COGS2030

Hearing and Brain

Session 2, Weekday attendance, North Ryde 2021

Archive (Pre-2022) - Department of Cognitive Science

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Session 2 Learning and Teaching Update

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of units with mandatory on-campus classes/teaching activities.

Visit the MQ COVID-19 information page for more detail.

General Information

Unit convenor and teaching staff Paul Sowman paul.sowman@mq.edu.au Bianca De Wit bianca.dewit@mq.edu.au
Credit points 10
Prerequisites COGS1000 or COGS100 or PSYU1101 or PSYU1104 or PSYC104 or PSYU1102 or PSYU1105 or PSYC105
Corequisites
Co-badged status
Unit description Hearing is of fundamental importance for human cognition and communication and reflects the complex interplay of physical, biological, and psychological processes. This unit will provide a detailed introduction to the cognitive neuroscience of hearing. Topics will include the neuroanatomy and physiology of the auditory system; how the brain is organised to achieve identification and localisation of sound sources; how the auditory system interacts with motor, speech and language systems in the brain; the science of cochlear implants; the nature and cognitive consequences of hearing loss; and the science and technology of cochlear implants. Lecture topics will be reinforced and complemented with hands-on tutorials covering the fundamentals of digital signal processing and analysis of acoustic and speech signals.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Explain the structure and function of the auditory system, with an emphasis on how the brain is organized to structure sound information into meaningful perceptual and cognitive units.

ULO2: Demonstrate an understanding of the causes of hearing impairments and hearing loss, the effects of hearing loss on cognitive functioning, and the current capabilities and limitations of artificial sensory prosthetic devices.

ULO3: Critically evaluate contemporary theories and concepts of audition, including the interface of the auditory system with the motor and speech systems of the brain and with other aspects of human cognition.

ULO4: Display effective scientific communication in written form.

ULO5: Display a practical understanding of digital signal processing (DSP) techniques by applying them flexibly and appropriately to measure and analyse acoustic and speech signals.

Assessment Tasks

Name	Weighting	Hurdle	Due
Software code portfolio	15%	No	31/10/21
Mid-term exam	20%	No	07/09/2021
Online quizzes	10%	No	Weekly
Commentary paper	15%	No	10/10/2021
Final exam	40%	No	Session 2 Exam Period

Software code portfolio

Assessment Type [1]: Portfolio
Indicative Time on Task [2]: 12.5 hours
Due: **31/10/21**
Weighting: **15%**

Compilation and explanation of code used in weekly tutorials.

On successful completion you will be able to:

- Display a practical understanding of digital signal processing (DSP) techniques by applying them flexibly and appropriately to measure and analyse acoustic and speech signals.

Mid-term exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 17 hours
Due: **07/09/2021**

Weighting: **20%**

Multiple-choice exam

On successful completion you will be able to:

- Explain the structure and function of the auditory system, with an emphasis on how the brain is organized to structure sound information into meaningful perceptual and cognitive units.
- Demonstrate an understanding of the causes of hearing impairments and hearing loss, the effects of hearing loss on cognitive functioning, and the current capabilities and limitations of artificial sensory prosthetic devices.
- Critically evaluate contemporary theories and concepts of audition, including the interface of the auditory system with the motor and speech systems of the brain and with other aspects of human cognition.
- Display a practical understanding of digital signal processing (DSP) techniques by applying them flexibly and appropriately to measure and analyse acoustic and speech signals.

Online quizzes

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 9 hours
Due: **Weekly**
Weighting: **10%**

Weekly online MC quizzes completed before each class lecture.

On successful completion you will be able to:

- Explain the structure and function of the auditory system, with an emphasis on how the brain is organized to structure sound information into meaningful perceptual and cognitive units.
- Demonstrate an understanding of the causes of hearing impairments and hearing loss, the effects of hearing loss on cognitive functioning, and the current capabilities and limitations of artificial sensory prosthetic devices.

Commentary paper

Assessment Type [1]: Report
Indicative Time on Task [2]: 12.5 hours
Due: **10/10/2021**
Weighting: **15%**

Highly structured critical analysis of hearing research across the disciplines (max. 750 words)

On successful completion you will be able to:

- Critically evaluate contemporary theories and concepts of audition, including the interface of the auditory system with the motor and speech systems of the brain and with other aspects of human cognition.
- Display effective scientific communication in written form.

Final exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 34 hours
Due: **Session 2 Exam Period**
Weighting: **40%**

Multiple-choice and short-answer exam

On successful completion you will be able to:

- Explain the structure and function of the auditory system, with an emphasis on how the brain is organized to structure sound information into meaningful perceptual and cognitive units.
- Demonstrate an understanding of the causes of hearing impairments and hearing loss, the effects of hearing loss on cognitive functioning, and the current capabilities and limitations of artificial sensory prosthetic devices.
- Critically evaluate contemporary theories and concepts of audition, including the interface of the auditory system with the motor and speech systems of the brain and with other aspects of human cognition.
- Display effective scientific communication in written form.
- Display a practical understanding of digital signal processing (DSP) techniques by applying them flexibly and appropriately to measure and analyse acoustic and speech signals.

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

COGS2030 – Hearing and Brain Semester 2 2021

Unit Outline

Convener: Paul Sowman

Teaching Staff: Paul Sowman, Harvey Dillon, Brent Edwards, Amanda Barnier, Mridula Sharma, Iain Giblin, Michael Proctor

Tutors: Ghasem Azemi, Ioanna Anastasopoulou

Time: Tues 9:30 – 11:00

Lectures: On-line

Practicals and Tutorials: TBA

Unit description: Hearing is of fundamental importance for human cognition and communication and reflects the complex interplay of physical, biological, and psychological processes. This unit will provide a detailed introduction to the cognitive neuroscience of hearing. Topics will include the neuroanatomy and physiology of the auditory system; development and plasticity; how the brain is organised to achieve identification and localisation of sound sources; and how the auditory system interacts with motor, speech, and language systems in the brain. Drawing on cutting-edge research done at Macquarie University, the unit will also cover the science behind cochlear implants and the effects of hearing loss on cognition.

Tutorials include hands-on activities in which students will learn the fundamentals of digital signal acquisition, processing and analysis of sounds and speech.

Recommended text: Schnupp J, Nelkin I, King A (2012). Auditory Neuroscience. MIT Press: Cambridge MA. Links to readings and extra materials are provided in the iLearn page for the unit.

Prereqs: COGS1000 or PSYU1104 or PSYU1105

Additional info: Lectures will include contributions from staff in the Department of Cognitive Science and the Department of Linguistics. Tutorials include hands-on lab sessions (MATLAB-based digital signal processing) and content review sessions.

Pattern: 1.5 hr weekly on-line lectures, 13 x 1.5 hr tutorials

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy

- Assessment Policy
- Fitness to Practice Procedure
- Grade Appeal Policy
- Complaint Management Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- Getting help with your assignment
- Workshops
- StudyWise
- Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.