



UNIVERSITY OF CALGARY
DEPARTMENT OF PHYSICS AND ASTRONOMY
COURSE OUTLINE

1. **Course:** Physics 501, The Theory of Relativity Winter 2016

Instructor: Dr. R. Ouyed | SB 515 | 403.210.8418 | rouyed@ucalgary.ca | Office Hours: W 14:00 – 15:00, F 14:00 – 15:00 or call 210-8418 for an appointment

Lecture Sections: LEC 1 | MWF 15:00-15:50 | SH 280

Course Website: d2l.ucalgary.ca

Departmental Office: SB 605, 403-220-5385, phasugrd@ucalgary.ca

2. **Prerequisites:** Physics 325 and 457 and Mathematics 353 or Applied Mathematics 309.

Note: The Faculty of Science policy on pre- and co-requisite checking is outlined in the UofC Calendar. A student may not register in a course unless a grade at least "C-" has been obtained in each pre-requisite course; it is the responsibility of students to ensure that their registrations are in order. See <http://www.ucalgary.ca/pubs/calendar/current/sc-3-5.html> for details.

3. **Grading:** The University policy on grading and related matters is described sections F.1 and F.2 of the online University Calendar. In determining the overall grade in the course the following weights will be used:

Assignments	40%	(4 in total at 10% each)
In-class Midterm	30%	(February 26-29)
Presentations	15%	(weekly- see note A below)
In-class Final Examination	15%	(April 11-13)

All class work will be graded numerically (e.g. 7/10) which can directly be converted to percent. The final course mark will be calculated as a percent then converted to a grade using the following scale:

>= 95 %	A +	>= 78 %	B +	>= 60 %	C +	>= 42 %	D +
>= 90 %	A	>= 72 %	B	>= 54 %	C	>= 36 %	D
>= 84 %	A -	>= 66 %	B -	>= 48 %	C -	< 36 %	F

Note A: Presentations will normally be held on Monday of each week starting Jan.18 and ending Apr.11. The detailed schedule will be provided in class.

4. **Missed Components of Term Work:** The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself with these regulations. See also [Section E.6](#) of the University Calendar
5. **Course Materials:** "*Space Time Physics*", Taylor&Wheeler, 2nd Edition (1992) (<http://www.amazon.com/Spacetime-Physics-Edwin-F-Taylor/dp/0716723271>)
6. **Examination Policy:** For all quizzes, tests, and examinations a calculator is allowed. In some cases the quiz, test or examination will also be open book or a formula sheet (prepared by the student) will be allowed: if so, the instructor will notify students in advance. Students should also read the Calendar, [Section G](#), on Examinations.

7. **Writing across the curriculum statement:** In this course, the quality of the student's writing in quizzes, tests and examinations will be a factor in their evaluation. See also [Section E.2](#) of the University Calendar.

8. **OTHER IMPORTANT INFORMATION FOR STUDENTS:**

- (a) **Academic Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties.
- (b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on assembly points.
- (c) **Student Accommodations:** Students needing an Accommodation because of a Disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available at http://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf. Students needing an Accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Associate Head of the Department of Physics and Astronomy, Dr. Michael Wieser, by email (<mailto:mwieser@ucalgary.ca>) or by phone (403.220.3641).
- (d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- (e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also <http://www.ucalgary.ca/secretariat/privacy>.
- (f) **Student Union Information:** [VP Academic](#) Phone: 220-3911 Email: suvpaca@ucalgary.ca.
SU Faculty Rep: Phone: 220-3913
Email: science1@su.ucalgary.ca, science2@su.ucalgary.ca and science3@su.ucalgary.ca
Student Ombuds Office: 403 220-6420 Email: ombuds@ucalgary.ca; <http://ucalgary.ca/provost/students/ombuds>
- (g) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.
- (h) **U.S.R.I.:** At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference - please participate in USRI Surveys.

Syllabus:

Midterm: Chapters 1, 2, 3, L, 4 + any additional material

Final : Chapters 5,6,7,8 + any additional material

Week	Class Dates	Reading	Homework	Exam
1	Jan 11-15	Ch. 1		
2	Jan 18-22	Ch. 2		
3	Jan 25-29	Ch. 3	Assignment 1	
4	Feb 1-5	Ch. LT		
5	Feb 8-12	Ch. 4		
Reading Week				
6	Feb 22-26	Ch. 5	Assignment 2	Midterm 1a (26)
7	Feb 29-Mar3	Ch. 6		Midterm 1b (29)
8&9	Mar 7-18	Ch. 7	Assignment 3	
10&11	Mar 21 – Apr 1	Ch. 8		
12	Apr 4-8	Ch. 9	Assignment 4	
13	Apr 11-13	TBD		Exam 1a & 1b

Topics that will be covered in this course include:

- Spacetime metrics (unification of space and time)
- Physics in inertial frames of reference
- Transforming between inertial frames (*Lorentz transformation*)
- Length contraction and time dilation
- Relativity of simultaneity
- Time travel
- Causality
- Unification of momentum and energy
- Transformation of mass and energy
- Curved space: General Relativity (?)

Department Approval _____ Date _____