PSYCHOLOGY 3260F (570)
Cognitive Neuroscience
Fall/Winter 2025-2026

Instructor: Dr. Rubina Malik
Email: rmalik42@uwo.ca

Course Information

Calendar Description:
This course examines the neural processes that support sensation and perception, motor control, attention, memory, emotion, and language. It will include a student-led research project that applies current methods used in the field of cognitive neuroscience and will explore case studies of patients with neurological disorders.

Prerequisite(s): Psychology 2135A/B, and Psychology 2840F/G (or Psychology 2801F/G, Psychology 2802F/G, the former Psychology 2800E, the former Psychology 2820E, Psychology 2830A/B, Psychology 2855F/G or Psychology 2856F/G) and registration in the third or fourth year of Honours Specialization in Psychology, Honours Specialization in Applied Psychology, Honours Double Major, Major or Specialization in Psychology, or permission of the Department

Antirequisite(s): Psychology 3224A/B, Psychology 3227A/B.

Extra Information: 2 lecture hours and 1 lab/tutorial per week.

Course Weight: 0.50
Breadth: Category A
Subject Code: PSYCHOL

Notice: Unless you have either the requisites for this course (fulfilment of pre-requisites, no anti-requisite conflicts), or special permission from your Dean to enrol in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

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1. COURSE INFORMATION

Course Name: Cognitive Neuroscience
Course Number: Psychology 3260F
Course website: https://owl.uwo.ca/portal

2. INSTRUCTOR INFORMATION

Professor: Dr. Rubina Malik, PhD
Email: rmalik42@uwo.ca

Office Hours: By appointment
Teaching Assistant: Sarah Al-Saoud, PhD Candidate
TA email: sabuals@uwo.ca

3. COURSE DESCRIPTION

This course examines the neural mechanisms underlying cognitive processes, including the mental processes involved in motor control, language, memory, and learning. We will discuss developmental neuroscience, brain injury, psychopathology, and neurodegenerative disorders. The course will focus on a variety of methodological approaches used to understand brain-behaviour relationships. Such techniques will be described within the classroom and then explored further in an excursion to the Brain and Mind Institute. The course will include a student-led fNIRS research project where students will design a study, collect and analyze data, and present their research proposal in both oral and written form.

4. COURSE LEARNING OUTCOMES

Upon completion of the course, students will be able to:

1. Describe, evaluate, and communicate the impact of scientific and technological advances in cognitive neuroscience on our understanding of how neural substrates give rise to mental processes.

2. Evaluate how methods used in cognitive neuroscience research differ and how those differences impact the kinds of insights that can be drawn when studying various cognitive processes.

3. Formulate a testable research question and design an experiment using functional near-infrared spectroscopy (fNIRS) techniques, to study a cognitive process with a high degree of originality and innovation.

4. Communicate scientific knowledge in clear, coherent, and concise written and oral form.

5. MODE OF INSTRUCTION

This course will be taught in-person.

6.COURSE MATERIALS

REQUIRED: Banich, M. T., & Compton, R. J. (2023). Cognitive neuroscience. Cambridge University Press. 5th ed. The bookstore (https://bookstore.uwo.ca/textbook-search) has both a print textbook ($93.80) and an e-book ($74.00) option, either option is acceptable for the course. Older editions of the textbook are not acceptable.

Technology requirements: it is expected that you have access to a computer to assess OWL for course-related announcements and the ability to download PowerPoint slides from OWL. For the fNIRS project, at least 1 person within your research group must have a laptop that will be needed during class time. Students will also need to have access to Microsoft Excel (which

comes standard with the UWO Microsoft 360) and a statistical package of choice (e.g. excel, R, SPSS, JASP, Jamovi).

TENTATIVE LECTURE SCHEDULE (any changes will be announced in-class or on OWL)

Week	Date	Lecture Topic	Textbook Reading	Tutorial/Lab
1	Sep 11	Introduction to Cognitive Neuroscience; Neuroanatomy Basics	Chapter 1	Introduction to Research Project
2	Sep 18	Methods in Cognitive Neuroscience	Chapter 3	Tutorial: Introduction to fNIRS
3	Sep 25	Excursion to the Brain and Mind Institute for demonstrations of current methodological approaches in cognitive neuroscience		
4	Oct 4	Motor Control	Chapter 4	Lab: research topic and literature search work period
5	Oct 9	Language	Chapter 8	**Research Problem Assignment Due** Tutorial: research design (1hr)
6	Oct 16	Memory and Learning	Chapter 9	Lab: research design work period (1hr)
7	Oct 23	Brain Development and Plasticity	Chapter 15	**Method and Design Assignment Due**
8	Oct 30	Psychopathology	Chapter 14	
9	Nov 6	Reading Week – No class		
10	Nov 13	Social Cognition	Chapter 13	
11	Nov 20	Generalized Cognitive Disorders	Chapter 16	Lab: fNIRS Data Analysis
12	Nov 27			Lab: Poster/paper preparation
13	Dec 4	Exam Review		Poster Presentation

7. METHODS OF EVALUATION

Component	Weight	Due Date
In-class questions	10%	Each lecture topic
Research Problem Assignment	10%	Oct 9
Method and Design Assignment	10%	Oct 23
Poster Presentation	15%	Dec 4
Final Paper	20%	Dec 6 by 11:55 pm
Final Exam	35%	TBD; will be scheduled by the registrar's office. Check: https://www.kings.uwo.ca/current-students/courses-

		enrolment/exams-and-tests/schedule/

In-class Questions

Research in undergraduate student education has found that class attendance is a strong predictor of academic success (Credé et al., 2010). Additionally, completing small quizzes is also a very powerful memory enhancer (when compared to re-study; Karpicke & Roediger, 2008) and can improve retention of material for the final examination. Therefore, to improve learning, 10% of your course grade will come from your performance on in-class questions. Approximately 4 multiple-choice questions will be posed within each lecture topic. You may refer to your notes taken in class to help you answer these questions in case you are test anxious. Questions will be posted on lecture slides, and you will login to the course OWL site and click on the iClicker tool to answer the questions.

Student-led fNIRS Research Project

This year, in groups of 2-3, students will design an experiment that uses functional near-infrared spectroscopy (fNIRS), which measures hemodynamic brain activity from the scalp, to investigate a cognitive neuroscience topic of interest. At the beginning of the term, students will take part in tutorials on how to acquire and analyze fNIRS data using the devices. Then, in groups, students will choose a research topic and formulate their hypothesis. Projects can vary across a wide range of cognitive fields and students are encouraged to be creative. Pick a topic that you find interesting to ensure that the research process is fun and engaging. For examples of project ideas log on to the OWL course site. Groups will report their research proposal in an oral poster presentation and students, individually, will submit an APA-formatted final term research paper. The project will be evaluated over 4 stages.

A. **Research Problem Assignment**. Please refer to the OWL course site for the worksheet that is to be completed. In this assignment, you will define your topic area of interest and describe a problem that could be addressed in your area of research. You will provide a list of papers you have evaluated that are most relevant to your area of research and note what is unknown or unresolved in this area. You will then be asked to create your research question and state your hypothesis.
B. **Method and Design Assignment.** Please refer to the OWL course site for the worksheet that is to be completed. In this assignment, you will describe how you collect the data, what the stimuli will look like, the procedure, and the proposed analysis.
C. **Poster Presentation.** Please refer to the OWL course site for poster examples and grading rubric. Groups will have 15 minutes to present 1 static electronic poster slide to the class, 10 minutes describing your research experiment and 5 minutes for questions from the audience.
D. **Final Paper.** Please refer to the OWL course site for the final paper grading rubric. The final paper will be completed *individually* and should be at least 2500 words. The paper

should follow proper APA formatting guidelines and should include: the title page, abstract, introduction, method, predicted results, discussion, and reference section.

Note about team-learning projects. Group work fosters collaborative learning, where students are charged with sharing the workload, being accountable to their teammates, and combining areas of expertise, which serves to improve students' creative thinking, interpersonal skills, and problem-solving abilities. To ensure that groups function to the best of their abilities we will provide team expectation agreements, and you will be tasked with evaluating your team collectively and individual team members at each stage of the project. These peer evaluations will factor into each student's grade as a multiplying factor for each assessment. We also encourage students to read the article on OWL "Coping with Hitchhikers and Couch Potatoes on Teams" and contact the instructor at the first instance of difficulties with group functioning.

Final Exam.
The final exam will be a mixed-format, closed-book, cumulative exam written in person.

8. POLICIES ON LATE WORK AND ABSENCES

LATE WORK: Meeting deadlines is an important skill both within and outside of academia. Instructors set deadlines to ensure you do not become overwhelmed by heavy workloads when you fall behind. Thus, meeting deadlines helps your academic performance. All students in this course are expected to complete work on time.

For assessments worth 10% or more of the overall course grade (i.e., final paper), students must submit an academic consideration request with medical or other supporting documentation to Academic Advising. If Academic Consideration has been granted by the Academic Dean's Office, any work will be due 48 hours after the end of the period for which the student received Academic Consideration. Late final papers submitted without Academic Consideration will be penalized 10% per day and will not be accepted after 7 days.

If you do not present the group poster you will not earn a grade for the poster presentation.

If a group member does not contribute to a group assignment the group should not place the name of that student on the paper and thus no grade will be given.

Absences for assessments worth less than 10% of the overall course grade (i.e., in-class questions) can only be made up the following week during office hours, and not after a period of 7 days.

ABSENCES: Please refer to the Policy of Academic Accommodations and Academic Considerations attached to this syllabus.

9. ACADEMIC INTEGRITY

King's is committed to fostering a culture of professionalism, honesty, and academic integrity, and all members of our community—faculty, staff, and students—have a role to play in

promoting an ethical learning environment. Furthermore, through the work they submit for academic evaluation, students develop important habits of critical thinking, independent inquiry, and creativity. Thus, it is expected that students will submit work that is truly their own, completed without external assistance (human or artificial) except as explicitly permitted by the course instructor.

Within this course, the use of artificial intelligence (AI) tools [such as Chat GPT] is not permitted for written work submitted for evaluation.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com). Please note that Turnitin analysis now includes AI detection.

Department of Psychology Policies Related to AI Tools

1. Policy on the Use of Generative AI Tools

The Department of Psychology expects that students will submit work that is truly their own, completed without external assistance (human or artificial).

The use of generative AI tools (such as ChatGPT) is not permitted for any submitted coursework unless express permission has been granted by your instructor.

Students **should not have AI tools write any part of their assignments or papers, either by copying and pasting or by paraphrasing the output**. Unauthorized use of AI constitutes an academic offence and will be subject to academic discipline.

Additional information: Students can use AI tools to clarify questions they have about course content (e.g., you can ask ChatGPT about a course concept to help with your understanding), but students should be aware that the response may be inaccurate or inconsistent with the course content. Asking your instructor is a more effective strategy. Students should note that information provided by AI tools such as ChatGPT can include mistakes, inaccuracies, biases, and outdated information. Whenever these tools are used, students should cross-verify the information provided to them. This means verifying that the sources used by AI exist and have been accurately summarized, consulting multiple original and reputable up-to-date sources to verify information, and being cautious of bias that could be present in the information provided.

2. Policy on Use of Translation Tools*

The Department of Psychology views the unapproved use of translation or language applications as an academic offence.

Any usage of translation applications or language generation by students to complete specific assigned work for this course **must be approved** by the instructor **prior** to submitting the work **and noted by the student in the submitted work** itself.

Writing text and then feeding it into a computer application to improve or translate your own words, changing a few words, and then submitting this text as if it was your own **constitutes plagiarism**. You must compose text, choose words, construct logic flow, structure sentences and paragraphs to organize, synthesize, interpret information with your own mind. When you borrow language or ideas from another person or from a machine this must be acknowledged with quotation marks and/or citations.

Why do we have this policy?

- Translation is intellectual work and produces intellectual property, thus any text which is translated must cite the translator.
- Psychology endeavors to advance students' linguistic, analytic, and reasoning competencies – this can not happen outside of specific language competencies.
- Earning a university degree signals that an individual has advanced literacy and communicative skill in the language of instruction at the university; this is English at King's University College at Western University. If translation machines are used by students without regulation, we will have no way of certifying whether these competencies exist and fewer mechanism for encouraging students to do the hard work to develop them.

* *Based on the policy developed by the Department of Child and Youth Studies*

KING'S UNIVERSITY COLLEGE

GENERAL COURSE POLICIES

2025-2026

1. Academic Accommodations, Consideration for Absences

Academic Accommodation (Accessibility)

Accessibility Services works to ensure that academic programs are accessible to all students, and supports students who may have a condition related to, but not limited to, vision, hearing, mobility, different ways of learning, mental health, chronic illnesses, chronic pain, autism spectrum disorder, ADD/ADHD, and temporary conditions (beyond short-term academic consideration). Accessibility Services provides recommendations for accommodation based on medical documentation or psychological and cognitive assessment. The accommodation policy can be found here Academic Accommodation for Students with Disabilities. Information on Accessibility Services at King's can be found here.

Academic Consideration for Student Absence

If a student is unable to meet a course requirement due to substantial but temporary extenuating circumstances (medical or compassionate), they should follow the procedures below.

In some cases, where instructors have built flexibility into their assessments, this flexibility will already address consideration needs.

Requests for academic consideration should be directed to the Academic Advising Office of your faculty/college of registration. Requests must be made as soon as possible and no later than 48 hours after the missed assessment.

As a rule, documentation is required for academic consideration. For academic consideration requests on medical grounds, the Student Medical Certificate is available at https://www.kings.uwo.ca/kings/assets/File/currentStudents/courses_enrollment/exams_and_tests/SMC-Feb-2025.pdf.

Students are permitted one academic consideration request without supporting documentation per term per course.

Instructors may designate one assessment per half-course weight as requiring formal supporting documentation. Please refer to the course outline for each course.

For further information, please see:
https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf

Absences from Final Examinations

If you miss the Final Exam, contact the Academic Advising Office of your faculty/college of registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (e.g., more than 2 exams in 23-hour period, or more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under Special Examinations).

Religious Accommodation

Students should consult the University's list of recognized religious holidays, and should give notice in writing to the instructor and Academic Advising Office if a course requirement will be affected by a religious holiday/observance. Notice must be given as early as possible, and no later than two weeks prior to an examination, and one week prior to a midterm test date. It is the responsibility of such students to inform themselves concerning the work done in classes from which they are absent and to take appropriate action.

2. Support Services

Accessibility, Counselling and Student Development at King's University College:
https://www.kings.uwo.ca/current-students/student-services/

Students experiencing emotional or mental health distress can access services at King's University College: http://www.kings.uwo.ca/current-students/campus-services/student-support-services/personal-counselling/

Good2talk is a good online and phone 24/7 resource for students and is available in English, Mandarin, and French: https://good2talk.ca, 1-866-925-5454

MentalHealth@Western provides a complete list of options about how to obtain help: https://www.uwo.ca/health/mental_wellbeing/

Academic Support Services at King's University College: https://www.kings.uwo.ca/current-students/academic-resources/

GBSV Support:

King's is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at: https://www.kings.uwo.ca/about-kings/safe-campus/gender-and-sexual-violence/

You can reach someone supports at Kings by emailing Care@kings.uwo.ca or calling 519-930-4640 to reach a social worker who can offer help.

You can also reach Western's Gender-Based Violence & Survivor Support Case Manager by email or by calling 519-661-3568.

Further supports can be found on this website: https://www.kings.uwo.ca/about-kings/safe-campus/gender-and-sexual-violence/

See also https://www.uwo.ca/health/student_support/survivor_support/get-help.html

University Students' Council offers many valuable support services for students, including the health insurance plan: http://westernusc.ca/services/

3. Statement on Use of Electronic Devices

Use of Electronic Devices: Unless explicitly stated otherwise, you are not allowed to have a cell phone, or any other electronic device, with you during tests or examinations. Unauthorized possession of such a device during a test or examination constitutes an academic offence.

Use of Laptops, Tablets, and Smartphones in the Classroom: King's University College at Western University acknowledges the integration of new technologies and learning methods into the curriculum. The use of electronic devices such as laptop computers, tablets, or smartphones can contribute to student engagement and effective learning. At the same time, King's recognizes that instructors and students share jointly the responsibility to establish and maintain a respectful classroom environment conducive to learning.

The use of electronic devices by students during lectures, seminars, labs, etc., shall be for matters related to the course at hand only. Students found to be using electronic devices for

purposes not directly related to the class may be subject to sanctions under the Student Code of Conduct; see https://www.kings.uwo.ca/current-students/student-affairs/code-of-student-conduct1/

Inappropriate use of electronics (e.g., laptops, tablets, smartphones) during lectures, seminars, labs, etc., creates a significant disruption. As a consequence, instructors may choose to limit the use of electronic devices in these settings. In addition, in order to provide a safe classroom environment, students attending in-person class sessions are strongly advised to operate laptops with batteries rather than power cords.

4. Statement on Academic Offences

King's is committed to academic integrity. Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, is posted at http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

It is expected that students will submit work that is truly their own, completed without external assistance (human or artificial) except as explicitly permitted by the course instructor. Check with you instructor on what tools, including generative AI (ChatGPT, translation tools, grammar-checking tools) are permitted in the course. Because a tool is permitted in one course, that does not mean it is permitted in other courses.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system; see https://elearningtoolkit.uwo.ca/tools/Originality Reports - TurnItIn.html.

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

5. Copyright of Course Material

Lectures and course materials, including PowerPoint presentations, tests, outlines, and similar materials are protected by copyright. Faculty members are the exclusive owner of copyright in those materials they create. Students may take notes and make copies for their own use. Students may not allow others to reproduce or distribute lecture notes and course materials

publicly (whether or not a fee is charged) without the express written consent of a faculty member. Unauthorized sharing of class content is subject to academic discipline.

Similarly, students own copyright in their own original papers and exam essays. If a faculty member wishes to post a student's answers or papers on the course website, they should ask for the student's written permission.

6. Use of Recordings

Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation and/or the participant has the prior written permission of the instructor. Unauthorized recording and/or sharing of class content is subject to academic discipline.

7. Policy on Attendance

Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course, will be reported to the Dean of the Faculty offering the course, after due warning has been given. On the recommendation of the department concerned, and with the permission of the Dean of that Faculty, the student will be debarred from taking the regular examination in the course.