

CAS LX 432 / GRS LX 732
Intermediate Semantics

Fall Semester 2018
Boston University

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Course description. This course provides an introduction to the study of the underlying logical structure of natural language. We will consider:

- how to model the meanings of:
 - logical words like English *if, not, a, the, nobody, which, him, you, now, and then*;
 - morphemes like the English plural *-s*, past tense *-ed*, and comparative *-er*;
- how the meanings of smaller expressions combine to form the meanings of larger expressions (*semantic composition*).

Although we will mainly use English examples to build up our theoretical toolbox, students will have several opportunities to explore cross-linguistic variation, including in the final project.

As the course progresses, students will build up a *fragment* of English, including:

- Lexical entries for particular words, specifying their meanings
- Composition rules for putting them together

This practice of building fragments stems from the pioneering work of Richard Montague, the grandfather of modern formal semantics, who brought together the fields of mathematical logic and linguistics. Montague’s most paradigmatic work, an article entitled “The Proper Treatment of Quantification in Ordinary English” (1973), is explicated very nicely in the textbook *Introduction to Montague Semantics* by Dowty et al. (1981). This course is heavily influenced by that book, and interested students are warmly encouraged to read it at some point. Using the excellent pedagogical software called the Lambda Calculator created by Lucas Champollion, we will be able to carry out Montague’s program in modern style by encoding our fragment in a computer, making *digital fragments*.

The three most important composition rules that we will learn are: *Functional Application*, *Predicate Modification*, and *Predicate Abstraction*. These composition rules are standardly known in the formal semantics community and are laid out in the widely-used textbook *Semantics in Generative Grammar* by Irene Heim and Angelika Kratzer 1998. Interested students are encouraged to read this book as well at some point. It very much looms in the background for this course, and in fact, this course has previously been taught using that book. But here, the same theory of composition will be presented as in *Formal Semantics Boot Camp*, which uses more traditional and precise notation (notation which is

furthermore aligned with the Lambda Calculator software), is explicitly *model-theoretic* as in Montague's work (so truth and meaning are defined relative to a model), and is aimed at undergraduate students.

This makes it sound like there is one and only one theory that you will be forced to accept. Indeed, with respect to certain questions, we will do very little to consider alternative views and merely present a single, 'standard' view. Intermediate-level proficiency in semantics requires familiarity with this basic setup. (This is not to discourage you from challenging whatever is dogmatically presented; on the contrary, you are encouraged to think slowly and carefully about what is really being said, identify any potential challenges, and imagine alternatives.) But in other cases, we will engage in the practice of hypothesis-comparison, where we consider two different theories, compare their empirical predictions, and see which one fares better in the face of the facts.

Learning objectives. Students who take this class will:

- gain familiarity with a diverse range of semantic phenomena and their empirical characteristics;
- engage in the incremental construction of a formal fragment that captures these facts;
- gain proficiency with some of the standard tools of compositional semantics;
- develop an ability to compare among different semantic theories using appropriate empirical data, an ability that is comprised of several important sub-skills: (i) identifying predictions of a theory; (ii) finding places where the predictions of two theories differ; and (ii) finding out which prediction is actually met, using appropriate empirical data
- have an opportunity to compare among analyses of a semantic phenomenon that particularly interests them.

Students enrolled at the graduate level will, furthermore, take steps toward an original research project in formal semantics.

Prerequisite. CAS LX 331/ GRS LX 631 Semantics & Pragmatics: Introduction to Linguistic Meaning (or CAS LX 502) or consent of instructor.

Course materials

- [BootCamp] Coppock, Elizabeth and Lucas Champollion (manuscript). *Formal Semantics Boot Camp*. Excerpts distributed through Blackboard.
- The Lambda Calculator. This is a software program designed for teaching and learning semantics designed by Lucas Champollion, Josh Tauberer and Maribel Romero. We will use for some exercises. Download it at:

<http://lambdacalculator.com>

Courseware. The materials for the course will be made available on Blackboard at <http://learn.bu.edu>.

Assessment. The final grade will be determined as follows:

- 60% problem sets
- 10% class participation & attendance
- 10% group presentations
- 20% final project

Problem sets. Weekly exercises concerning the readings and lecture material, through which students will build up a compositional fragment of English. You may not ask any other student what answer they got for any question, or tell another student what answer you got for a question. You may give each other hints.

Anything that even remotely suggests that you are blindly writing down what somebody else said without thinking through the issue for yourself will be followed up on as a potential case of plagiarism. Unacceptable behavior includes: (i) copying and pasting another student's answers; (ii) conferring with a student other than your partner in real time in person or remotely while writing solutions; (iii) using another student's completed solutions as a guide to producing your own. When you write your name at the top of your assignment (as I hope you will remember to do!), you indicate that you are the *author* of the document. Always make sure that this is genuinely the case; otherwise, you are plagiarizing.

The lowest problem set grade will be dropped. There are 10 problem sets in total. You are exempt from the problem set on the week that you present (see below), so this portion of the grade will be determined on the best 8 of the remaining 9 problem sets.

Group presentations. Students will work in groups of 2-4 to present two opposing analyses of a phenomenon discussed in the textbook and comparing their predictions. The presentations should take place over the course of two sessions. The first session should lay out the alternative analyses, and the second session should assess the relative empirical adequacy of the two theories. The debate topics are indicated in the schedule below. Presentations will be evaluated on clarity, timing, persuasiveness, and technical competence. Those who are making the group presentation for the week are exempt from the problem set for the week.

Class participation. Class time is an important component of your learning process. This is a chance to explore the material more deeply through interactive learning experiences, and learn from your peers; this can't be made up. Therefore, in order to honor this educational opportunity, please come to every class session on time and ready to learn actively. Attendance at each class meeting affects your classroom participation grade, as will the degree to which you are mentally present during class, take active responsibility for your own learning, and help others learn. When other students are presenting, students are expected to listen actively to others' presentations, offer reflections, and raise questions and potential objections at appropriate points.

Final project. For the final project, students will work in groups of 2 or 3. The final project should compare multiple different analyses of a phenomenon that you find interesting, other than the one you did your group presentation on. These may be found in prior semantics literature. Ideally, the phenomenon should be in a language other than English. The analyses you discuss should be formalized in the style we develop in class, so it does not suffice to blindly copy formulas from the literature; you might have to change the notation a bit in order to make it conform to our style. It would be lovely to implement the

analyses you consider in the Lambda Calculator; this would make for an excellent presentation. You can find examples of formal semantic analyses in the journals *Natural Language Semantics*, *Journal of Semantics*, *Natural Language and Linguistic Theory*, *Linguistics and Philosophy*, and *Semantics and Pragmatics*. Other good sources of semantics papers include the proceedings of the annual Semantics and Linguistic Theory conference, as well as the proceedings of Sinn und Bedeutung (the main annual semantics conference in Europe) and the proceedings of the Amsterdam Colloquium.

Graduate students are asked to incorporate **some element of originality** in their final project, either by considering existing analyses with respect to a new phenomenon or by offering an original theory of some phenomenon (new or old). The originality component makes up 25% of the final project grade for graduate students. I recommend starting by perusing the journals listed above for papers related to your research interests, in order to find a place where you can make an original contribution.

Please decide who you are working with and what topic you will address by **Monday, November 19** (the last day before Thanksgiving). Teams will be asked to present their project ideas in class on **Wednesday, December 5**. You will present your project during the last week of class and during the exam period. As part of your presentation, mention explicitly how the individual team members contributed to the project.

The project will be evaluated solely on the basis of the presentation. As with the group presentation, the final project presentation must present both analyses, and adjudicate among them on the basis of empirical data. Presentations will be evaluated on clarity, timing, persuasiveness, and technical competence.

Gear. For every class meeting, please bring a notebook and a pen for taking notes. Given the huge potential for distraction, as well as educational research showing that taking notes by hand leads to better results than taking notes on a laptop, electronic devices must be put away, except when we are using laptops for a specific classroom activity.

Late policy. Because the material in this class builds up cumulatively, it is important that you stay on track with the homework assignments. Dealing with late homework assignments is also very time-consuming for instructors. Therefore, late homeworks will not be accepted except under extenuating circumstances. If anything stands in the way of your ability to finish your homework on time, please request an extension as soon as possible. Extensions will not be granted less than 24 hours before the deadline except in case of emergency. In general, homeworks are due by the start of class on Wednesdays. A smart strategy is to try to finish by the start of class of Monday so that if you have any questions you can ask them in class on Monday.

Academic Conduct. Boston University's Academic Conduct Code is accessible at <http://www.bu.edu/academics/policies/academic-conduct-code/>. The Academic Conduct Code for graduate students is accessible at <http://www.bu.edu/cas/students/graduate/grs-forms-policies-procedures/academic-discipline-procedures/>. Plagiarism in any form (including from online sources) and other academic misconduct is contrary to our goals and will not be tolerated. If you are unsure of any aspect of these policies, please ask!

Well-being. Learning and well-being are inextricably linked. In the event that you are experiencing struggles or mental health symptoms, and you need additional support, if

you would like, you can speak with me and I will listen and most likely remind you of the many resources here at BU. Actually, as you may already know, BU has a wealth of student support systems in place, with licensed counselors available to speak with you (see <https://www.bu.edu/students/health/counseling/>). As a BU student, help is available to you at 24 hours a day, 7 days a week. Appointments for regular care are available from 8 a.m. to 8 p.m., Monday through Thursday, and 8 a.m. to 5 p.m. on Friday. Phone assistance is available at all times at 617-353-3569 (BU's Behavioral Medicine Services Line). Emergencies are attended to immediately. Crisis intervention counselors are available and coordinated with other counseling resources on campus, such as with BU Psychological Services. These confidential services are easily accessible to help you manage personal challenges that may threaten your well-being and your learning goals. Know that if you do come to me for support, I cannot keep confidential any concerns related to safety (of yourself or others). Overall, taking steps to focus on your well-being, and reaching out for help if needed, are important and courageous things to do – for yourself and for those who care about you.

Accommodations for Students with Documented Disabilities. If you are a student with a disability or believe you might have a disability that requires accommodations, please contact the Office for Disability Services (ODS) at (617) 353-3658 or access@bu.edu to coordinate any reasonable accommodation requests. ODS is located at 19 Deerfield Street on the second floor (19 Buick Street as of September 1, 2018).

Communication. We will regularly use Slack for communication (<https://slack.com>). It is freely downloadable on many computer platforms, and can also be used on a mobile phone. You will be invited to join the 'Intermediate Semantics' workspace l432.slack.com through your BU email address.

Schedule (subject to revision)

Numbers under ‘Reading’ indicate a chapter/section of *Formal Semantics Boot Camp*.

Week 1: Sets and relations			Reading	Problem Sets
W	Sept. 5	Welcome		PS1 out
F	Sept. 7	Sets and relations	1, 2.1-2.3	
Week 2: First-order logic				
M	Sept. 10	Functions	3.1	
W	Sept. 12	Predicate logic	3.2-3.3	PS1 due, PS2 out
F	Sept. 14	Quantifiers in predicate logic	3.4.1	
Week 3: Type theory and Functional Application				
M	Sept. 17	Quantifiers in predicate logic	3.4.2	
W	Sept. 19	Lambda calculus	4	PS2 due, PS3 out
F	Sept. 21	Functional Application	5.1	
Week 4: Quantifiers in natural language				
M	Sept. 24	Functional Application	5.2	
W	Sept. 26	Quantifiers	5.3	PS3 due, PS4 out
F	Sept. 28	Quantifiers: Debate		
Week 5: Modifiers and descriptions				
M	Oct. 1	Quantifiers: Debate		
W	Oct. 3	Predicate Modification	6.1	PS4 due, PS5 out
F	Oct. 5	Definite descriptions	6.2	
Week 6: Coordination and plurals				
M	Oct. 8	<i>Columbus Day</i>		
T	Oct. 9	Presupposition		
W	Oct. 10	Coordination & Plurals	7.1-7.3	PS5 due, PS6 out
F	Oct. 12	Plurals: Debate (on <i>the two</i>)		
Week 7: Relative clauses and quantifier scope				
M	Oct. 15	Plurals: Debate (on <i>the two</i>)		
W	Oct. 17	Relative clauses	8.1	PS6 due, PS7 out
F	Oct. 19	Quantifier raising	8.2	
Week 8: Pronouns				
M	Oct. 22	Quantifier raising	8.2	
W	Oct. 24	Pronouns	8.3	PS7 due, PS8 out
F	Oct. 26	Pronouns: Debate		
Week 9: Indefinites				
M	Oct. 29	Pronouns: Debate		

W	Oct. 31	Dynamic semantics	9.1-9.3	PS7 due, PS8 out
F	Nov. 2	Indefinites: Debate		
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Week 10: Intensionality and indexicality				
M	Nov. 5	Indefinites: Debate		
W	Nov. 7	Intensional semantics	10.1–10.4	PS8 due, PS9 out
F	Nov. 9	Intensional semantics	10.6	
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Week 11: Tense				
M	Nov. 12	Indexicality		
W	Nov. 14	Tense	11.1-11.2	PS9 due, PS10 out
F	Nov. 16	Tense: Debate	11.3	
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Week 12: Final project presentations				
M	Nov. 19	Tense: Debate		
W	Nov. 21	<i>Thanksgiving</i>		
F	Nov. 23	<i>Thanksgiving</i>		
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Week 13				
M	Dec. 3	Review		PS10 due
W	Dec. 5	Final project presentations		
F	Dec. 7	Final project presentations		
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Week 14: Final project presentations				
M	Dec. 10	Final project presentations		
W	Dec. 12	Final project presentations		
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Note: This schedule is subject to change depending on student interest. Potential topics we could swap in for intensional semantics & indexicality and/or tense:

- gradability
- comparison
- measurement
- event semantics

References

- Dowty, David, Robert E. Wall & Stanley Peters. 1981. *Introduction to Montague semantics*. Dordrecht: Kluwer.
- Heim, Irene & Angelika Kratzer. 1998. *Semantics in generative grammar*. Oxford: Blackwell.