PGF5299: Physical Cosmology II

Course Information

The purpose of this course sequence is to prepare you for *professional work* on Astrophysics and Cosmology, which may range from theoretical work to analysis of observed data, and the phenomenology connecting both. *Physical Cosmology I* focused on the foundations, whereas *Physical Cosmology II* focuses on more advanced topics and recent developments.

Instructor: Marcos Lima, `mlima@fma.if.usp.br`
Website: `www.fma.if.usp.br/~mlima` + click on "Teaching"+ "Physical Cosmology II"
Meetings: Tuesdays and Fridays, 16:00 hrs, Sala Jayme Tiomno.
Office hours: Right after class on Tuesday.

References:

- Main text: Dodelson, *Modern Cosmology*.
- Other references:
  Amendola & Tsujikawa, *Dark Energy: Theory and Observations*,
  Peacock, *Cosmological Physics*,
  Weinberg, *Cosmology*,
  Peebles, *Large-Scale Structure of the Universe*,
  Padmanabhan, *Structure Formation in the Universe*,
- Lecture Notes may also be provided throughout the course.
- All material used is in English, which you are supposed to master at this point.

Grades:

Your grade will be based on weekly Problem Sets (50%) and a Final Project (50%) on a topic of your choice that must involve Numerical Calculations. Some rules:

- Each Problem Set must be turned in on the *due date* by midnight. No excuse will be accepted for returning homework late. Late homework will be accepted but will have 1.0 point discounted for each late day, up to a maximum of 3 days, after which the homework will not be accepted. If you return your solutions on the due date, but after class time, you must send it to me by e-mail (either a LaTeX generated or a scanned pdf); failing to do so will count as one day late.
- We will not have make-up Problem Set ("substitutiva"). Instead, from all Problem Set grades, the *lowest grade* will be *disregarded* when computing your average grade. So in principle you may choose not to return one Problem Set, with no effect on your final grade.

- Most problems will require **numerical** calculations in a **programming** language of your choice.
- You must **print** the **codes** that you wrote for the numerical calculations and attach them at the end of your Problem Set Solution.
- If you write your Problem Set Solutions in **English**, you get an extra 0.5 point in each set.
- If you type your Problem Set in **LaTeX** you get an extra 0.5 point in each set.
- You may discuss the Problem Set with other people, but make sure you write your own numerical programs, and that you understand and write your own solution to each problem. Simply copying someone else's work will be regarded as very dishonest.

- The Final Project will consist of a Final Paper you must hand in on a specified date.
- The Final Paper must be written in LaTeX. If you write the paper in English you may get up to 0.5 extra point (depending on your proficiency).
- You may discuss your Final Project with other people that have similar topics, but again make sure you write yourself every word in your Final Paper.

Final Project: See details and ideas for topics in separate sheet.

Course Schedule: See rough tentative schedule in separate sheet.

Recuperação: If necessary, we will schedule a make-up exam in December.