

**VERY EARLY UNIVERSE****Goals**

The aim of the course is to prepare beginning graduate students for research in theoretical cosmology, and to give students in related areas interested in cosmology the background to follow the field.

**Topics Covered**

The following are suggested topics to focus on. Student input is welcome. The first five topics constitute the core of the materials, the other items are supplementary, and the order in which these supplementary topics are discussed is not set in stone.

- \* **Overview of Standard Big Bang Cosmology** (Week 1)
- \* **Inflationary Cosmology** (Week 2)
- \* **Theory of Cosmological Perturbations** (Weeks 3 and 4)
- \* **Alternatives to Inflation** (Week 5)
- \* **Topological Defects in Cosmology** (Week 6)
- \* Parametric Resonance and Reheating in Inflationary Cosmology (Week 7)
- \* Elements of Superstring Cosmology (Week 8)
- \* Cosmic Microwave Background Anisotropies (Week 9)
- \* Gravitational Waves (Week 10)
- \* Dark Energy (Week 11)
- \* Quantum Field Theory Methods for Cosmology (Week 12)

**Format**

The format of the course will be that of a “guided” reading course. It will “meet” once a week for about 90 minutes. Each week will cover a set of pre-assigned readings. The students are required to submit **summaries of the readings emphasizing their questions** by the end of the afternoon of the day before the class. The class will begin with a summary of the material. Most of the class, however, will be devoted to discussion of the issues raised by the students in their summaries.

#### Assessment

There will be a series of roughly bi-weekly homework sets so that the students can test their mastery of the materials. The students will be evaluated based on the quality of their summaries on their homework solutions, and on class participation.

**Meeting Time: TBA .**

Brief Organizational Meeting TBA

#### Statement of Academic Integrity

McGill course syllabi must contain the following: “McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offenses under the Code of Student Conduct and disciplinary Procedures (see <http://www.mcgill.ca/integrity> for more information.”

#### Language of Submission

In accord with McGill University’s Charter of Students’ Rights, students in this course have the right to submit in English and French any written work that is to be graded.

Note: In the event of extraordinary circumstances beyond the University’s control, the content and/or evaluation scheme in this course is subject to change.