

GENERAL STUDIES COURSE PROPOSAL COVER FORM

Course information:

Copy and paste **current** course information from Class Search/Course Catalog.

College/School College of Health Solutions Department/School Speech and Hearing Science
 Prefix: SHS Number: 230 Title: Peering into the Human Brain Units: 4

Course description:

Is this a cross-listed course? No If yes, please identify course(s): _____

Is this a shared course? No If so, list all academic units offering this course: _____

*Note- For courses that are crosslisted and/or shared, a letter of support from the chair/director of **each** department that offers the course is required for **each** designation requested. By submitting this letter of support, the chair/director agrees to ensure that all faculty teaching the course are aware of the General Studies designation(s) and will teach the course in a manner that meets the criteria for each approved designation.*

Is this a permanent-numbered course with topics? Yes

If yes, all topics under this permanent-numbered course must be taught in a manner that meets the criteria for the approved designation(s). It is the responsibility of the chair/director to ensure that all faculty teaching the course are aware of the General Studies designation(s) and adhere to the above guidelines.

Chair/Director Initials

WJ (Required)

Requested designation: Natural Sciences–SG

Mandatory Review: Yes

*Note- a **separate** proposal is required for each designation.*

Eligibility: Permanent numbered courses **must** have completed the university’s review and approval process. For the rules governing approval of omnibus courses, contact Phyllis.Lucie@asu.edu.

Submission deadlines dates are as follow:

For Fall 2018 Effective Date: October 1, 2017

For Spring 2019 Effective Date: March 10, 2018

Area(s) proposed course will serve:

A single course may be proposed for more than one core or awareness area. A course may satisfy a core area requirement and more than one awareness area requirements concurrently, but may not satisfy requirements in two core areas simultaneously, even if approved for those areas. With departmental consent, an approved General Studies course may be counted toward both the General Studies requirement and the major program of study.

Checklists for general studies designations:

Complete and attach the appropriate checklist

- Literacy and Critical Inquiry core courses (L)
- Mathematics core courses (MA)
- Computer/statistics/quantitative applications core courses (CS)
- Humanities, Arts and Design core courses (HU)
- Social-Behavioral Sciences core courses (SB)
- Natural Sciences core courses (SQ/SG)
- Cultural Diversity in the United States courses (C)
- Global Awareness courses (G)
- Historical Awareness courses (H)

A complete proposal should include:

- Signed course proposal cover form
- Criteria checklist for General Studies designation being requested
- Course catalog description
- Sample syllabus for the course
- Copy of table of contents from the textbook and list of required readings/books

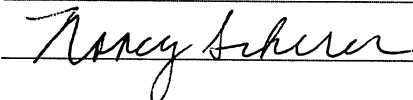
It is respectfully requested that proposals are submitted electronically with all files compiled into one PDF.

Contact information:

Name B. Blair Braden E-mail bbbraden@asu.edu Phone (480) 727-3414

Department Chair/Director approval: (Required)

Chair/Director name (Typed): Nancy Sherer Date: 3-6-18

Chair/Director (Signature): 

Arizona State University Criteria Checklist for

NATURAL SCIENCES [SQ/SG]

Rationale and Objectives

Public scientific literacy, critical for sound decisions on scientifically infused issues such as climate change, includes understanding of basic science concepts, such as the fundamental behavior of matter and energy. It also includes the understanding that "science" is not an encyclopedic collection of facts. Rather, it is a process of exploration that embraces curiosity, inquiry, testing, and communication, to reduce uncertainty about nature. Absent understanding of scientific concepts and of the nature of science, science and pseudoscience are difficult to distinguish, and normal scientific disagreements may be misinterpreted as ideological or political disputes. The goal of the natural sciences (SQ/SG) requirement, including the laboratory requirement, is to instill understanding of basic science content and of the nature of science in every ASU graduate.

10/1989

REV: 1/1991, 3/1991, 1/2000, 10/2008, 4/2014

Proposer: Please complete the following sections and attach appropriate documentation.

ASU--[SQ] CRITERIA			
I. - FOR ALL QUANTITATIVE [SQ] NATURAL SCIENCES CORE AREA COURSES, THE FOLLOWING ARE CRITICAL CRITERIA AND MUST BE MET:			
YES	NO		Identify Documentation Submitted
<input type="checkbox"/>	<input type="checkbox"/>	A. Course emphasizes the mastery of basic scientific principles and concepts.	
<input type="checkbox"/>	<input type="checkbox"/>	B. Addresses knowledge of scientific method.	
<input type="checkbox"/>	<input type="checkbox"/>	C. Includes coverage of the methods of scientific inquiry that characterize the particular discipline.	
<input type="checkbox"/>	<input type="checkbox"/>	D. Addresses potential for uncertainty in scientific inquiry.	
<input type="checkbox"/>	<input type="checkbox"/>	E. Illustrates the usefulness of mathematics in scientific description and reasoning.	
<input type="checkbox"/>	<input type="checkbox"/>	F. Includes weekly laboratory and/or field sessions that provide hands-on exposure to scientific phenomena and methodology in the discipline, and enhance the learning of course material.	
<input type="checkbox"/>	<input type="checkbox"/>	G. Students submit written reports of laboratory experiments for constructive evaluation by the instructor.	
<input type="checkbox"/>	<input type="checkbox"/>	H. Course is general or introductory in nature, ordinarily at lower-division level; not a course with great depth or specificity.	
II. - AT LEAST ONE OF THE FOLLOWING ADDITIONAL CRITERIA MUST BE MET WITHIN THE CONTEXT OF THE COURSE:			
<input type="checkbox"/>	<input type="checkbox"/>	A. Stresses understanding of the nature of basic scientific issues.	
<input type="checkbox"/>	<input type="checkbox"/>	B. Develops appreciation of the scope and reality of limitations in scientific capabilities.	
<input type="checkbox"/>	<input type="checkbox"/>	C. Discusses costs (time, human, financial) and risks of scientific inquiry.	
NOTE: CRITERIA FOR [SG] COURSES BEGIN ON PAGE 4.			

III. - [SQ] COURSES MUST ALSO MEET THESE ADDITIONAL CRITERIA:			
YES	NO		Identify Documentation Submitted
<input type="checkbox"/>	<input type="checkbox"/>	A. Provides a substantial, quantitative introduction to fundamental principles governing behavior of matter and energy, in physical or biological systems.	
		B. Includes a college-level treatment of some of the following topics (check all that apply below):	
<input type="checkbox"/>	<input type="checkbox"/>	a. Atomic and molecular structure	
<input type="checkbox"/>	<input type="checkbox"/>	b. Electrical processes	
<input type="checkbox"/>	<input type="checkbox"/>	c. Chemical processes	
<input type="checkbox"/>	<input type="checkbox"/>	d. Elementary thermodynamics	
<input type="checkbox"/>	<input type="checkbox"/>	e. Electromagnetics	
<input type="checkbox"/>	<input type="checkbox"/>	f. Dynamics and mechanics	
[SQ] REQUIREMENTS CANNOT BE MET BY COURSES:			
<ul style="list-style-type: none"> • Presenting a qualitative survey of a discipline. • Focusing on the impact of science on social, economic, or environmental issues. • Focusing on a specific or limiting but in-depth theme suitable for upper-division majors. 			

Proposer: Please complete the following section and attach appropriate documentation.

ASU--[SG] CRITERIA			
I. - FOR ALL <i>GENERAL</i> [SG] NATURAL SCIENCES CORE AREA COURSES, THE FOLLOWING ARE CRITICAL CRITERIA AND MUST BE MET:			
YES	NO		Identify Documentation Submitted
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. Course emphasizes the mastery of basic scientific principles and concepts.	Syllabus; Text Book Table of Contents
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. Addresses knowledge of scientific method.	Syllabus; Text Book Table of Contents
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. Includes coverage of the methods of scientific inquiry that characterize the particular discipline.	Syllabus; Text Book Table of Contents
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. Addresses potential for uncertainty in scientific inquiry.	Syllabus; Text Book Table of Contents
<input checked="" type="checkbox"/>	<input type="checkbox"/>	5. Illustrates the usefulness of mathematics in scientific description and reasoning.	Syllabus
<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. Includes weekly laboratory and/or field sessions that provide hands-on exposure to scientific phenomena and methodology in the discipline, and enhance the learning of course material.	Syllabus; Supp. Material: Example Lab Description
<input checked="" type="checkbox"/>	<input type="checkbox"/>	7. Students submit written reports of laboratory experiments for constructive evaluation by the instructor.	Syllabus; Supplemental Material: Example Lab Assignment
<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. Course is general or introductory in nature, ordinarily at lower-division level; not a course with great depth or specificity.	Syllabus; Text Book Table of Contents
II. - AT LEAST ONE OF THE ADDITIONAL CRITERIA THAT MUST BE MET WITHIN THE CONTEXT OF THE COURSE:			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	A. Stresses understanding of the nature of basic scientific issues.	Syllabus; Text Book Table of Contents
<input checked="" type="checkbox"/>	<input type="checkbox"/>	B. Develops appreciation of the scope and reality of limitations in scientific capabilities.	Syllabus; Text Book Table of Contents

<input checked="" type="checkbox"/>	<input type="checkbox"/>	C. Discusses costs (time, human, financial) and risks of scientific inquiry.	Syllabus; Text Book Table of Contents
-------------------------------------	--------------------------	--	--

[SG] REQUIREMENTS CANNOT BE MET BY COURSES:		
	<ul style="list-style-type: none">• Presenting a qualitative survey of a discipline.	
	<ul style="list-style-type: none">• Focusing on the impact of science on social, economic or environmental issues.	
	<ul style="list-style-type: none">• Focusing on a specific or limiting but in-depth theme suitable for upper-division majors.	

Course Prefix	Number	Title	General Studies Designation
SHS	230	Peering into the Human Brain	SG

Explain in detail which student activities correspond to the **specific** designation criteria. Please use the following organizer to explain how the criteria are being met.

Criteria (from checklist)	How course meets spirit (contextualize specific examples in next column)	Please provide detailed evidence of how course meets criteria (i.e., where in syllabus)
1. Course emphasizes the mastery of basic scientific principals and concepts.	The first two weeks are dedicated to the basic scientific principals and concepts of neuron structure, communication, brain organization, and neurotransmitter systems. This is foundational for students to later and understand how disorders/diseases perturb these systems. These concepts are cemented in the first two labs. Lab 1 uses tennis balls to mimic how ions trigger neural communication. Lab 2 gives students hands on opportunities with mammal brains (human, sheep, and rat) to understand the brain architecture and differences across species.	Syllabus: Course overview and Learning outcomes Syllabus: General topic schedule: Week 1: The parts of the neuron; Neuronal communication; Week 2: Neuroanatomy; Neurotransmitter systems Text Book: Chapter 1, 2, and 5
2. Addresses knowledge of scientific method.	During lecture in week 3, we review the scientific method and how it is applied to human brain research methods. Students then put the scientific method into practice in weeks 14 and 15 by constructing a hypothesis, testing an experiment, analyzing data, and drawing conclusions	Syllabus: Course overview and Learning outcomes Syllabus: General topic schedule: Week 3: Brain Research Methods; Week 13: Lab Activity: Sex differences experiment; Week 14: Lab Activity: Sex differences data analysis Text Book: Chapter 3
3. Includes coverage of the methods of scientific inquiry that characterize the particular discipline.	Week 3 also teaches the major methods currently in use to study the brain in humans. Students go deeper in this understanding in Lab 3 by finding a brain	Syllabus: Course overview and Learning outcomes Syllabus: General topic schedule: Week 3: Brain Research Methods; Week 4: Lateralization; Week 5: Executive functions; Week 6: Schizophrenia and autism; Week 8: Long-term memory; Week 9:

	<p>research paper to discuss. As we move through the specific topics, we discuss the methods used to determine 1) brain lateralization, 2) executive functions, 3) schizophrenia and autism characterizations, 4) long-term memory, 5) dementia characterization, 6) procedural memory, 7) language neuroanatomy/aphasia, 8) cognitive sex difference, and 9) facial, emotional, and vision processing</p>	<p>Dementia; Week 10: Procedural memory; Week 12: Language neuroanatomy/aphasia; Week 13: Sex difference; Week 14: Facial, emotional, and vision processing</p> <p>Text Book: Chapter 3, 4, 6, 7, 8, 9, 11, 12, and 13</p>
<p>4. Addresses the potential for uncertainty in scientific inquiry.</p>	<p>When reviewing each of the brain research methods, students learn what the method does well and the uncertainties that remain. Further, in lab 4, students compare and contrast how the methodology and results of a given brain research paper are presented in lay media versus peer-reviewed journals. One of the lessons here is that uncertainty in scientific inquiry is often overlooked by the lay media. As the semester continues, students learn the vastness of uncertainty that remains in the scientific understanding of how the brain underlies human behavior. This is highlighted for neuroplasticity (e.g. traumatic brain injury and long-term memory) and understanding the etiology of brain disorders and diseases (e.g. schizophrenia, autism, amnesia, dementia, depression, aphasia, agnosia).</p>	<p>Syllabus: Course overview and Learning outcomes</p> <p>Syllabus: General topic schedule: Week 3: Brain Research Methods; Lab Activity: Brain imaging in the media; Week 4: Traumatic Brain Injury; Week 6: Schizophrenia and autism; Week 8: Long-term memory; Week 9: Dementia; Week 11: Depression; Week 12: Aphasia; Week 15: Agnosia</p> <p>Text Book: Chapter 3, 6, 9, 10, 11, and 13</p>

Criteria (from checksheet)	How course meets spirit (contextualize specific examples in next column)	Please provide detailed evidence of how course meets criteria (i.e., where in syllabus)
5. Illustrates the usefulness of mathematics in scientific description and reasoning.	In Week 3, students learn a basic understanding of how mathematics are applied to brain research. We then spend an entire lecture on the functional brain imaging techniques, fMRI and EEG. Here, students are given a clear demonstration and appreciation of how mathematics (statistics) are necessary to interpret findings, and that the way statistics are implemented can alter the results. Ethical implications of this are discussed. In Lab 13, students put what they've learned into practice by completing a field assignment of data collection on cognitive test in participants of both sexes. Lab 14 is an in class demonstration and participation using mathematical statistics to interpret the results.	Syllabus: Course overview Syllabus: General topic schedule: Week 3: Brain research methods and imaging the brain; Week 13: Sex differences experiment; Week 14: Lab Activity: Sex differences data analysis Text Book: Chapter 3
6. Includes weekly laboratory and/or field sessions that provide hands-on exposure to scientific phenomena and methodology in the discipline, and enhance the learning of course material.	Students complete either a weekly laboratory or field session that provides hands-on exposure to cognitive and language brain function phenomena and methodology. An example laboratory instructions and assignment has been submitted as Supplemental Material.	Syllabus: General topic schedule: Lab Activities Syllabus: Course grading: Methods of evaluation and Description of assessments Supplemental Material: Example lab description
7. Students submit written reports of laboratory experiments for constructive evaluation by the instructor.	Students submit weekly reports of either a laboratory or field session. Each report is graded by the instructor and given constructive feedback.	Syllabus: General topic schedule: Assignments Supplemental Material: Example lab assignment Syllabus: Course grading: Methods of evaluation and Description of assessments

<p>8. Course is general or introductory in nature, ordinarily at lower-division level; not a course with great depth or specificity.</p>	<p>This 200-level course provides an overview of many brain research techniques and the types of typical versus disorder/disease-related cognitive processes. The topics change frequently, with no more than one lecture devoted to each in order to provide a general introduction of this large field.</p>	<p>Syllabus: General topic schedule: Lecture topics Text Book: Chapters 1 - 14</p>
<p>A. Stresses understanding of the nature of basic scientific issues.</p>	<p>Understanding human behavior is fundamental to our existence. This course illustrates how understanding the human brain is a necessary scientific issue towards our quest of understanding human behavior.</p>	<p>Syllabus: Course overview and Learning outcomes Text Book: Chapter 1 and 14</p>
<p>B. Develops appreciation of the scope and reality of limitations in scientific capabilities.</p>	<p>Each week, students are exposed to the many amazing discoveries of the human brain and the vast limitations of our current methodology and understanding.</p>	<p>Syllabus: Course overview and Learning outcomes Text Book: Chapter 1 and 3</p>
<p>C. Discusses cost (time, human, financial) and risks of scientific inquiry.</p>	<p>Each brain research method is contextualized by the level of invasiveness (i.e. cost and risk). Further, a detailed history of brain research methods is presented which demonstrates the evolution of ethical considerations in the field. The costs/risks of scientific inquiry are revisiting again and again throughout the semester. In our quest to understand human behavior, we must consider resources and the risks to the humans we are studying. This is highlighted for understanding split brain, autism and brain development, schizophrenia, dementia, Parkinson's disease, depression, aphasia, sex differences, and agnosia). The discussion is pushed further into the future of considering the</p>	<p>Syllabus: General topic schedule: Week 3: Brain Research Methods; Week 4: Split-Brain; Week 6: Schizophrenia and autism; Week 9: Dementia; Week 10: Parkinson's disease; Week 11: Depression; Week 12: Aphasia; Week 13: Sex difference; Week 15: Agnosia Text Book: Chapters 1, 3, 4, 10, 11, 13, and 14</p>

	application of brain research in legal realms when applicable.	
--	--	--

Peering into the Human Brain

SHS 230

Catalog Description

An introductory look into the cognitive and language functions of the human brain, and the resulting behavioral consequences of injury, disease, and disorders.

Peering into the Human Brain

SHS 230

Lecture and Lab Syllabus

Faculty Information

Name: Dr. B. Blair Braden
Office: Coor 3410
Phone: (480) 727 - 3414
Email address: bbbraden@asu.edu
Office hours: Arranged via email

Course Information

Course Number

SHS 230

Course Title

Peering into the Human Brain

Credit Hours

4

Course Modality

Face-to-Face Course

Course Meeting Information

TBD
Tempe Campus

Prerequisites

- None

Corequisites

- None

Catalog Description

An introductory look into the cognitive and language functions of the human brain, and the resulting behavioral consequences of injury, disease, and disorders.

Course Overview

It is only by peering into our own brain that we can begin to understand the biology of what makes us human. “Under the hood” we find the most complex object in the world that we are only beginning to understand. In this class, we will cover the basics of healthy brain functioning and typical cognitive and language processing as well as the impact of brain damage and brain-based disorders, such as autism, amnesia, dyslexia, and aphasia. We will emphasize the basic scientific principles and concepts that allow us to deduce brain-cognition relationships. In particular, we will explore how the scientific method and statistics apply to neuro-imaging

techniques, case study research, and hands-on experiments, and the possibility for uncertainty in scientific inquiry.

Learning Outcomes

At the completion of this course, students will be able to:

- Understand the basic scientific principles of cognitive and language brain functions, and the resulting behavioral consequences of injury, disease, and disorders.
- Ability to apply the scientific method to cognitive and language brain science questions.
- Describe current methods used to understand cognitive and language brain science.
- Identify the many scientific uncertainties of how the brain performs human cognitive and language functions.
- Ability to apply basic statistics to analyze neuropsychological data.

Course Materials

Required Materials

- *Cognitive Neuroscience: The Biology of the Mind, 4th Edition* by Michael S. Gazzaniga (Can rent on Amazon for less than purchasing).
- Online content populated in Blackboard to complete some lab assignments.

Optional Materials

- Additional freely available online content populated in Blackboard.

General Topic Schedule

Week	Lecture Topics	Lab Activities	Assignments
Week 1	<ul style="list-style-type: none"> • The parts of the neuron • Neuronal communication 	<ul style="list-style-type: none"> • Ion tennis ball game 	<ul style="list-style-type: none"> • Read Ch. 1 & 2 • Lab report
Week 2	<ul style="list-style-type: none"> • Neuroanatomy • Neurotransmitter systems 	<ul style="list-style-type: none"> • Real-life brain dissections 	<ul style="list-style-type: none"> • Read Ch. 5 • Lab report
Week 3	<ul style="list-style-type: none"> • Brain research methods • Imaging the brain 	<ul style="list-style-type: none"> • Brain imaging in the media 	<ul style="list-style-type: none"> • Read Ch. 3 & 14 • Lab report • Quiz
Week 4	<ul style="list-style-type: none"> • Lateralization/hemispherectomy • Traumatic brain injuries 	<ul style="list-style-type: none"> • Split-brain - experiments 	<ul style="list-style-type: none"> • Read Ch. 4 • Lab report
Week 5	<ul style="list-style-type: none"> • Frontal & parietal lobes • Executive functions 	<ul style="list-style-type: none"> • Working memory span testing 	<ul style="list-style-type: none"> • Read Ch. 7 & 12 • Lab report • Quiz
Week 6	<ul style="list-style-type: none"> • Schizophrenia • Autism 	<ul style="list-style-type: none"> • Building neural networks 	<ul style="list-style-type: none"> • Read Ch. 13 • Lab report

Week	Lecture Topics	Lab Activities	Assignments
Week 7	<ul style="list-style-type: none"> • Review • Mid-Term 	<ul style="list-style-type: none"> • Virtual brain dissections 	<ul style="list-style-type: none"> • Lab report • Mid-term
Week 8	<ul style="list-style-type: none"> • Temporal lobe & synaptic plasticity • Long-term memory 	<ul style="list-style-type: none"> • Episodic memory field assignment 	<ul style="list-style-type: none"> • Reach Ch. 9 • Lab report
Week 9	<ul style="list-style-type: none"> • Amnesia • Dementia 	<ul style="list-style-type: none"> • H.M. & Wearing case studies 	<ul style="list-style-type: none"> • Lab report • Quiz
Week 10	<ul style="list-style-type: none"> • Basal Ganglia & Cerebellum • Parkinson's & procedural memory 	<ul style="list-style-type: none"> • Mirror tracing test 	<ul style="list-style-type: none"> • Read Ch. 8 • Lab report
Week 11	<ul style="list-style-type: none"> • Limbic System: Emotional Memory; Depression • Right Hemisphere Damage 	<ul style="list-style-type: none"> • Psychedelics as therapeutics 	<ul style="list-style-type: none"> • Read Ch. 10 • Lab report • Quiz
Week 12	<ul style="list-style-type: none"> • Language neuroanatomy • Aphasia 	<ul style="list-style-type: none"> • Neuroimaging stroke case study 	<ul style="list-style-type: none"> • Read Ch. 11 • Lab report
Week 13	<ul style="list-style-type: none"> • Spatial processing/memory • Hormones & sex differences 	<ul style="list-style-type: none"> • Sex differences experiment 	<ul style="list-style-type: none"> • Lab report • Quiz
Week 14	<ul style="list-style-type: none"> • Facial and Emotional Processing • Vision Pathway 	<ul style="list-style-type: none"> • Sex differences data analysis 	<ul style="list-style-type: none"> • Read Ch. 6 • Lab report
Week 15	<ul style="list-style-type: none"> • Agnosia • Review 	<ul style="list-style-type: none"> • Optical illusions 	<ul style="list-style-type: none"> • Lab report • Final

Course Grading

Methods of Instruction

This course uses Blackboard™ for the facilitation of communications between faculty and students, submission of assignments, and posting of grades. The course site can be accessed at <http://my.asu.edu> or <http://myasucourses.asu.edu>. All required materials, including readings, videos, and interactive activities, will be posted on the class Blackboard site. Thus, it is very important that you check the site regularly and that the email account associated with Blackboard is able to receive and send messages in a timely manner. We will send out important email messages with reading lists, websites, updated summary outlines, and changes to schedules.

Activities in this course include discussion/presentations; textbook and supplemental readings; individual and group laboratory activities; and case scenarios.

Methods of Evaluation

Assessment Type	Number in Course	Total Course Value
Lab Reports	15	150 points/30%
Quiz	5	150 points/30%
Mid-Term	1	100 points/20%
Final	1	100 points/20%

Description of Assessments

- **Lab Reports:** Written report of laboratory and/or field sessions that provide hands-on exposure to cognitive and language brain function phenomena and methodology.
- **Quizzes:** Closed-note, 10-20 questions covering lectures, reading materials, online materials, and videos covered since the last quiz/mid-term. These are *not* cumulative.
- **Mid-Term:** The mid-term exam will cover lectures, reading materials, online materials, videos, labs, and field research presented in the first half of the course. It will consist of multiple-choice, fill-in-the blanks, and short answer questions.
- **Final:** The final exam will cover lectures, reading materials, online materials, videos, labs, and field research presented from the entire semester, but with a greater focus on the second half of the course. It will consist of multiple-choice, fill-in-the blanks, and short answer questions.

Grading Procedure

Grades reflect your performance on assignments and adherence to deadlines. Graded assignments will be available within one week of the due date via the My Grades tab in Blackboard.

Grading

Grade	Percentage	Points Range
A	90 – 100%	448 - 500
B	80 – 89%	398 - 447
C	70 – 79%	348 - 397
D	60 – 69%	298 - 347
E	Below 60%	297 and below

Course Policies & Procedures

Technology Enhanced Course

This is a face-to-face course that requires attendance in face-to-face meetings and utilization of online resources.

Communicating With the Instructor

When you have a general question about the course, please check with the syllabus, Blackboard announcements, and your classmates. If you do not find an answer, you may e-mail the class TA or me. You can expect a response within 48 hours.

Email and Internet

ASU email is an official means of communication among students, faculty, and staff (<http://www.asu.edu/aad/manuals/ssm/ssm107-03.html>). Students are expected to read and act upon email in a timely fashion. Students bear the responsibility of missed messages and should check their ASU-assigned email regularly.

All instructor correspondence will be sent to your ASU email account.

Campus Network or Blackboard™ Outage

When access to Blackboard™ is not available for an extended period of time (greater than one entire evening) you can reasonably expect that the due date for assignments will be changed to the next day (assignment still due by 11:59pm).

If an outage occurs, it is expected that you will confirm that the outage is with the University and not your local internet service provider. To monitor the status of campus networks and services, please visit the System Health Portal (<http://syshealth.asu.edu/>). If a system-wide ASU outage is NOT listed, you are responsible for contacting the ASU Help Desk to report and troubleshoot the issue. By contacting the help desk, a request case number will be created for you, which serves as an important documentation of your attempt to resolve any technical problems in a timely fashion. You may be required to forward this documentation to your instructor.

Course Time Commitment

This four-credit course requires approximately 180 hours of work. Please expect to spend 4 hours each week in class and around 8 hours each week completing homework and preparing for the class time.

Late or Missed Assignments

Notify the instructor **BEFORE** an assignment is due if an urgent situation arises and the assignment will not be submitted on time. Published assignment due dates (Arizona Mountain Standard time) are firm. Please follow the appropriate University policies to request an accommodation for religious practices (<http://www.asu.edu/aad/manuals/acd/acd304-04.html>) or to accommodate a missed assignment due to University-sanctioned activities (<http://www.asu.edu/aad/manuals/acd/acd304-02.html>).

Submitting Assignments

All assignments, unless otherwise announced, **MUST** be submitted to the designated area of Blackboard™. Do not submit an assignment via other methods unless specifically directed.

Drop and Add Dates/Withdrawals

This course adheres to a set schedule and may be part of a sequenced program, therefore, there is a limited timeline to drop or add the course (<https://students.asu.edu/academic-calendar>). Consult with your advisor and notify your instructor to add or drop this course. If you are considering a withdrawal, review the following ASU policies:

- Withdrawal from Classes (<http://www.asu.edu/aad/manuals/ssm/ssm201-08.html>)
- Medical/Compassionate Withdrawal (<http://www.asu.edu/aad/manuals/ssm/ssm201-09.html>)
- Grade of Incomplete (<http://www.asu.edu/aad/manuals/ssm/ssm203-09.html>)

Grade Appeals

Grade disputes must first be addressed by discussing the situation with the instructor. If the dispute is not resolved with the instructor, the student may appeal to the department chair per the University Policy for Student Appeal Procedures on Grades (<https://catalog.asu.edu/appeal>).

Student Conduct and Academic Integrity

ASU expects and requires its students to act with honesty, integrity, and respect. Required behavior standards are listed in the Student Code of Conduct and Student Disciplinary Procedures (<http://www.asu.edu/aad/manuals/ssm/ssm104-01.html>), Computer, Internet, and Electronic Communications policy (<http://www.asu.edu/aad/manuals/acd/acd125.html>), ASU Student Academic Integrity Policy (<http://provost.asu.edu/academicintegrity>), and outlined by the Office of Student Rights & Responsibilities (<https://eoss.asu.edu/dos/srr>). Anyone in violation of these policies is subject to sanctions.

Students are entitled to receive instruction free from interference by other members of the class (<http://www.asu.edu/aad/manuals/ssm/ssm104-02.html>). An instructor may withdraw a student from the course when the student's behavior disrupts the educational process per Instructor Withdrawal of a Student for Disruptive Classroom Behavior (<http://www.asu.edu/aad/manuals/usi/usi201-10.html>).

Appropriate online behavior (also known as *netiquette*) is defined by the instructor and includes keeping course discussion posts focused on the assigned topics. Students must maintain a cordial atmosphere and use tact in expressing differences of opinion. Inappropriate discussion board posts may be deleted by the instructor.

The Office of Student Rights and Responsibilities accepts incident reports (<https://eoss.asu.edu/dos/srr/filingreport>) from students, faculty, staff, or other persons who believe that a student or a student organization may have violated the Student Code of Conduct.

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at

<http://sexualviolenceprevention.asu.edu/faqs/students>

As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, <https://eoss.asu.edu/counseling>, is available if you wish discuss any concerns confidentially and privately.

Prohibition of Commercial Note Taking Services

In accordance with ACD 304-06 Commercial Note Taking Services (<http://www.asu.edu/aad/manuals/acd/acd304-06.html>), written permission must be secured from the official instructor of the class in order to sell the instructor's oral communication in the form of notes. Notes must have the note taker's name as well as the instructor's name, the course number, and the date.

Course Evaluation

Students are expected to complete the course evaluation. The feedback provides valuable information to the instructor and the college and is used to improve student learning. Students are notified when the online evaluation form is available.

Syllabus Disclaimer

The syllabus is a statement of intent and serves as an implicit agreement between the instructor and the student. Every effort will be made to avoid changing the course schedule but the possibility exists that unforeseen events will make syllabus changes necessary. Please remember to check your ASU email and the course site often.

Accessibility Statement

Disability Accommodations: Qualified students with disabilities who will require disability accommodations in this class are encouraged to make their requests to me at the beginning of the semester either during office hours or by appointment. Note: Prior to receiving disability accommodations, verification of eligibility from the Disability Resource Center (DRC) is required. Disability information is confidential.

Establishing Eligibility for Disability Accommodations: Students who feel they will need disability accommodations in this class but have not registered with the Disability Resource Center (DRC) should contact DRC immediately. Students should contact the Disability Resource Center, campus-specific location and contact information (<https://eoss.asu.edu/drc/contactus>) can be found on the DRC website. DRC offices are open 8 a.m. to 5 p.m. Monday – Friday. Check the DRC website (<http://eoss.asu.edu/drc>) for eligibility and documentation policies.

Email: DRC@asu.edu

DRC Phone: (480) 965-1234

DRC FAX: (480) 965-0441

Technical Requirements & Support

Computer Requirements

This course requires Internet access and the following:

- A web browser. Please use only Google Chrome (<https://www.google.com/chrome>) or

- Mozilla Firefox (<http://www.mozilla.org/en-US/firefox/new/>)
- Adobe Acrobat Reader (<http://get.adobe.com/reader/>)
- Adobe Flash Player (<http://get.adobe.com/flashplayer/>)
- Microphone (optional) and speaker

Computer Skills Requirements

It is expected that you will be able to do at least the following tasks on a computer:

- Use the Blackboard™ Learning Management System (see <https://myasu.force.com/akb?id=kA3d00000004jh4> for assistance)
- Using ASU email
- Creating and submitting files in commonly used word processing program formats (specifically Microsoft Word)
- Copying and pasting text
- Downloading and installing software
- Using spreadsheet programs (specifically Microsoft Excel)
- Using presentation and graphic programs

Technical Support

This course uses Blackboard™ to deliver course content. It can be accessed through MyASU at <http://my.asu.edu> or the Blackboard™ home page at <http://myasucourse.asu.edu/>.

To monitor the status of campus networks and services, visit the System Health Portal at <http://syshealth.asu.edu/> or via Twitter by following @ASUOutages.

To contact the help desk you have two options:

- Website: accessed through the MyASU Service Center at <http://my.asu.edu/service>
- Chat: accessed through the MyASU Service Center at <http://my.asu.edu/service>
- Call toll-free at 1-855-278-5080

This syllabus and all other course materials (powerpoint slides, handouts, assignments, quizzes, exams, digital recordings, etc.) are intellectual property of Arizona State University and are not to be publicly distributed or otherwise commercialized since these materials are copyright protected. Publishing, uploading, linking, redistributing, and/or downloading course material may subject students to penalties for academic misconduct. Such materials are for sole use in that designated semester. It cannot be used in any other form unless via a written statement of approval from the instructor of record. Commercial note taking services are prohibited without written permission from the instructor of record in accordance with ACD 304-06 available at <http://www.asu.edu/aad/manuals/acd/acd304-06.html>. This includes powerpoint slides and powerpoint slides with audio.

Cognitive Neuroscience: The Biology of the Mind, 4th Edition by
Michael S. Gazzaniga

Table of Contents

Brief Overview

PART I Background and Methods

- 1** A Brief History of Cognitive Neuroscience 2
- 2** Structure and Function of the Nervous System 22
- 3** Methods of Cognitive Neuroscience 70

PART II Core Processes

- 4** Hemispheric Specialization 120
- 5** Sensation and Perception 162
- 6** Object Recognition 218
- 7** Attention 272
- 8** Action 326
- 9** Memory 378
- 10** Emotion 424
- 11** Language 468

PART III Control Processes

- 12** Cognitive Control 506
- 13** Social Cognition 558
- 14** Consciousness, Free Will, and the Law 604

SHS 230: Peering into the Human Brain

Lab Instructions – Neural Development and Autism

Overview: In this lab assignment, students use beads, string, scissors, and tape to symbolize neural networks according to the eight stages of neural development. One half of the class will construct a typical neural network and the other half of the class will construct an “autism-like” neural network. This will happen sequentially, so the entire class will be engaged and participating in the planning and designing of each network.

“Typical” Neural Network:

1. White foam balls which represent the proliferation of stem/neural progenitor cells are passed out to about half of the students.
2. White string is given to the same students and they are asked to connect with a student who does not have a white foam ball. This represents radial glia that the neural progenitor cells will use to migrate to their appropriate place in the brain. Students place string through the white foam balls and move them to the end of the string.
3. Multi-color wooden beads are passed out to all students to replace the white foam balls. This represents differentiation into specific neural types.
4. Students are asked to work together to aggregate all like-colored neurons together.
5. Green and red string is passed out to all students to begin synaptogenesis. Students form connections between neurons. Care is taken to make sure there is a balance of green and red string to symbolize the necessary balance of excitation and inhibition. Further, care is taken to ensure there are a balance of short and long connections.
6. Some neurons are collected from the students to represent the normal cell death that occurs in development.
7. Some strings are cut to represent the normal synaptic pruning that occurs in development. Again, care is taken to make sure there is a balance of green and red string and short and long connections.
8. Finally, yellow tape is placed along some connections to represent myelination. In particular, long range connections are heavily myelinated.

“Autism Spectrum Disorder-Like” Neural Network:

1. Proliferation happens unevenly with too many stem/neural progenitor cells passed out to in some places and not enough in others.
2. Migration is disorganized in some cases, where the neural progenitor cell does not follow the path of its radial glia and ends up in another location. In other cases, migration happens as it should.
3. A different balance of multi-color wooden beads are passed out to students which represents that in differentiation some cells may not become the “right” cell.
4. When students are aggregating all like-colored neurons together, some intentional mistakes are made to represent that some neurons may not group together appropriately.

5. Green and red string is passed out to all students to begin **synaptogenesis**. Students form connections between neurons. In this case, less care is taken to make sure there is a balance of green and red string. There will be slightly more green string to symbolize the over-excitation that can occur in autism. Further, less care is taken to ensure there are a balance of short and long connections, and the end result is too many short connects, not enough long.
6. Some neurons are collected from the students to represent the normal **cell death** that occurs in development, but in this case many neurons may be taken from one area and very few from another. This illustrates how in autism some brain structures end up with more neurons than typical and some with less than typical.
7. Some strings are cut to represent the normal **synaptic pruning** that occurs in development. Again, less care is taken to make sure there is a balance of green and red string. There will be slightly more green string to symbolize the over-excitation and more short connects to symbolize over “local” connectivity and under long-range connectivity.
8. Finally, less yellow tape is placed along the connections to represent less **myelination** that is characteristic of autism.

Pictures: Students take pictures of each of the neural networks to turn in with their lab assignment.

Lab Assignment: Students draw the eight steps of neural development, a “typical” developed neural network, and an “autism-like” neural network. Finally, students list three differences between networks.

SHS 230: Peering into the Human Brain

Lab Assignment – Neural Network Development and Autism

2/15/18

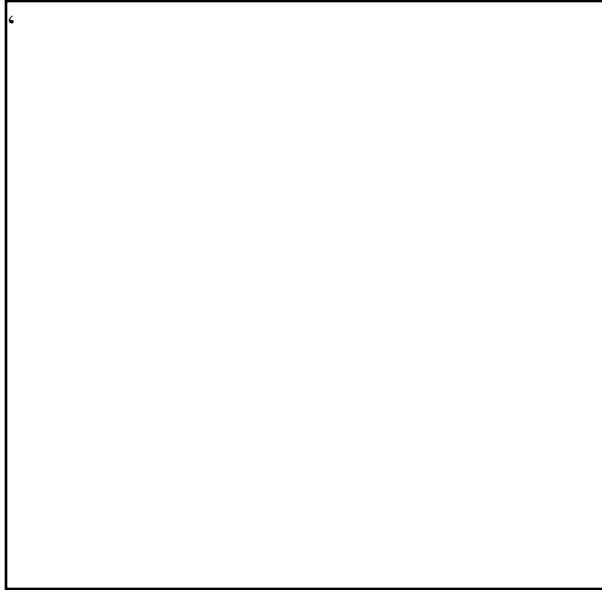
Name:

Draw each step of neural network development:

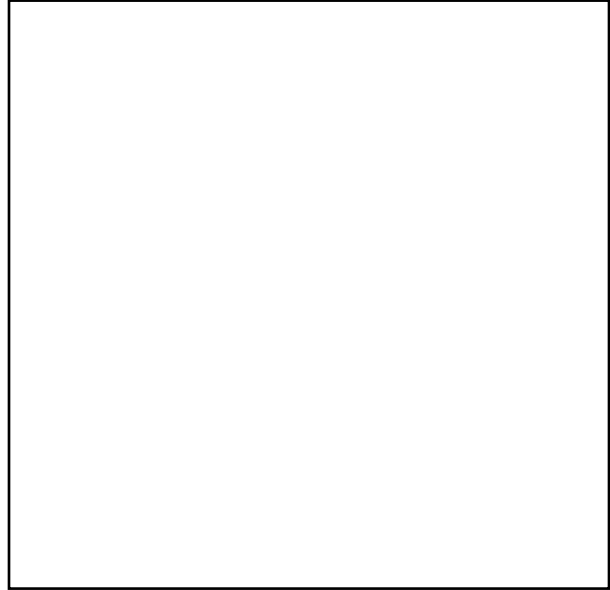
1. Proliferation
2. Migration
3. Differentiation
4. Aggregation
5. Synaptogenesis
6. Cell Death
7. Synaptic Pruning
8. Myelination

Draw a typical neural network and an “ASD” neural network:

Typical



ASD



List three differences between the two networks:

- 1.
- 2.
- 3.

SHS 230: Peering into the Human Brain

Lab Assignment – Brain Research in the Media

Name:

Being an informed consumer of scientific research will help you navigate our ever-expanding world of knowledge. Thinking critically about research studies is a key component to using new information in your personal and maybe even professional life. This lab exercise is meant to help you understand 1) how brain research studies are designed, 2) what type of techniques are used, 3) how research may be misrepresented in the media, and 4) limitations of current methods.

1. Find and read a lay internet article aimed to the general public that describes some type of brain research (preferably about language or memory brain areas or related disorders).
 - a. Example websites: CNN, Google News, New York Times, BBC news, USA Today, etc. (example articles are on the next page).
2. Find and read (at least skim) the original peer-reviewed research article from the scientific journal. Typically, the internet article will give you information about the author, title, and/or journal it was published in or have a link to the original article. This link may not give you access to the whole thing, but it should at least give you the title and abstract. Once you have info about the original article, to find the full text:
 - a. Log into my.asu.edu
 - b. Go to <https://scholar.google.com/>, search for the title, authors, journal, or keywords
 - c. Click on the links to the right of the article (circled in red):

Secure | <https://scholar.google.com/scholar?q=Loss+of+mTOR-Dependent+Macroautophagy+Causes+Autistic-like+Synaptic+Pruning+Deficits&btnG=&hl:>

Web Images More...

Google

Scholar

Articles [\[HTML\] Loss of mTOR-dependent macroautophagy causes autistic-like synaptic pruning deficits](#)

Case law [G Tang, K Gudsruk, SH Kuo, ML Cotrina, G Rosoklija... - Neuron, 2014 - Elsevier](#)

My library [Summary Developmental alterations of excitatory synapses are implicated in autism spectrum disorders \(ASDs\). Here, we report increased dendritic spine density with reduced developmental spine pruning in layer V pyramidal neurons in postmortem ASD temporal lobe. These spine deficits correlate with hyperactivated mTOR and impaired autophagy. In Tsc2+/- ASD mice where mTOR is constitutively overactive, we observed postnatal spine ...](#)

Any time [Cited by 166 Related articles All 20 versions Cite Save](#)

Since 2017

Since 2016

Since 2013

Custom range...

Showing the best result for this search. [See all results](#)

Sort by relevance

About Google Scholar Privacy Terms Provide feedback

[\[HTML\] sciencedirect.com Get It @ ASU](#)

Popular article: Headline, writer, publication/website, date

- Example: “Loneliness is all in your head!” John Smith. Google News website. January 20 2017.

Scientific article: Title, researchers, publication, date

- Example: “The role of the amygdala in the self-perception of depression.” Klein, J.R., & Johnson, Y.W. *Brain Imaging Research*. 2016.

Answer these questions based ONLY on what you read in *each* article. If you can’t tell what it is or if there is not enough information (which will sometimes be the case for the popular article), you should put “not enough information provided.”

	Popular Article	Scientific Article
Describe the participants (who was tested or studied, how many were there, and how were they selected)?		
Describe the design of the study (Correlational, experimental, quasi-experimental)		
What were the researchers studying, aka independent variable (e.g., a drug, a therapy, a clinical condition)? What was their research question or hypothesis?		
What type of research technique did they use to examine the brain, aka dependent variable (e.g., MRI, DTI, fMRI, EEG, PET, etc.)?		
What were the important conclusions or findings of the study?		

Verbal Learning and Memory Task

Tell the participant, “I am going to read you a list of words. Try to remember as many words as you can and when I’m finished, repeat back all the words you remembered. You can repeat them back in any order. Ready?”

Read the list of 10 words at a pace of about 1 second a word. When you are finished write down all of the words the participant says back. Repeat this for Trials 2.

For Trial 3 say, “I am going to read you a NEW list of words. Try to remember as many words as you can from this NEW list and when I’m finished, repeat back all the words you remembered. You can repeat them back in any order. Ready?”

*****DON’T TELL THEM TO KEEP THE WORDS IN MIND*****

DON’T TELL THEM YOU WILL BE ASKING THEM ABOUT THE WORDS AGAIN

*****GO ON TO SPATIAL TASK*****

After the participant completes the spatial task say, “Remember those words I read you a few minutes ago? Can you repeat them back to me?” Record the answers

List - 1	Trial 1	Trial 2	List - 2	Trial 3	Go on to Spatial Tasks	Trial 4 – Delay
1. Van			1. Watch			
2. Song			2. Rod			
3. Apple			3. Stitch			
4. Promise			4. Pepper			
5. Key			5. Baby			
6. Plant			6. Ocean			
7. Cabbage			7. Tire			
8. Bead			8. Train			
9. Bubble			9. Bat			
10. Snail			10. Fire			
Number Correct:						