

Version date = 22 Feb 2017. May be revisions or corrections after 22 Feb 2017. Always check online syllabus in UBC Connect website for most recent version syllabus.

Course

Phil 220 Sec 98A May-Aug 2017 (no class section)

Lectures

None

Course Team

Lecture Meeting Instructor, Course Organizer

Leslie Burkholder

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Drop in office hours: Mon 08 Aug 2-3.30pm, Wed 10 Aug 1-2.30pm, Fri 12 Aug 1-2.30pm. Appointments may be made for times during and outside drop in office hours.

Texts (Recommended and Required)

Barker-Plummer et al, *Language Proof and Logic* 2nd ed (LPL2 textbook). 1st edition not usable. Available at Discount Texts in Village, UBC bookstore, Amazon and Chapters, download from CSLI at <http://ggweb.stanford.edu/store>

UBC bookstore etc: Physical printed text + software-on-CD package

Download: Text as .pdf + software

If second hand make sure (i) both printed text and CD combination and (ii) registration/iicense has not been used.

Additional material online inside UBC Connect course website.

Goals

Symbolic logic.

Evaluation

X% = 1 course intro orientation quiz + Many UBC Connect homework exercises. Homework exercises done at home. Open book, open computer windows, non-cumulative, unlimited tries. Best grade taken. Worth each homework depends on number questions. Homeworks each available all term unlimited time. All due by midnight (PST) one day after classes end. Check Course Calendar on course homepage for date.

Y% = GradeGrinder textbook homework exercises submissions. Worth each GradeGrinder exercise depends on number questions. GradeGrinder each available all term unlimited time. GradeGrinder submissions done at home. Open book, open computer windows, non-cumulative, unlimited tries. Most recent grade taken. All due by midnight (PST) one day after classes end. Check Course Calendar on course homepage for date.

Z% = Supervised final exam during final exam period for term. Closed book, closed computer window, one try only. Final exam dates and times to be determined. See Final exam information link in course website. Final exam may be done earlier than exam period. Contact instructor.

Course grade = Lowest two of X, Y, Z. Each weighted 50%.

Get course credit by doing Java or JavaScript programming for course! Credit may be extra unit or whole course. Contact instructor.

Week 1 (Starting Mon 15 May)

Topics: Course introduction. UBC Connect course website. Symbolic logic and logical concepts.
Tasks

Read LPL2 textbook "Introduction" p 1-5

Read LPL2 textbook "Introduction" p 5-11 (how to use Submit and Grader and other software). Go to GradeGrinder website to see video on how to use Submit.

(<https://ggweb.grader.net/support/tutorials> and scroll down)

Read LPL2 textbook ch 2 sec 0-1 p 41-44 (explanation argument, validity, logical consequence concepts), ch 4 sec 1 p 94 first three paragraphs (explanation logical truth concept), ch 4 sec 2 p 106 first two paragraphs (explanation logical equivalence concept), exercise 11.15

(explanation logical independence concept, don't do exercise), ch 5 sec 3 p 138 3rd and 2nd last paragraphs and ch 5 sec 4 p 141-142 (explanation contradiction/inconsistency concept)

Read LPL2 textbook ch 1 sec 0,1,2.

Read LM Unit 1 sec 1, sec 2, sec 3, sec 4. ([What's LM?](#))

Watch videos that go with LPL2 textbook: Go to

<https://ggweb.grader.net/lpl/coursecontent> and watch video "An overview of the course" under title "Welcome to Language, Proof and Logic" and "Valid and sound arguments" under title "Chapter 2: The logic of atomic sentences"

Do course orientation exercise in UBC Connect Assessments. All answers correct.

Do exercises in UBC Connect Assessments exercises 1.3.1, 1.3.2, 1.4

Topics: Tarski artificial language and worlds. Other logic languages and worlds.

Tasks

Read LPL2 textbook ch1 sec 0, ch1 sec 1, ch1 sec 2, ch1 sec 3, ch1 sec 4, ch 1 sec 7.

Read LM Unit 2 sec 1.

Watch videos that go with LPL2 textbook: Go to

<https://ggweb.grader.net/lpl/coursecontent> and watch "Atomic sentences" and "The blocks world language" and "Other example languages" under title "Chapter 1. Atomic Sentences"

Register at GradeGrinder using same name as in Connect grades record.

Do (submit to GradeGrinder using Submit program set to also email to instructor at leslie.burkholder@ubc.ca) LPL2 textbook exercises 1.3, 1.4, 1.5. GradeGrinder record can be checked at GradeGrinder website. Go to GradeGrinder website to see video on how to use GradeGrinder website. (<https://ggweb.grader.net/support/tutorials> and scroll down)

Do exercises in UBC Connect Assessments exercise The Bonus Survey

Week 2 (Starting Mon 22 May)

Topics: Artificial logic languages (eg Tarski logic language) truth-functional operators.

Tasks:

Read LPL2 textbook ch 3 sec 0-4 p 67-77 (skip "game rule for NOT" p 69, skip "game rule for AND" p 72, skip "game rule for OR" p 75-76), ch 3 sec 5-6 p 79-84, ch 7 sec 0-2 p 178-189 (skip "game rule for IF" p 180, skip "game rule for IFF" p 185), ch 7 sec 4 p 192-198.

Read LM Unit 2 sec 2.

Watch videos that go with LPL2 textbook: Go to

<https://ggweb.grader.net/lpl/coursecontent> and watch "The Boolean connectives: negation" and "The Boolean connectives: conjunction" and "The Boolean connectives: disjunction" under title "Chapter 2. The logic of atomic sentences" and "Conditionals" and "The many uses of implication" and "Biconditionals" under the title "Chapter 7. Conditionals".

Do (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises 3.2, 3.3, 3.7, 3.10, 3.13, 3.18, 7.10 (ignore "play the game" in this exercise), 7.16, 7.17, 7.25. GradeGrinder record can be checked at GradeGrinder website. Go to GradeGrinder website to see video on how to use GradeGrinder website.

(<https://ggweb.gradgrinder.net/support/tutorials> and scroll down)

No exercises in UBC Connect Assessments

Recommended do extra practice exercises outside Connect. Go to [Many Worlds Logic](#) outside Connect. Go to Truth-functional logic II Calculations (exercises 3,4)

Week 3 (Starting Mon 29 May)

Topics: Artificial logic languages (eg Tarski logic language) quantifiers.

Tasks:

Read LPL2 textbook ch 9 sec 0-2 p 229-233, sec 4-5 p 237-245 (skip "Game rules quantifiers" p 239-241)

Read LM Unit 2 sec 3

Watch videos that go with LPL2 textbook: Go to

<https://ggweb.gradgrinder.net/lpl/coursecontent> and watch "Introduction to the quantifiers" and "Quantifier semantics" under the title "Chapter 9. Introduction to quantification".

Do (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises 9.5, 9.6. GradeGrinder record can be checked at GradeGrinder website. Go to GradeGrinder website to see video on how to use GradeGrinder website.

(<https://ggweb.gradgrinder.net/support/tutorials> and scroll down)

Topics: Artificial logic languages (eg Tarski logic language) quantifiers.

Tasks:

Read LPL2 textbook ch 10 sec 3 p 280 (starting at "De Morgan laws for quantifiers")-281, ch 10 sec 4, ch 11 sec 0-2, ch 11 sec 7.

Read about truth-functional expansions in course materials folder in Connect course website

Read LM Unit 2 sec 5, sec 6, sec 8.

Watch videos that go with LPL2 textbook: Go to

<https://ggweb.gradgrinder.net/lpl/coursecontent> and watch "First order equivalence and de Morgan's laws" under the title "Chapter 10. The logic of quantifiers".

Do (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises 9.9, 9.14, 10.22, 11.2, 11.3, 11.9, 11.10, 11.12, 11.38

Do exercises in UBC Connect Assessments exercises 2.5, 2.6, 2.8

Week 4 (Starting Mon 05 Jun)

Topics: Syntax Tarski logic language and other logic languages. Legal strings and formulas. Free variables. Sentences vs wffs. Main logic operator.

Tasks:

Read LPL2 textbook ch 9 sec 3 p 233-236

Read LM Unit 3 sec 1-5, sec 7-8

Watch videos that go with LPL2 textbook: Go to

<https://ggweb.gradgrinder.net/lpl/coursecontent> and watch "Variables, wffs, and sentences" under the title "Chapter 9. Introduction to quantification".

No (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises

Topics: Syntax Tarski logic language and other logic languages. Legal strings and formulas. Free variables. Sentences vs wffs. Main logic operator.

Tasks:

Read LPL2 textbook ch 9 sec 3 p 233-236

Read LM Unit 3 sec 1-5, sec 7-8

No (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises

Do exercises in UBC Connect Assessments exercises 3.2, 3.3, 3.5, 3.7, 3.8

Recommended do extra practice exercises outside Connect. Go to [Many Worlds Logic](#) outside Connect. Go to Truth-functional logic II Calculations (exercises 1,2)

Week 5 (Starting Mon 12 Jun)

Topics: Tarski logic language truth-functional operators translation.

Tasks:

Review LPL2 textbook ch 3 sec 0-4 p 67-77 (skip "game rule for NOT" p 69, skip "game rule for AND" p 72, skip "game rule for OR" p 75-76), ch 3 sec 5-6 p 79-84, ch 7 sec 0-2 p 178-189 (skip "game rule for IF" p 180, skip "game rule for IFF" p 185), ch 7 sec 4 p 192-198.

Read LPL2 textbook ch 3 sec 7 p 84-89, ch 7 sec 3 p 189-192

Read LM Unit 4 sec 1-2

Recommended do extra practice exercises outside Connect. Go to [Many Worlds Logic](#) outside Connect. Go to Truth-functional logic I Elementary translations (exercises 1, 2,3)

Topics: Tarski logic language truth-functional operators translation.

Tasks:

Review LPL2 textbook ch 3 sec 0-4 p 67-77 (skip "game rule for NOT" p 69, skip "game rule for AND" p 72, skip "game rule for OR" p 75-76), ch 3 sec 5-6 p 79-84, ch 7 sec 0-2 p 178-189 (skip "game rule for IF" p 180, skip "game rule for IFF" p 185), ch 7 sec 4 p 192-198.

Read LPL2 textbook ch 3 sec 7 p 84-89, ch 7 sec 3 p 189-192

Read LM Unit 4 sec 1-2

Watch videos about translation outside Connect: [Video1](#),

Do extra practice exercises outside Connect. Go to [Many Worlds Logic](#) outside Connect. Go to Truth-functional logic I Elementary translations

Do exercises in UBC Connect Assessments exercises 4.2.1, 4.2.2

Do (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises 3.20, 3.21, 7.11, 7.12, 7.15

Week 6 (Starting Mon 19 Jun)

Topics: Tarski logic language identity and quantifier operators translation.

Tasks:

Review LPL2 textbook ch 9 sec 0-2 p 229-233, sec 4-5 p 237-245 (skip "Game rules quantifiers" p 239-241), ch 10 sec 3-4 p 279 (starting at "De Morgan for quantifiers")-286, ch 11 sec 0-2 p 298-306, ch 11 sec 7 p 320-324.

Read LPL2 textbook ch 9 sec 6 p 245-253, ch 7 sec 3 p 189-192, ch 11 sec 3-5 p 307-317

Read LM Unit 4 sec 3, 5-6

Watch videos that go with LPL2 textbook: Go to <https://ggweb.gradegrinder.net/lpl/coursecontent> and watch "Translation involving quantifiers" under the title "Chapter 9. Introduction to quantification".

Watch videos that go with LPL2 textbook: Go to <https://ggweb.gradegrinder.net/lpl/coursecontent> and watch "First-order equivalence and de Morgan's laws" and "Quantifier equivalences" under the title "Chapter 10. The logic of quantifiers".

Do exercises in UBC Connect Assessments exercises 4.3.1, 4.3.2, 4.3.3, 4.5, 4.6

Do (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises 9.12, 9.13, 9.16, 9.17, 9.18, 11.4, 11.16, 11.17, 11.19, 11.20

Week 7 (Starting Mon 26 Jun)

Topics: Tarski logic language quantifier operators complex patterns translation, eg numeric quantification, definite descriptions.

Tasks:

Read LPL2 textbook ch 14 sec 0-1 p 373-383, ch 14 sec 3 p 388-391

Read LM Unit 4 sec 4, Unit 5 sec 2

Watch videos that go with LPL2 textbook: Go to <https://ggweb.gradegrinder.net/lpl/coursecontent> and watch "Sentences containing multiple quantifiers" and "Translation and ambiguity" under the title "Chapter 11. Multiple quantifiers".

Watch videos that go with LPL2 textbook: Go to <https://ggweb.gradegrinder.net/lpl/coursecontent> and watch "Numerical quantifiers" and "Definite descriptions" under the title "Chapter 14. More about quantifiers".

Do exercises in UBC Connect Assessments exercises 4.4, 5.2

Do (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises 14.1, 14.3, 14.4, 14.28

Week 8 (Starting Mon 27 Jun)

Topics: Applications logic language translation.

Tasks:

Read LM Unit 5 sec 3-4.

Nothing to read in LPL2 textbook

Recommended on BNA project: Guardian newspaper articles Bloomfield and Kowalski on logic and law in Course Materials folder

Recommended on Arrow and voting methods: New Yorker magazine article in Course Materials folder

Recommended Arrow movie in Course Materials folder

Do exercises in UBC Connect Assessments exercises 5.3

No (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises

Week 9 (Starting Mon 03 Jul)

Topics: Nonstandard interpretations and the logical concepts again.

Tasks:

Read LM Unit 2 Sec 7, Unit 6 all sections

Nothing to read in LPL2 textbook

Watch videos that go with LPL2 textbook: Go to <https://ggweb.grade grinder.net/lpl/coursecontent> and watch "Logical truths and tautologies" and "Logical and tautological equivalence" and "Logical and tautological consequence" under the title "Chapter 4. The logic of Boolean connectives".

Watch videos that go with LPL2 textbook: Go to <https://ggweb.grade grinder.net/lpl/coursecontent> and watch "Tautologies and quantifiers" and "First order validity and consequence" and "First order equivalence and De Morgan's laws" under the title "Chapter 10. The logic of quantifiers".

Do exercises in UBC Connect Assessments exercises 2.7, 6.2, 6.3, 6.5, 6.6, 6.7, 6.8

No (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises

Week 10 (Starting Mon 10 Jul)

Topics: Semantic tableau truthtrees. The truth-functional operators.

Read LM Unit 7 all sections

Nothing to read in LPL2 textbook

Recommended: Sections from Hodges, *Logic Sec 10, 11, 20, 36, 40* in Course Materials folder

Watch video on truth-functional tableau from India Inst Technology at

<http://nptel.ac.in/courses/109104040/>. Go to Lecture 19 and 20 and 21

Do exercises in UBC Connect Assessments exercises 7.1, 7.3

No (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises

Topics: Semantic tableau truthtrees. Quantifier operators and identity.

Read LM Unit 7

Nothing to read in LPL2 textbook

Recommended: Sections from Hodges, *Logic Sec 10, 11, 20, 36, 40* in Course Materials folder

Watch video on quantificational tableau from India Inst Technology at

<http://nptel.ac.in/courses/109104040/>. Go to Lecture 40 and 41

Do exercises in UBC Connect Assessments exercises 7.2, 7.4, 7.5

No (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises

Instructions for using TWOOTIE semantic tableau truthtrees program on Mac OSX. Download

TWOOTIE MSDOS package for Macintosh. See Course Materials folder in course website.

Instructions for using TWOOTIE semantic tableau truthtrees program on Windows. Download TWOOTIE MSDOS package for Windows. See Course Materials folder in course website.

Week 11 (Starting Mon 17 Jul)

Topics: Proof / derivations. Rules for identity, the truth-functional operators, quantifiers. Using derivation rules forwards and backwards.

Tasks:

Read LPL2 textbook ch 2 sec 2-4 p 46-62, ch 5 all secs p 128-142, ch 6 all secs p 143-177, ch 8 sec 0-2 p 199-215, ch 12 sec 0-4 p 328-347, ch 13 sec 0-3 p 351-369

Watch videos that go with LPL2 textbook: Go to <https://ggweb.gradegrinder.net/lpl/coursecontent> and watch "Formal proofs" and "Formal proofs in FITCH" under the title "Chapter 2. The logic of atomic sentences".

Watch videos that go with LPL2 textbook: Go to <https://ggweb.gradegrinder.net/lpl/coursecontent> and watch "Formal rules for conjunction" and "Formal rules for disjunction" and "Formal rules for negation" and "More on subproofs" under the title "Chapter 6. Formal proofs and Boolean logic".

Watch videos that go with LPL2 textbook: Go to <https://ggweb.gradegrinder.net/lpl/coursecontent> and watch "Formal rules for conditionals" under the title "Chapter 8. The logic of conditionals".

Watch videos that go with LPL2 textbook: Go to <https://ggweb.gradegrinder.net/lpl/coursecontent> and watch "Formal rules for quantifiers" under the title "Chapter 13. Formal proofs and quantifiers".

Read LM Unit 8 sec 1, sec 2, sec 4, sec 5, sec 7

Week 12 (Starting Mon 24 Jul)

Topics: Proof / derivations. Rules for identity, the truth-functional operators, quantifiers. Using derivation rules forwards and backwards.

Tasks:

Read LPL2 textbook ch 2 sec 2-4 p 46-62, ch 5 all secs p 128-142, ch 6 all secs p 143-177, ch 8 sec 0-2 p 199-215, ch 12 sec 0-4 p 328-347, ch 13 sec 0-3 p 351-369

Watch Quicktime video of doing LPL exercise 6.1 Conjunction proof 2 in FITCH program in Course Materials folder

Read LM Unit 8 sec 1, sec 2, sec 4, sec 5, sec 7

Do exercises in UBC Connect Assessments exercises 8.2, 8.4, 8.7

Do (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises 2.16, 6.1, 6.2, 6.7, 6.8, 6.33, 8.17, 13.1 Proof Universal 1 only, 13.10

Week 13 (Starting Mon 31 Jul)

Topics: Positive subformulas. Identity proof /derivation strategies, truth-functional proof /derivation strategies, quantifier proof/ derivation strategies.

Tasks:

Read LPL2 textbook ch 6 sec 5, ch 8 sec 2, ch 13 sec 3

Read LM Unit 3 sec 9, Unit 8 sec 3, sec 6, sec 8, sec 9

Do exercises in UBC Connect Assessments exercises 3.9, 8.3, 8.5, 8.8

Do (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises 2.17, 2.18, 6.3-6.6, 6.9, 6.12, 6.18-6.20, 6.24-6.27 no informal proofs just FITCH proofs, 8.19, 8.20, 8.23, 8.24, 8.25, 8.26-8.30 not using Taut Con rule, 13.2 not using Taut Con rule, 13.3 not using Taut Con rule, 13.4 not using Taut Con rule, 13.8 not using Taut Con rule, 13.11 not using Taut Con rule, 13.14 not using Taut Con rule, 13.28-13.31 not using Taut Con rule

Strategies flowchart: [TF+identity+Quantifier operators](#)

Week 14 (Starting Mon 07 Aug)

Fri 11 Aug Last day classes

Topics: Logic applications proofs / derivations and tableau: Russell set theory paradox

Tasks:

Read LPL2 textbook ch 1 sec 6 p 37-38, ch 15 sec 0-3 p 413-422, ch 15 sec 9 p 442-443

Read LM Unit 9 sec 1-3

Watch background YouTube video about Russells' set theory paradox in course materials folder in Connect.

Do exercises in UBC Connect Assessments exercises 9.2.1, 9.2.2, 9.2.3, 9.2.4, 9.3.1, 9.3.3, 9.3.5

No (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises

Topics: Logic applications proofs / derivations and tableau: God

Tasks:

Nothing to read in LPL2 textbook

Read LM Unit 9 sec 4

Watch YouTube [video about Anselm's proof](#). Read [Anselm Proslogion ch 2](#).

Read outside Connect. Go to [Many Worlds Logic ontological argument](#)

Do exercises in UBC Connect Assessments exercises

No (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises

Topics: Logic applications proofs / derivations and tableau: Arrow on preferences

Tasks:

Read LPL2 textbook ch 15 sec 6 p 432 "Properties of relations"

Read LM Unit 9 sec 5

Do exercises in UBC Connect Assessments exercises 9.5.1

No (submit to GradeGrinder using Submit program set to also email to instructor) LPL2 textbook exercises

Topics: Logic applications: Natural language reasoning = Logic language reasoning?

Tasks:

Read to be determined

Exam period (starting Tue 15 Aug and ending Sat 19 Aug)

Final exam. For date, time, and location see final exam information link in course website.