PHI 323 / MAT 306 Advanced Logic: Set Theory

GENERAL INFORMATION

A lot of what follows is boilerplate, but please do read it at the outset, and refer back to it as appropriate.

Despite the title of the course, PHI 312, Intermediate Logic, is *not* a prerequisite.

Time: TUE/THU 11:00-12:20

Place: to be divulged by the registrar at the very last moment before classes begin

Instructor: J. P. Burgess, office 224 1879 Hall (office hours 1-3 TUE), email jburgess@princeton.edu, vmail 609-921-3181

The textbook will be J. P. Burgess, *Set Theory*, in the Cambridge Elements series

It is supposed to be inexpensive, partly because the publisher does not pay authors royalties,

mainly because the booklet is short, so that we will be going through it slowly, filling in a lot of details in the condensed presentation.

Lectures will be loosely keyed to the pages of the text indicated in the Syllabus below (which is only approximate: there may be departures).

Note that there is no class on the week of Thanksgiving (since the TUE of that week will follow a FRI schedule).

Though there are no precepts as such, about 25% of our time will be used for work on sample problems,

mostly presented by students who have volunteered (or been assigned) in advance.

(These oral presentations, in contrast to the written homework, will be evaluated more for effort than for outcome.)

There will be 6 problem sets to be written up, the first five due on TUE of the 3rd, 5th, 7th, 9th,11th weeks of classes,

the last on Dean's Date.

The due time is 5:00 pm on the due date (not midnight as it was during the pandemic when classes were remote).

Only deans, not instructors, are authorized to give extensions of more than 24 hours on Dean's day assignments.

No one can or will give an extension beyond Dean's date on any assignment that was due before the end of classes.

There will be a penalty of one point per weekday of lateness to a maximum of 10 or one full letter

(on a scale of 95 = A, 85 = B, 75 = C; conversion to the scale 4.0 = A, 3.0 = B, 2.0 = C is like that between Fahrenheit and Celsius)

Since grades will depend mainly on these problem sets, they are to be treated as INDIVIDUAL, not group assignments,

subject to the regulations in the University document *Rights, Rule, Responsibilities*:

in particular, undergraduates should write at the end of each assignment

"This paper represents my own work in accordance with University regulations" followed by the student's signature.

[Note the exact wording: The word "honor" does not appear.

The Honor System pertains only to in-class examinations, and we will have none of those.]

Requests for extensions for medical reasons should be supported if feasible by a note (usually easily obtained) from University Health Services.

Extensions for predictable reasons (e.g. scheduled extracurricular activities requiring absence from campus) should be sought in advance.

Papers should be submitted electronically, preferably typed, though a scan of a hand-written paper is acceptable

(but please do try to be legible).

Submission should be as an ordinary attachment in pdf format to an ordinary email.

(No Google docs or other fancy delivery systems, please.)

SYLLABUS

Week 1	SEP 05 TUE & SEP 07 THU	pages 01-09	Historical introduction
Week 2	SEP 12 TUE & SEP 14 THU	pages 09-15	Zermelo-Fraenkel axioms and immediate consequences
Week 3	SEP 19 TUE & SEP 21 THU	pages 15-21	Pairs, relations, functions, orders, equivalences
Week 4	SEP 26 TUE & SEP 28 THU	pages 22-28	The classical number systems, set theory as framework for all mathematics
Week 5	OCT 03 TUE & OCT 05 THU	pages 29-37	Transfinite numbers
Week 6	OCT 10 TUE & OCT 12 THU	pages 38-40	The axiom of choice
Fall break			
Week 7	OCT 24 TUE & OCT 26 THU	pages 41-46	Descriptive set theory
Week 8	OCT 31 TUE & NOV 02 THU	pages 47-49	Combinatorial set theory
Week 9	NOV 07 TUE & NOV 09 THU	pages 50-55	Metamathematics
Week 10	NOV 14 TUE & NOV 16 THU	pages 55-57	Consistency of the axiom of choice (and continuum hypothesis)
Thanksgiving break			
Week 11	NOV 14 TUE & NOV 16 THU	pages 58-61	Independence of the axiom of choice (and continuum hypothesis)
Week 12	DEC 05 THE & DEC 07 THU	pages 62-68	Large cardinals and determinacy

Dean's date is DEC 15 FRI

There are problem sets due the TUE of the 3rd, 5th, 7th, 9th, 11th weeks, and on Dean's date