Course Information

- PHYS 303 / RCS 303: An Introduction
- Instructor Info and Course Requirements
- Course Texts and References
- Readings and Lecture Schedule
- Reading Depository
- Grading Scheme

Class Notes

For convenience, I am making copy of my basic overhead slide set available below. Please note that the information contained therein is subject to revision in that in any one year, I may choose to present only a subset of the material, change the emphasis and/or order of presentation, and add extra material not included in notes below depending on the developments and discoveries that have occurred over the past year.

These notes should NOT be used as a reason for not attending the lectures as all the additional content introduced during the lectures is legitimate source of questions for midterms and final exams.

- Set I
- Set II
- Set III
- Set IV
- Set V
- Set V (extra)
- Set VI
- Set VII
- Set VIII

Supplementary Material (Videos and Articles)

Some of the concepts that will be discussed in the class room and in your readings are difficult to grasp. The links below will direct you to articles and videos with graphics that may prove helpful.

There are also some mindblowing topics covered by some of the links that we will only touch briefly in the class due to lack of time.

For Weeks 1-2: Introduction

- Why Physics 303?
- TED Lecture: Truth and Beauty in Physics
- The Humans and the Heavens: An Ancient Affair
- On the Origins of the Zodiac

For Weeks 3: Pre-Einstein

- Kepler's Laws (animation)
- Newton's Laws explained, with animation

For Weeks 4: Symmetry and Supersymmetry

- What is symmetry? What is supersymmetry?
- Symmetry: Key to Nature's Secrets
- The Most Important Woman in the History of Mathematics
- Symmetry in Physics: Part 1-Spacetime Symmetry
- Symmetry in Physics: Part 2-Discreet Symmetries and Antimatter
- Symmetry in Physics: Part 3-Internal Symmetries and Particle Physics
- Symmetry in Physics: Part 4-Gauge Symmetries and Physical Interactions
- Atoms, Spacetime and Unity of Physics
- Supersymmetry and Origin of Matter (Four videos)
- The Origin of Mass

For Weeks 5-6: Einstein's Relativity

- Basics of Relativity (A student project)
- A Neat Intro to Relativity, with animation
- Intro to Relativity (A student project)
- Falling into a Black Hole (movies, animation, etc.)
- Inside a Black Hole (movies, animation, etc.)
- Time is an OBJECT...but see the next link (youtube video)
- How To Build A Time Machine | Weird Science
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- Gravity Waves: Ripples in Spacetime
- What are Gravity Waves?
- Pre-2016 Evidence for Gravity Waves?

For Weeks 7-8: Quantum Physics

- Weird Quantum World
- Weird Topics from the Quantum Realm
- An Intro to Quantum Mechanics
- Schrodinger's Cat Explained (Sort Of)
- TED Lect.: Making Sense of Visible Quantum Objects
- An Introduction to Quantum Theory

For Weeks 9-10: Big Bang and the Origin of the Universe

- WMAP Cosmology 101
- Cosmic Voyage: A Journey Through the Universe
- Dark Matter, Dark Energy the Invisible Universe HD Full Documentary
- Observing the Beginning of Time
- Back to the Beginning
- National Geographic: Death of the Universe

For Weeks 11-12: Inflation and the Origins of the Universe

- Inflation Tutorial
- Proof of Inflation? -- The BICEPS Detection
- The Myth of the Beginning of Time
- Universe or Multiverse - A Documentary
- Does the Multiverse Really Exist?
- The illusion of Time– Alternative TimeLines– Parallel Realities
- Putting Multiverse Model to the Test
- Parallel Universes FAQ
- Primer on particles, strings & quantum spacetime foam

Problem Sets

There will be a total of 6 problem sets assigned over the course of the semester. Jointly these will comprise 40% of your final mark. The assignments (and their due dates as well as an outline of suitable responses) will be posted here. Please check this page regularly.

To receive a non-failing final course grade, students must - at the very least, submit the LAST FOUR COURSE problem sets and sit for the final exam. The actual course grade will depend on the scores received on the problem sets, midterms and the final exam.

For further details about submission requirements etc., please see Grading Scheme

If you require assistance with the problem sets, I recommend - in the first instance - visiting the Physics Aid Service offered by the Department of Physics and Astronomy. Click on the link for information about the room and schedule information.

- Problem-Set-1 **Due SEPT 14TH**
- Problem-Set-2 **Due SEPT 28TH**
- Problem-Set-3 **Due OCT 12TH [Must Submit]**
  Please use this link here for question #2.
- Problem-Set-4 **Due OCT 31ST [Must Submit]**
- Problem-Set-5 **Due NOV 16TH [Must Submit]**
- Problem-Set-6 **Due NOV 30TH [Must Submit]**
  Please use this link here for the first question. Please continue to "next" to read a total of 5 webpages.

Midterm Test

The scores of the midterm exam will comprise 25% of the final course mark.

To receive a non-failing final course grade, students must - at the very least, submit the LAST FOUR COURSE problem sets and sit for the final exam. The actual course grade will depend on the scores received on the problem sets, midterms and the final exam.

For further details about submission requirements etc., please see Grading Scheme

- **DATE: MID-OCTOBER (see Class Schedule for date)**

Final Exam

(or optional Term-End Essay for RCS303 Students)

The scores from the final exam (term-end essay — see Grading Scheme for details) will comprise 35% of the final course mark.

To receive a non-failing final course grade, students must - at the very least, submit the LAST FOUR COURSE problem sets and sit for the final exam. The actual course grade will depend on the scores received on the problem sets, midterms and the final exam.

For further details about submission requirements etc., please see Grading Scheme

- **DATE: SEE UNIVERSITY EXAM SCHEDULE**

Course Experience Survey

Towards the end of term, you will have the opportunity to complete an anonymous survey regarding your learning experience (CES). The survey is vital to providing feedback to me regarding the course, as well as to help the department improve the overall program for students in the future. In due course, you will receive an email inviting you to do so.

To make sure you receive the invite, please ensure that your current email address is listed in MyPage (http://uvic.ca/mypage) . If you do not receive an email invitation, you can go directly to http://ces.uvic.ca . You will need to use your UVic netlink ID to access the survey, which can be done on your laptop, tablet, or mobile device. I will remind you and provide you with more detailed information nearer the time

IMPORTANT NOTE:

Physics and Astronomy majors (or potential majors) should note that this course cannot be used to satisfy their program credit requirements, but can be taken as one of their free (i.e. unrestricted) electives.

Please check with me or with the department administrator.