouraged, but attendance will not be taken.

The best way to reach me is to email me (d-llano@illinois.edu).

You are free to bring audio recording devices to class.

MCB Curriculum Policies

Religious Observances and Practices:

- Students are required to submit the Request for Accommodation for Religious Observances Form (which can be found at www.odos.illinois.edu/.../Religious_Observance_Accommodation_Request_Form.docx) to their instructors and the Office of the Dean of Students requesting accommodation by the end of the second week of the course. Requests that are not submitted within this time frame may not be granted. Information about accommodations can be found in the Student Code: <http://studentcode.illinois.edu/>.

Disability Resources and Educational Services (DRES) Accommodations:

- We are committed to providing a learning environment where our students can succeed. If you require special accommodations, please contact us and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES, you may visit 1207 S. Oak Street, Champaign, call 217.333.4603, or email disability@illinois.edu. We will try to meet all accommodations once the process has started. Please note that accommodations are not retroactive to the beginning of the semester, but begin the day you contact your professor, instructor or coordinator with a current letter of accommodation from DRES.
- If a student believes that they need DRES accommodations, they should contact DRES at disability@illinois.edu.

Academic Integrity:

- The Code of Policies and Regulations Applying to All Students will be applied in all instances of academic misconduct committed by students. This applies to all exams, presentations, assignments and materials distributed or used in this course. You can review these policies at the following website: <http://admin.illinois.edu/policy/code/index.html> and specifically here: <http://studentcode.illinois.edu/article1/part4/1-401/>
- Science cannot exist without honesty. The faculty and staff in MCB require students, as scientists-in-the-making, to hold the highest standards of scientific and academic conduct. Any form of cheating on any graded work in courses is unacceptable.
- We require that all graded work be entirely your own, and that anything you write using the words of other writers be correctly attributed. Some specific points follow.
- On exams, the answers that your turn in for grading must be your own, formulated during the exam from your own understanding of the material and without any supporting information, be it written, verbal or electronic. Copying the work of another student, or allowing another to copy your work, or copying work from any other source, is unacceptable. Since we cannot always monitor you as you complete your work, we must rely upon appearance of your work from which to judge. If the work you submit resembles that of another student or another source too closely, we may conclude that it was not your original work. Always make a conscious effort to complete your work on your own and to protect it from the view of others, in order to ensure that it will be seen as your own. Failure to adhere to these standards for any

portion of an exam may result in a grade of zero for the entire exam or quiz for all persons involved.

- Texting, or the use of a cell phone or any other device for any purpose, during an exam is prohibited. Doing so may earn you a zero or a more extreme penalty on the quiz or exam at the discretion of the instructor.
- Use of any social or electronic media to share information, request information or make confidential information public is prohibited. Any use of this type may earn you a zero on the exam or a more extreme penalty at the discretion of the instructor.

University Information of Student Safety - Active Threats:

- **General Emergency Response Recommendations** ([Emergency Response Guide](#)):
- Security Threat. The Department of Homeland Security and the University of Illinois at Urbana-Champaign Office of Campus Emergency Planning recommend the following three responses to any emergency on campus: **RUN > HIDE > FIGHT**
- **Only follow these actions if safe to do so.** When in doubt, follow your instincts - you are your best advocate!
- **RUN** – Action taken to leave an area for personal safety.
 - Take the time to learn the different ways to leave your building **before** there is an emergency.
 - Evacuations are mandatory for fire alarms and when directed by authorities! No exceptions!
 - Evacuate immediately. Pull manual fire alarm to prompt a response for others to evacuate.
 - Take critical personal items only (keys, purse, and outerwear) and close doors behind you.
 - Assist those who need help, but carefully consider whether you may put yourself at risk.
 - Look for **Exit** signs indicating potential egress/escape routes.
 - If you are not able to evacuate, go to an Area of Rescue Assistance, as indicated on the front page of this plan.
 - Evacuate to Evacuation Assembly Area, as indicated on front page of this plan.
 - Remain at Evacuation Assembly Area until additional instructions are given.
 - Alert authorities to those who may need assistance.
 - Do not re-enter building until informed by emergency response personnel that it is safe to return.
 - Active Threat: IF it is safe to do so, run out of the building. Get as far away as possible. Do NOT go to the Evacuation Assembly Area.
- **HIDE** – Action taken to seek immediate shelter indoors when emergency conditions do not warrant or allow evacuation.
 - Severe Weather:
 - If you are outside, proceed to the nearest protective building.
 - If sheltering-in-place due to severe weather, proceed to the identified Storm Refuge Area or to the lowest, most interior area of the building away from windows or hazardous equipment or materials.
 - Active Threat:

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- Lock or barricade your area.
 - Get to a place where the threat cannot see you.
 - Place cell phones on silent.
 - Do not make any noise.
 - Do not come out until you receive an Illini-Alert advising you it is safe.
 - **FIGHT** – Action taken as a last resort to increase your odds of survival.
 - Active Threat: If you cannot run away safely or hide, be prepared to fight with anything available to increase your odds for survival.

Student Resources/Where to go for Help:

We Care at Illinois

- For sexual misconduct support, response and prevention visit: wecare.illinois.edu

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here: http://oiir.illinois.edu/sites/prod/files/SexualMisconduct_ResourceGuide.pdf

Safety and Emergency

University Police Department, Emergency, 9-911; Non-emergency, 217-333-8911

University Fire Department Emergency, 9-911

Crisis Line, 217-359-4141

Emergency Dean, 300 Turner Student Services Bldg., 610 E. John St., 217-333-0050

Counseling Center, 110 Student Services Bldg., 610 E. John St., 217-333-3704

McKinley Health Center, General Information, 217-333-2701

McKinley Mental Health Center, 1109 S. Lincoln, 217-333-2705

Dean of Students, 300 Turner Students Services Bldg, 610 E. John St., 217-333-0050

Local Sexual Assault Center, RACES, 217-384-4444

Women's Resources Center, 703 South Wright Street, 2nd Floor, 217-333-3137

Rape Crisis 24-hour Hotline, 217-384-4444

Suicide & Psychological Emergency, Suicide Prevention Team, 217-333-3704

SafeRides (free nighttime campus ride program), 217-265-RIDE (265-7433)

SafeWalks (free walking escort service by Student Patrol), 217-333-1216

Student Services and Advocacy

Office of the Dean of Students, 300 Student Services Bldg., 610 E. John St., 217-333-0050

Classroom Support, Teaching Skills, and Instructional Strategies

Center for Innovation in Teaching & Learning, 249 Armory Building, 217-333-1462

Counseling Services

Counseling Center, 110 Student Services Bldg., 610 E. John St., 217-333-3704

McKinley Mental Health Center, 1109 S. Lincoln Ave., 217-333-2701

Psychological Services Center, 3rd Floor, 505 E. Green St., 217-333-0041

Disability Services

Disability Resources and Educational Services (DRES), 1207 S. Oak St., 217-333-1970

Lesbian, Gay, Bisexual, Transgender Resource Center

LGTB Resource Center, 323 Illini Union, 1401 W. Green St., 217-244-8863

Veterans Services

Veteran Student Support Services, Office of the Dean of Students, 610 E. John St., 217-333-0050

Center for Wounded Veterans in Higher Education, 908 W. Nevada St., 217-300-3515

General Study Skills Assistance

Office of Minority Student Affairs, 130 Student Services Bldg., 610 E. John St, 217-333-0054

Office of Minority Student Affairs Tutoring Services, 701 S. Gregory Dr., Suite 1, 217-333-7547

Writer's Workshop, 251 Undergraduate Library, 1402 W. Gregory Dr., 217-333-8796

**Additional academic assistance may be available through individual departments

Health Resources

Health Education, McKinley Health Center, 1109 S. Lincoln Ave., 217-333-2701

Alcohol & Other Drug Office, 2nd Floor Counseling Center, 610 E. John St., 217-333-7557

Sexual Health Educator, McKinley Health Center, 1109 S. Lincoln Ave., 217-333-2714

Dial-A-Nurse, McKinley Health Center (24-hour), 1109 S. Lincoln Ave., 217-333-2700

Health Resource Center, McKinley Health Center, 1109 S. Lincoln Ave., 217-333-6000

Health Resource Center, Room 40 Illini Union, 1401 W. Green St., 217-244-5994

McKinley Health Center, General Information, 1109 S. Lincoln Ave., 217-333-2701

Sexual Harassment/Assault & Acts of Intolerance/Hate Crimes

Office of the Dean of Students, 300 Students Services Bldg., 610 E. John St., 217-333-0050

The Office of Diversity, Equity and Access (ODEA):

- For non-academic support visit: diversity.illinois.edu
 - Discrimination & Harassment Prevention
 - Title IX
 - Accessibility & Accommodations
 - Inclusive Illinois

For non-academic campus assistance and support:

- See Office of Diversity, Equity and Access (ODEA) information at the end of this document.

Student Advocacy Resources:

- For student-centered advocacy programs and services visit: mcb.illinois.edu/undergrad/advising/resources.

Statement on Policies:

- Unfamiliarity with policies is not a defense for not knowing what they cover.

Adding the Course after the Semester Starts:

- We understand that the University has an add deadline 10 days into the semester, but the University lets individual courses and/or programs determine their policies for late adds. We feel that students who choose to add a course late do so at their own discretion with knowledge that there may be points lost in the process.

Contacting MCB Course Personnel:

- MCB course personnel are more than happy to assist students.
- Emails to instructors, TAs, or course coordinators will only be answered if they come from an @illinois.edu account. We will only use this account in order to protect your educational information and profile. As a student, please remember that when you email a staff member, it is important to include all pertinent information so that we can assist you in the most efficient and effective manner possible. This information includes:
 - The course rubric in the subject line
 - Your full first and last name
 - Your NetID (the first part of your illinois.edu email account)
 - Your UIN (9 digit number that can be found on your ICard)
 - The course that you are concerned about (the course personnel often work with multiple courses)
 - Your section letter/number
 - The previous email "thread" or previous communicated information pertinent to the situation
- Your cooperation will help us respond much more quickly to your concerns.

Class Absences:

- Regular class attendance is expected of all students at the University. (http://odos.illinois.edu/studentAssistance/absence/revised_code.asp)
- If you find yourself ill, you must submit confirmation of a visit with a medical practitioner within 24 hours of your absence. The confirmation cannot be provided by a relative, even if the relative is a practitioner.
- The Office of the Dean of Students will only provide informative letters to instructors for protracted illness of 3 or more days, certain emergencies and to be present during the serious illness of immediate family members (parents, legal guardian, spouse/partner, siblings, children, or grandparents). These letters do not excuse you from class but merely provide information for the instructor to consider with regard to excusing the absence and permitting make-up work. Students must request absence letters from the Office of the Dean of Students after the student has returned to class but not more than 10 business days after the last date of absence.
- Absences that may be excused without a letter include circumstances beyond the student's control such as medical treatment, surgery related to prolonged illness or injury, pregnancy, legal matters, citizenship or naturalization processes, or acts of nature which cause destruction to a primary residence or disrupt air travel. All will require documentation.
- Absences that may also be excused without a letter include a conference or job, graduate or professional school interviews, though a best effort should be made to schedule these events to minimize class attendance disruption. All will require documentation.
- Absences planned for the items listed in previous bullet point must be communicated to your instructor or course coordinator at least two weeks in advance of the absence. Failure to do so may result in the loss of opportunity to reschedule the missed class period and the portion of the grade associated with this class period.

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- Absences that will not be excused include family events such as reunions or weddings, or presence during serious illness of extended family members (aunt, uncle, niece, nephew, or cousin).
 - Unplanned absences may result in the loss of opportunity to reschedule the missed class period and, therefore, the portion of the grade associated with this class period.
 - Absences will be handled according to individual course policy.

Exam Absences:

- If you must miss an exam due to unforeseen circumstances, you are required to contact your instructor or course coordinator within 24 hours of the absence. You will then have 48 hours from the absence in which to submit documentation to your instructor or course coordinator. Course personnel will evaluate documentation and decide whether or not there will be an option to compensate for the missed exam through either a make-up exam or proration. Failure to follow this procedure will result in a zero for the exam. In most cases, students will be instructed to take the make-up exam (exam 5 or 6, depending on which exam is missed) given during finals week.
- If you find yourself ill, you must submit confirmation of a visit with a medical practitioner within 24 hours of your absence. The confirmation cannot be provided by a relative, even if the relative is a practitioner.
- If you must miss an exam for a conference or job, graduate or professional school interviews, the exam may be prorated. A best effort should be made to schedule these events around exams. You will need to be mindful that only one exam may be prorated in a semester for any and all absences. All will require documentation.
- There will be instances when the student must make an individual choice about their ability to perform on an exam and will need to accept any and all consequences for that choice.
- If the absence is a result of a protracted illness of 3 days or more, you should follow the procedure for obtaining a letter from the Office of the Dean of Students. The request may be made once the student returns to class but not more than 10 business days after the last date of absence.

Exam Conflicts:

- If you have a regularly scheduled University course that conflicts with the exam, you should complete the online Conflict Exam Request Form on the course website. This request must be made by 5:00 pm not less than 3 business days prior to the exam. Requests made after 5:00 pm and less than 3 business days prior to the exam will not be granted. See course policies for a specific deadline for your course.
- Work schedules should be adjusted, if at all possible, in order to eliminate a conflict with scheduled exams. Please plan accordingly at the beginning of the semester. If eliminating a conflict is not possible, the student should complete the online Conflict Exam Request Form on the course website. This request must be made by 5:00 pm not less than 3 business days prior to the exam. Requests made after 5:00 pm and less than 3 business days prior to the exam will not be granted.
- Students that are formally participating in officially recognized groups, such as athletic teams and performing groups, with a conflict should request a conflict exam

by 5:00 pm not less than 3 days prior to the exam via the online Conflict Request Form. Formal participation does not include general meetings of RSOs or any other recognized groups. Documentation of the event will be required prior to scheduling the conflict exam. Requests made after 5:00 pm and less than 3 business days prior to the exam will not be granted.

- Students with DRES accommodations should also submit the online Conflict Request Form by 5:00 pm no later than 3 business days prior to the exam. Requests made after 5:00 pm and less than 3 business days prior to the exam will not be granted.

Final Exam Absence:

- If you must miss a final exam that you were planning on taking due to unforeseen circumstances, you are required to contact your instructor or course coordinator within 24 hours of the absence. You must also contact the Dean of your college. Finally, you must submit an online Absence Form if one is available on your course website. The Dean can allow a limited window of time for you to complete the final exam and earn a grade in the course.
- There will be instances when the student must make an individual choice about their ability to perform on an exam and will need to accept any and all consequences for that choice.
- If the absence is a result of a protracted illness, you should follow the procedure for obtaining a letter from the Office of the Dean of Students. The request may be made once the student recovers but not more than 10 business days after the date of absence.
- Information about final exams can be found in the Student Code:
<http://studentcode.illinois.edu/>.

Final Exam Conflict:

- Conflict final exams may only be granted for any one of the following situations:
 - Students with three final exams scheduled within a 24 hour period as defined in Section 82.A.4). Final Examinations of the *Code of Policies and Regulations Applying to All Students* which can be found at:
www.illinois.edu/admin/manual/code/
 - Students who have two final exams scheduled at the same time. Final conflict exam requests should be made to the course with larger enrollment. Course personnel can assist with information to determine which course this would be.
 - Students who have a verified personal problem, and who have received written permission to take a conflict final exam from a dean in their college.
 - Students who have DRES academic accommodations.
- Students that find themselves in any of the above situations should complete the online Conflict Final Exam Request Form which can be found on the course website. This request must be made by 5:00 pm on the last day of class in order for the request to be granted. Any requests made after this time may not be granted. If a conflict final exam is granted, it may be scheduled at any time during the final examination period and is at the discretion of the instructor or course coordinator.

Electronic Media/Device Use:

- Use of any social or electronic media to share course information, request course information or make confidential course information public is prohibited. Any use of this type may earn you a zero on an assignment or exam or a more extreme penalty at the discretion of the instructor.
- Any violation of the social media policy **on your account** may result in a zero on an assignment or exam or a more extreme penalty at the discretion of the instructor.
- Any social media sites created in relation to MCB courses must grant access to course personnel upon request. Failure to provide access will result in a failing grade in the course for the group/site's administrator(s).
- No electronic devices, including smart watches, are allowed at exams.

Recording and Posting Course Material:

- Students are welcome and encouraged to make audio recordings of course lectures.
- The material recorded is intellectual and copyrighted property of the University of Illinois Board of Trustees and may be made for personal use only.
- Video recordings of any kind are strictly prohibited.
- Posting of audio recordings or transcriptions on social or electronic media platforms is strictly prohibited.
- Posting or redistributing of course material in any format is strictly prohibited.