

NSCI 280 Glia: Not just neuron glue!
Section A: Undergraduates, Section B: Graduates

Fall 2019 - 3 Credit Hours
COURSE SYLLABUS

M, W, F: 2:20-3:10 in Kalkin 004

Course Director:

Dr. Diane M. Jaworski

E-mail: diane.jaworski@uvm.edu

Phone: 656-0538

Office: Health Science Research Facility 418 (HSRF 418)

Office Hours: Monday 3:30-5:00, Thursday 9:00-10:30 or by appointment

A. Course Summary:

Historically, glial cells (i.e., astrocytes, oligodendrocytes, and microglia) were considered the space filling cells of the brain, simply the brain's "glue". Later, their primary role was considered metabolic support of neurons (e.g., buffer extracellular potassium, recycle neurotransmitters, myelination, etc.). However, the notion of glia as inert bystanders has recently been revised. It is now accepted that glial cells play critical physiological roles in normal nervous system development and function, including controlling brain wiring, the modulation of synaptic transmission, regulating blood flow, and serving as the brain's lymphatic system; just to name a few functions. Moreover, glia contribute to a variety of neurological disorders such as epilepsy, glioma, multiple sclerosis, neurodegenerative diseases and psychiatric disorders like major depressive disorder and schizophrenia. Hence, these underappreciated cells are long overdue recognition.

"Glia: Not just neuron glue!" is an interdisciplinary course in which students will engage in a focused, in-depth exploration of how glial cells contribute to neurological and psychiatric disorders. Lectures by both basic scientists and clinicians will highlight recent research on the molecular mechanisms by which glial cells contribute to the establishment and progression of neurological and psychiatric disorders. To put a face and life story to these disorders, patient-physician panels will discuss the patient's symptoms, treatments and disease impact on their lives. Prior to each examination, students will engage in an active-learning "flipped classroom" activity to assess their comprehension of the presented material. Students will also learn the historical perspective of ground breaking contributions to Neuroscience.

B. Course Objectives:

1. Describe the development, histology, and normal physiological function of glial cells.
2. Describe the role inflammation plays in neurological and psychiatric conditions.
3. Describe the role traumatic brain injury plays in neurological and psychiatric conditions.
4. Describe the role genetics plays in neurological and psychiatric conditions.
5. Describe the physiology, pathology, and disease mechanisms of neurological and psychiatric conditions.
6. Demonstrate effective written communication skills to construct a succinct "News & Views" style summary of a primary research report for a lay audience.
7. Demonstrate effective oral communication skills during your group disease presentation.
8. Demonstrate professionalism (e.g., compassion, respect, and sensitivity) during patient panel presentations.
9. Demonstrate professionalism through adherence to course and university policies.

C. Course Schedule:

Date	Topic	Instructor	
M 8-26	Course Introduction (iClicker test)	Dr. Diane Jaworski	
W 8-28	Glial development	Dr. Diane Jaworski	
F 8-30	Astrocyte function	Dr. Diane Jaworski	9/1 Quiz #1 due
M 9-2	LABOR DAY HOLIDAY		Neuron cell biology
W 9-4	Reactive gliosis	Dr. Diane Jaworski	Neurochemistry
F 9-6	Chronic Traumatic Encephalopathy	Dr. Diane Jaworski	
M 9-9	Patient panel - spinal cord injury*	Dr. TBD	9/8 Quiz #2 due
W 9-11	Glymphatics	Dr. Diane Jaworski	Neurophysiology
F 9-13	Epilepsy: basic science	Dr. TBD	
M 9-16	Epilepsy: childhood	Dr. Greg Holmes	
W 9-18	Epilepsy: adult	Dr. Danilo Vitorovic	
F 9-20	Patient panel - epilepsy*	Drs. Holmes & Vitorovic	
M 9-23	Flipped class - astrocytes*	Dr. Diane Jaworski	
W 9-25	Exam #1		
F 9-27	Oligodendrocytes vs Schwann cell	Dr. Diane Jaworski	
M 9-30	Glioma: Basic science	Dr. Diane Jaworski	9/29 Quiz #3 due
W 10-2	Glioma: Clinical	Dr. Alissa Thomas	Cell cycle & signaling
F 10-4	Multiple Sclerosis: Basic science	Dr. Diane Jaworski	
M 10-7	Patient panel - glioma*	Dr. Alissa Thomas	10/6 Quiz #4 due
W 10-9	Multiple Sclerosis: Clinical	Dr. TBD	Immunobiology
F 10-11	Patient panel - MS*	Dr. TBD	
M 10-14	FALL RECESS		
W 10-16	Demyelinating Disorders	Dr. Diane Jaworski	
F 10-18	Dysmyelinating Disorders	Dr. Diane Jaworski	
M 10-21	Flipped class - myelinating glia*	Dr. Diane Jaworski	
W 10-23	Exam #2		
F 10-25	Microglial origin	Dr. Diane Jaworski	11/4 Quiz #5 due
M 10-28	Microglia & ALS	Dr. TBD	Neuroanatomy
W 10-30	Glia & Alzheimer's disease	Dr. Bob Hamill	
F 11-1	Glia & Huntington's disease	Dr. Bob Hamill	
M 11-4	Glia & Parkinson's disease	Dr. Bob Hamill	
W 11-6	Patient panel - HD, PD*	Dr. Bob Hamill	
F 11-8	Flipped class - microglia*	Dr. Diane Jaworski	
M 11-11	Exam # 3		
W 11-13	Glia in Psychiatric disorders	Dr. Diane Jaworski	
F 11-15	Graduate student presentation•		
M 11-18	Graduate student presentation*		
W 11-20	Graduate student presentation*		
F 11-21	NO CLASS: Independent study - work on News & Views report		
11-25, 27, 29	THANKSGIVING RECESS		
M 12-2	Tourette's syndrome	Dr. Diane Jaworski	
W 12-4	Lewy Body Dementia	Dr. Diane Jaworski	
F 12-6	Patient panel - psychiatric disorders*	Dr. TBD	
TBD	Final		

*Required attendance - see E6: Attendance policy for details

D. **Course Resources:**

1. **Lectures:** There will be three 50-minute lectures each week. Students are responsible for the information appearing in the lecture PowerPoints and presented during lecture. The annotated notes within the PowerPoint are provided for students whose preferred learning style is reading. It is highly recommended you review the PowerPoints prior to attending lecture. This will help you get familiar with the terminology and concepts that will be discussed in class.
2. **Textbook:** **There is no assigned textbook for the course** (see below D3: review articles). Handouts of the lecture slides will not be distributed. If you want to take notes during lecture, either bring your computer to take electronic notes within the PowerPoint or print out the slides to take handwritten notes.
3. **Review articles:** This course seeks to present the most up-to-date information on the role glial cells play in the establishment and progression of neurological and psychiatric disorders. As such, a textbook is not the most appropriate resource. Rather, for each lecture, a recent review article will be posted on Blackboard for student reference. While reading the review articles is not a course requirement, these articles serve as an excellent reference if you find a particular topic interesting and want more information about it.
4. **iClickers:** **iClickers are required for this course. REEF polling will not be used in this course.** Prior to each exam, students will assess their test readiness via an active learning flipped classroom exercise (see below E4: Flipped classroom). Student responses will be recorded as part of their course grade using iClicker software.
5. **Podcasts:** Audio recordings of lectures will be uploaded as podcasts to the Blackboard site. These podcasts are provided as a courtesy, when they are available, and should not be used as a substitute for attending lecture. **Attendance at flipped classrooms, patient panels, and student presentations is required** (see below E7: Attendance Policy for details). Podcasts will not be available for flipped classrooms or patient panels, but will be available for student presentations. Personal recording devices, both audio and video, are strictly prohibited for flipped classrooms and patient panels. Students found in violations of this policy will not receive credit for that day's activity (flipped classroom) or associated exam questions (patient panels).
6. **Evaluations:** As a matter of professional responsibility, all students are expected to complete course and instructor evaluations at the end of the semester. Evaluations are anonymous and confidential. Feedback to individual instructors will help them revise their material and improve their instruction.
7. **Blackboard:** Blackboard is an online resource for accessing the course schedule and policies, lecture material, review articles, and your grades. Bookmark the site on your computer, and check it often since we will also use the Blackboard website for announcements and course updates. All announcements posted on Blackboard will also be sent to the student's UVM e-mail account. It is the student's responsibility to ensure that their "In box" has sufficient available space to receive updates. The Course Director is not responsible for students missing announcements due to a full In box.

To access Blackboard: <https://bb.uvm.edu>

Blackboard ID: Your UVM netID

Password: Your UVM network password

E. **Evaluation Policies:**

1. Lecture Exams (60%): Four (4) non-cumulative exams (50-minute) will comprise the major course assessment. Each exam will consist of 50 multiple-choice questions drawn from lecture material and patient panel discussions. Scantron answer sheets are used with the exams. Only answers that are filled in on the Scantron sheet will be graded, regardless if the correct answer is marked on the exam packet. Please bring a pencil and your student 95# to exams. **Exams will not be scaled and no extra credit options will be offered**. Exam scores will be posted to the grade book in Blackboard, and can be seen under the 'My Grades' tab. Requests to review the exam should be made to the Course Director within one-week of the exam. Questions about your exam grade should also be directed to the Course Director.
2. Patient panels: To help students understand the therapeutic approaches used in Neurology and the impact that a neurological disease has on a patient's life, the clinical faculty will bring patients to class. This is a unique opportunity for students to ask patients about their experiences, including symptoms, treatment and side effects, how the disease has impacted their personal and professional life, positive and negative experiences with the healthcare delivery system, etc. These interactions are often very emotional, for both the patient and student, and require professionalism and compassion. **Patient presentations will not be podcast**. Exam questions will be drawn from the patient presentation similar to any other lecture. Thus, **attendance is required**. **Students are allowed to only take hand-written notes on paper**. **The use of computers, cell phones or any other type of recording device is strictly prohibited**. Students using these devices will forfeit the exam questions related to that patient panel.
3. Pre-lecture preparatory quizzes (5%): This is an upper level course that requires knowledge from previous Biology, Cell Biology, Chemistry, and Neuroscience courses. Throughout the course, students will independently view Power Point screencasts that present the foundational material that students need to recall to understand the week's topic. After viewing the screencast, students will complete an on-line quiz posted on Blackboard. Students are allowed only one attempt, but if a score greater than 80% is achieved, students will receive a grade of 100%. Quizzes are due 9/1, 9/8, 9/29, 10/6 and 11/4. Quizzes must be completed by midnight.
4. Flipped classroom (10%): **An iClicker is required for this course**. Due to the Course Director's poor experience with REEF polling, this response system will not be supported in this course. Prior to each exam, students will assess their test readiness via an active learning flipped classroom exercise. During these sessions, students will be presented with questions similar to those on the exam and will respond using their Blackboard registered iClicker. **It is the student's responsibility to ensure that their iClicker is in working order**. Prior to the Course Director closing the poll, students may discuss the question with their classmates. However, students are not allowed to access ANY other resource. If a student is observed accessing electronic or text resources, they will forfeit all points for that flipped classroom, regardless of when their use was detected.

During the course introduction (8/26), students will be presented with simple, sample questions to become facile with their iClicker and ensure that the software is properly recording their responses.

Because flipped classroom activities are a component of a student's grade, **attendance at flipped classrooms is required**. **Students may only respond using their own iClicker**. Students using another student's iClicker, as well as the absent student(s), will forfeit all points for that flipped classroom, regardless of when its use was detected.

5. News & Views report (10%): Effective written communication is a "transferable skill" that transcends disciplines. The ability to engage the lay public is critical to garner financial support for research. However, as we delve deeper into our research area, it becomes more difficult to convey information in a manner that the general public can grasp and become excited about. Students will hone their communication skills by writing a one page "News & Views" style summary of a primary research paper. Sample reports and guidelines are posted on Blackboard in the Introductory Materials folder. These reports may be submitted at any time during the course; however, reports are due by Friday November 30th.

6. Student presentation (15%): Effective oral communication skills and teamwork are "transferable skills" that transcend disciplines. However, there are few opportunities for undergraduate students to hone didactic presentation skills. Depending on the number of students enrolled, it may not be feasible for all students to present. Thus, undergraduate students will either work together as a team (of ~5 students) to research a disease not discussed during the course, prepare and present a didactic lecture, including writing annotated notes within the PowerPoint, preparing a matching worksheet with answers, and writing exam questions or they will create an individual 15-minute or less screencast video. **Graduate students are expected to develop a didactic lecture and all material independently.** Guidelines for the presentation are posted on Blackboard in the Introductory Materials folder. The final exam will cover material from the student presentations. **Attendance at student presentations is required.**

7. Attendance Policy: Lecture attendance is not required, but highly recommended. Although lectures are recorded and posted onto Blackboard as podcasts, these are meant to supplement lecture (i.e., hear a difficult concept again) and not replace attending lectures. Also, there may be unforeseen issues with the recorder and a lecture is not taped.
Three class activities have required attendance: flipped classrooms, patient panels and student presentations. Students who do not have a legitimate reason to miss class (e.g., illness, UVM sanctioned sports activity, presentation at a scientific meeting, activity deemed appropriate by the Course Director) will receive a score of 0 for the exam questions associated with the missed session.

8. Grading Policy: Your final course grade will be calculated as follows:

Component	% of grade
Exam #1	15%
Exam #2	15%
Exam #3	15%
Final exam	15%
Exams	60%
Pre-lecture quiz	5%
Flipped classroom	10%
News & Views	10%
Presentation	15%

Graduate Students		Undergraduate or Non-degree Students			
Numerical Grade	Letter Grade	Numerical Grade	Letter Grade	Numerical Grade	Letter Grade
97-100	A+	97-100	A+	67-69	D+
93-96	A	93-96	A	63-66	D
90-92	A-	90-92	A-	60-62	D-
87-89	B+	87-89	B+	<60	F
83-86	B	83-86	B		
80-82	B-	80-82	B-		
77-79	C+	77-79	C+		
73-76	C	73-76	C		
70-72	C-	70-72	C-		
<70	F				

9. **Missing an Exam:**

Make-ups for missed lecture exams will be made available only to the student who documents that they are unable to attend a scheduled exam AND have a legitimate reason for rescheduling. Severe illness requiring students to be away from school and family tragedies are all qualifying reasons for rescheduling an exam. Vacation plans, minor illness, work schedule conflicts and social functions (including weddings) are not qualifying reasons for rescheduling an exam. Students should contact the Course Director prior to the date of the exam if they will need to reschedule an exam. Students with sudden emergencies will need to document the reason for an absence. Students taking exams at anytime other than the scheduled time may be given an alternative exam.

F. **Faculty:**

1. **Course Director:** Dr. Diane M. Jaworski is responsible for course administration, student evaluation, and assignment of grades. Contact the course director concerning rescheduling an exam, post exam review, guidance on studying, or any other questions related to the course.

Dr. Diane M. Jaworski
Office: Health Science Research Facility (HSRF 418)
Phone: 656-0538
E-mail: diane.jaworski@uvm.edu

2. **Lecturers:** There are several instructors who will present lecture material throughout the semester. Although you may contact each lecturer directly with questions about the lecture material, the Course Director is an additional resource for assistance.

<u>Lecturer</u>	<u>Office</u>	<u>E-mail</u>
Sean Flynn, PhD	Given C450	sean.p.flynn@uvm.edu
Robert Hamill, MD	Given C225	robert.hamill@med.uvm.edu
Greg Holmes, MD	Stafford 118	gregory.holmes@med.uvm.edu
Andrew Solomon, MD	UVMMC - Arnold 2	andrew.solomon@uvmhealth.org
Alissa Thomas, MD	HSRF 432	alissa.thomas@uvm.edu
Danilo Vitorovic, MD	UVMMC - Arnold 2	danilo.vitorovic@uvmhealth.org

G. Where can you find HELP?

Help can be obtained in a variety of ways. Please avail yourself of any combination that works for you. Please, don't fall behind. Students who wait until the last moment to study invariably do poorly in courses. The Course Director and Lecturers are here to help, and want you to succeed. The Course Director is your primary point of contact should you have questions regarding the course material. If you have questions, ask promptly before or after lecture. Lecturers, other than the Course Director, do not have defined office hours, but you may directly contact them to make an appointment for help. Please understand that all of your lecturers have other teaching, research or clinical commitments; so, do not wait until just before the exam to make an appointment.

H. University Policies:

Student Learning Accommodations: In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact ACCESS, the office of Disability Services on campus. ACCESS works with students and faculty in an interactive process to explore reasonable and appropriate accommodations via an accommodation letter to faculty with approved accommodations as early as possible each semester. All students are strongly encouraged to meet with their faculty to discuss the accommodations they plan to use in each course.

ACCESS: A170 Living/Learning Center; 656-7753; access@uvm.edu; <http://www.uvm.edu/access>

UVM's policy on disability certification and student support:
<http://www.uvm.edu/~uvmppg/ppg/student/disability.pdf>

Academic Integrity: The policy addresses plagiarism, fabrication, collusion, and cheating.
<http://www.uvm.edu/~uvmppg/ppg/student/acadintegrity.pdf>

Grade Appeals: If you would like to contest a grade, please follow the procedures outlined in this policy: <http://www.uvm.edu/~uvmppg/ppg/student/gradeappeals.pdf>

Grading: For information on grading and GPA calculation, go to <http://www.uvm.edu/academics/catalogue> and click on Policies for an A-Z listing.

Code of Student Rights and Responsibilities:
<http://www.uvm.edu/~uvmppg/ppg/student/studentcode.pdf>

FERPA Rights Disclosure: The purpose of this policy is to communicate the rights of students regarding access to, and privacy of their student educational records as provided for in the Family Educational Rights and Privacy Act (FERPA) of 1974.
<http://www.uvm.edu/~uvmppg/ppg/student/ferpa.pdf>

Religious Holidays: Students have the right to practice the religion of their choice. If you need to miss class to observe a religious holiday, please submit the dates of your absence to the course director in writing by the end of the second full week of classes. You will be permitted to make up work within a mutually agreed-upon time.

Suggestions for Succeeding

1. **Attend lectures:** Students who don't attend lecture usually do not perform well in class. They also miss important class announcements and clarifications.
2. **Be respectful of your classmates:** Classes are for you to listen and learn, and the lecturers are trying their best to make the material understandable for your benefit. *If you come to class and socialize, you may be asked to leave the room.*
3. **Listen and take notes: Turn off your cell phone** and tune out your friends so you can get the most out of class. Bring your lecture notes to class so you can make notes in the margins and highlight areas stressed by the lecturer.
4. **Use the review articles as a resource:** If you did not understand something covered in lecture, use the review article as a reference source.
5. **Study every day:** The expectation for college students is that they **spend 2 hours of study time for every hour of lecture**. Spend this time by reviewing the lecture notes and review articles. **Don't wait until right before an exam**, and then study for 24 hours straight and expect to learn the material! This course covers a tremendous amount of new vocabulary, and can seem like you are studying a foreign language. If you wait until the last minute to study, you won't have time to master the vocabulary, let alone the concepts using that vocabulary.
6. **Don't wait until the last minute to start your News & Views assignment:** Didactic lectures and exams are completed before Thanksgiving break. However, your News & Views summary of one of the review articles is due on the last day of class (December 9th). If you wait to the last minute, you will have reports from all your other classes due. Therefore, plan ahead.
7. **Find some friends and study together:** Students who work together usually do well – you find out what you don't know by explaining it to each other. Working in a group also helps keep you motivated to stay current with the lecture material.
8. **DON'T WAIT TO ASK FOR HELP!**