

# Language, Mind, and Brain (LING 3350) – Fall 2024

Prerequisites: LING 2100, LING 2100E, or LING 2100H

## Course meeting times

Class meeting time: Tuesdays & Thursdays, 9:35–10:50 am

Class meeting location: Miller Learning Center 0275

## Instructor information

Instructor: Prof. Steven Foley (any pronouns)

Email: srfoley@uga.edu  
I'll respond to emails within 24 hours

Office hours: Mondays, 2:00–4:00 pm  
and by appointment  
Gilbert Hall 118A

Website: <https://stevenrfoley.github.io/>

## Course description and details

An introduction to the field of neurolinguistics. Examining the neural basis of human language, the course relates data from techniques like neuroimaging and electrophysiology to computational models across multiple levels of analysis, including phonology, morphology, syntax, and semantics.

### Learning outcomes

Upon successful completion of this course you should be able to:

- Understand basic principles of the cognitive neuroscience of language
- Connect neural data with linguistic theory and analysis
- Interpret and evaluate findings from the primary neurolinguistic literature

This course also fulfills the following University-wide learning outcomes:

- Students will be able to express ideas in writing with clarity and fluency.
- Have the ability to express, manipulate, and apply mathematical information, concepts, and thoughts using appropriate mathematical forms, including numeric, graphical, verbal, and symbolic forms for solving a variety of problems
- Explain how knowledge is constructed in the sciences using the scientific method.
- Locate and evaluate reliable sources of scientific evidence to construct arguments, to apply scientific knowledge, and to critically assess real-world issues
- Express and manipulate quantitative information, concepts, and thoughts in verbal, numeric, graphical, computational, and symbolic form to frame and devise a solution to a problem
- Evaluate conclusions drawn from or decisions based on quantitative data

### Course topics

- Aspects of neuroanatomy relevant to language
- Research methods applicable to neurolinguistics
- Neural correlates of linguistic processing, at multiple levels of analysis

## **Required course materials**

Textbook: Kemmerer, David. 2014. *Cognitive Neuroscience of Language*. Psychology Press. ISBN: 978-1-84872-620-8.

Additional materials: All readings (including textbook chapters) will be posted on eLC

## **Assessment and grading**

### Course assignments and requirements

<i>Attendance and active participation in lecture</i>	15%	Rolling
<i>Attend office hours</i>	5%	At least once
<i>Homework assignments and quizzes</i>	40%	About six throughout the semester
<i>Submit discussion/review questions</i>	5%	Ahead of Oct 1 and Nov 26
<i>Midterm exam</i>	15%	In class, tentatively Oct 3
<i>Final exam</i>	20%	Dec 5, 8:00–11:00 am

See eLC for more information about each course requirement.

### Missed exams, late assignments, and regrading requests

Group projects, your individual paper, and your final paper, are due at 11:59 pm ET on their respective due dates, unless otherwise instructed. These items may be turned in after the deadline, but you will be eligible for fewer points once the deadline has passed: you will only be eligible for 95% of the total grade if it is submitted by 3 am that night, and you will lose an additional 10% from the total you are eligible to earn for every 12 hour period it is late thereafter. Papers more than three days late will earn a grade of 0.

Extensions will not generally be permitted, but if you think you are subject to an exceptional circumstance, please discuss it with me outside of class or by emailing me at least 24 hours before the original deadline.

## Final grades

A	95–100	C+	76–79
A–	90–94	C	73–75
B+	86–89	C–	70–72
B	83–85	D	60–69
B–	80–82	F	<60

Final grades will be rounded to the nearest whole number (e.g. 89.5 to 90, and 89.4 to 89).

## **Course statements and policies**

### UGA honor code

“I will be academically honest in all of my academic work and will not tolerate academic dishonesty of others.” A Culture of Honesty, the University’s policy and procedures for handling cases of suspected dishonesty, can be found at [honesty.uga.edu](http://honesty.uga.edu).

Honesty and transparency are important features of good scholarship. On the flip side, plagiarism and cheating are serious academic offenses with serious consequences. If you are discovered engaging in either behavior in this course, I will follow the procedures laid out in UGA’s Academic Honesty Policy. There you can also find more information about what counts as prohibited conduct.

I encourage you to work together on homework assignments and to make use of campus resources like the Office of Student Success & Achievement and the Writing Center. While collaboration is encouraged, *each student must submit a unique assignment* reflecting their own work.

If you have questions about my integration of the Student Code of Conduct into this course, please do not hesitate to ask: my aim is to foster an environment where you can learn and grow, while ensuring that the work we all do is honest and fair.

### Accommodation for disabilities

If you plan to request accommodations for a disability, please register with the Disability Resource Center. They can be reached by visiting Clark Howell Hall, calling 706-542-8719 (voice) or 706-542-8778 (TTY), or by visiting <http://drc.uga.edu>.

### Attendance & participation policy

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the *quality* of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the “I feel” syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

### Use of AI in this course

UGA's policy is that the use of AI for coursework is not permitted unless explicitly authorized by me (your course instructor) ahead of time. In this course, to ensure you develop and master the foundational knowledge and skills in this course, the use of generative AI (GAI) tools is strictly prohibited. This includes all stages of your work process, even the preliminary ones. This prohibition extends to AI writing tools like Grammarly and Wordtune, as well as GAI tools like ChatGPT, Copilot, Writesonic, Rytr, and Rtutor. If you are uncertain about using a particular tool to support your work, please consult with me before using it.

### Well-being resources

UGA Well-being Resources promote student success by cultivating a culture that supports a more active, healthy, and engaged student community.

Anyone needing assistance is encouraged to contact Student Care & Outreach (SCO) in the Division of Student Affairs at 706-542-8479 or visit [sco.uga.edu](https://sco.uga.edu). Student Care & Outreach helps students navigate difficult circumstances by connecting them with the most appropriate resources or services. They also administer the [Embark@UGA](mailto:Embark@UGA) program which supports students experiencing, or who have experienced, homelessness, foster care, or housing insecurity.

UGA provides both clinical and non-clinical options to support student well-being and mental health, any time, any place. Whether on campus, or studying from home or abroad, UGA Well-being Resources are here to help.

- Well-being Resources: [well-being.uga.edu](https://well-being.uga.edu)
- Student Care and Outreach: [sco.uga.edu](https://sco.uga.edu)
- University Health Center: [healthcenter.uga.edu](https://healthcenter.uga.edu)
- Counseling and Psychiatric Services: [caps.uga.edu](https://caps.uga.edu) or CAPS 24/7 crisis support at 706-542-2273
- Health Promotion/ Fontaine Center: [healthpromotion.uga.edu](https://healthpromotion.uga.edu)
- Disability Resource Center and Testing Services: [drc.uga.edu](https://drc.uga.edu)

Additional information, including free digital well-being resources, can be accessed through the UGA app or by visiting <https://well-being.uga.edu>.

### Disclaimer

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

## Course schedule and activities

Date	Topic	Action items
Th, Aug 15	Introduction	<ul style="list-style-type: none"> <li>• Student survey</li> <li>• Read Brennan (2022, ch 1), Friederici (2017, pp 5–8)</li> </ul>
Tu, Aug 20	Neuroanatomy	• Read Kemmerer (2014, ch 1)
Th, Aug 22		• HW1 assigned; submit by Aug 29
Tu, Aug 27	Methods	• Read Kemmerer (2014, ch 2); Optional: Brennan (2022, ch 2)
Th, Aug 29		
Tu, Sep 3	Aphasia	• Read Kemmerer (2014, ch 3)
Th, Sep 5		• Read Kemmerer (2014, ch 4)
Tu, Sep 10	Speech processing	<ul style="list-style-type: none"> <li>• Read Brennan (2022, ch 3)</li> <li>• HW2 assigned; due by Sep 17</li> </ul>
Th, Sep 12		• Read Mesgarani et al (2014)
Tu, Sep 17	Is speech special?	• Read Brennan (2022, ch 4); Optional: Poeppel (2001)
Th, Sep 19	Visual wordform processing	<ul style="list-style-type: none"> <li>• Read Kemmerer (2014, ch 8)</li> <li>• HW3 assigned; due by Sep 26</li> </ul>
Tu, Sep 24	Lexical access	• Read Brennan (2022, ch 5)
Th, Sep 26	Speech production	<ul style="list-style-type: none"> <li>• Read Kemmerer (2014, ch 6)</li> <li>• Submit review questions by Sep 29</li> </ul>
Tu, Oct 1	<i>Review session</i>	
Th, Oct 3	<i>Midterm exam (in class)</i>	
Tu, Oct 8	Visual wordform processing	• Read Kemmerer (2014, ch 8)
Th, Oct 10	Reading and writing	
Tu, Oct 15	Processing morphology	• Read Kemmerer (2014, ch 13)
Th, Oct 17	Morphosyntactic representations	• Read Gwilliams & Marantz (2018)
Tu, Oct 22	Structure and prediction	• Read Brennan (2022, ch 7)
Th, Oct 24	Composing sentences	• Read Brennan (2022, ch 8)
Tu, Oct 29	Hierarchical structures	• Read Ding et al. (2016)
Th, Oct 31	Agent identification	• Read Bornkessel-Schlesewsky & Schlewsky (2009, §9.3)
Tu, Nov 5	Processing across languages	• Malik-Moraleda et al. (2022)
Th, Nov 7	Long-distance dependencies	• Read Brennan (2022, ch 9), Matchin et al. (2014)
Tu, Nov 12	Multilingualism	• Read Blanco-Elorrieta & Pytkäinen (2018)

Th, Nov 14	Sign language	• Read Kemmerer (2018, ch 9), Meyer et al. (2007)
Tu, Nov 19	Whorfianism in the brain	• Read Kemmerer (2019, ch 6)
Th, Nov 21		• Read Fedorenko & Varley (2016) • Submit review questions by Nov 24
Tu, Nov 26	<i>Review session</i>	
Th, Dec 5	<i>Final exam: 8:00–11:00 am, MLC 0275</i>	

## Readings

- Amici, Serena, Simona M. Brambati, David P. Wilkins, Jennifer Ogar, Nina L. Dronkers, Bruce L. Miller, and Maria Luisa Gorno-Tempini. 2007. Anatomical correlates of sentence comprehension and verbal working memory in neurodegenerative disease. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*, 27(23): 6282–90.
- Barton, Brian, Jonathan H. Venezia, Kouros Saberi, Gregory Hickok, and Alyssa A. Brewer. 2012. Orthogonal acoustic dimensions define auditory field maps in human cortex. *Proceedings of the National Academy of Sciences of the United States of America*, 109 (50): 20738–43.
- Blanco-Elorrieta, Esti, and Liina Pykkänen. 2018. Ecological validity in bilingualism research and the bilingual advantage. *Trends in Cognitive Sciences*, 22 (12): 1117–26.
- Bornkessel-Schlesewsky, Ina & Matthias Schlewsky. 2009. *Processing Syntax and Morphology: A Neurocognitive Perspective*. Oxford University Press.
- Brennan, Jonathan R. 2022. *Language and the Brain: A Slim Guide to Neurolinguistics*. Oxford University Press.
- Buchweitz, Augusto, Svetlana V. Shinkareva, Robert A. Mason, Tom M. Mitchell, & Marcel Adam Just. 2012. Identifying bilingual semantic neural representations across languages. *Brain and Language*, 120(3):282 – 289. DOI: 10.1016/j.bandl.2011.09.003.
- Buzsáki, György. 2006. *Rhythms of the Brain*. Oxford University Press.
- Dikker, Suzanne, Hugh Rabagliati, Thomas Farmer, and Liina Pykkänen. 2010. Early occipital sensitivity to syntactic category is based on form typicality. *Psychological Science*, 21(5): 629–34.
- Ding, Nai, Lucia Melloni, Hang Zhang, Xing Tian, & David Poeppel. 2016. Cortical tracking of hierarchical linguistic structures in connected speech. *Nature Neuroscience*, 19(1):158–164. DOI: 10.1038/nn.4186.
- Fedorenko, Evelina & Rosemary Varley. 2016. Language and thought are not the same thing: Evidence from neuroimaging and neurological patients. *Annals of the New York Academy of Sciences*, 1369(1):132–153.
- Frankland, Steven M. & Joshua D. Greene. 2015. An architecture for encoding sentence meaning in left mid-superior temporal cortex. *Proceedings of the National Academy of Sciences*, 112(37): 11732–11737. DOI: 10.1073/pnas.1421236112.
- Friederici, Angela D. 2017. *Language in Our Brain: The Origins of a Uniquely Human Capacity*. MIT Press.
- Fyshe, Alona, Leila Wehbe, & Brian Murphy. 2017. Decoding language from the brain. In Aline Villavicencio and Thierry Poibeau (eds.), *Language, Cognition, and Computational Models*. 53–80. Cambridge University Press.

- Guest, Olivia, and Andrea E. Martin. 2023. On logical inference over brains, behaviour, and artificial neural networks. *Computational Brain & Behavior*, February.
- Gwilliams, L., and A. Marantz. 2015. Non-linear processing of a linear speech stream: The influence of morphological structure on the recognition of spoken Arabic words. *Brain and Language*, 147(0): 1–13.
- Jonas, Eric, and Konrad Paul Kording. 2017. Could a neuroscientist understand a microprocessor? Edited by Jörn Diedrichsen. *PLOS Computational Biology*, 13 (1): e1005268.
- Kemmerer, David. 2015. *Cognitive Neuroscience of Language*. Psychology Press.
- Kemmerer, David. 2019. *Concepts in the Brain: The View From Cross-linguistic Diversity*. Oxford University Press.
- Klimovich-Gray, Anastasia, Lorraine K. Tyler, Billi Randall, Ece Kocagoncu, Barry Devereux, and William D. Marslen-Wilson. 2019. Balancing prediction and sensory input in speech comprehension: The spatiotemporal dynamics of word recognition in context. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*, 39(3): 519–27.
- Kocagoncu, Ece, Alex Clarke, Barry J. Devereux, & Lorraine K. Tyler. 2017. Decoding the cortical dynamics of sound–meaning mapping. *Journal of Neuroscience*, 37(5):1312–1319. DOI: 10.1523/JNEUROSCI.2858-16.2016.
- Leonard, Matthew K., Naja Ferjan Ramirez, Christina Torres, Katherine E. Travis, Marla Hatrak, Rachel I. Mayberry, and Eric Halgren. 2012. Signed words in the congenitally deaf evoke typical late lexicosemantic responses with no early visual responses in left superior temporal cortex. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*, 32(28): 9700–9705.
- Leonard, Matthew K., Laura Gwilliams, Kristin K. Sellers, Jason E. Chung, Duo Xu, Gavin Mischler, Nima Mesgarani, Marleen Welkenhuysen, Barundeb Dutta, and Edward F. Chang. 2023. Large-scale single-neuron speech sound encoding across the depth of human cortex. *Nature*, December, 1–10.
- Malik-Moraleda, Saima, Dima Ayyash, Jeanne Gallée, Josef Affourtit, Malte Hoffmann, Zachary Mineroff, Olessia Jouravlev, and Evelina Fedorenko. 2022. An investigation across 45 languages and 12 language families reveals a universal language network. *Nature Neuroscience*, 25(8): 1014–19.
- Matchin, William and Gregory Hickok. 2019. The cortical organization of syntax. *Cerebral Cortex*, 10. DOI: 10.1093/cercor/bhz180.
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- Sejnowski, Terrence J. 2018. *The Deep Learning Revolution*. MIT Press.
- Wehbe, Leila, Brian Murphy, Partha Talukdar, Alona Fyshe, Aaditya Ramdas, & Tom Mitchell. 2014. Simultaneously uncovering the patterns of brain regions involved in different story reading sub-processes. *PLOS One*, 9(11):e112575.
- Van Berkum, Jos J. A., Danielle van den Brink, Cathelijne M. J. Y. Tesink, Miriam Kos, and Peter Hagoort. 2008. The neural integration of speaker and message. *Journal of Cognitive Neuroscience*, 20(4): 580–91.
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