

SYLLABUS TO RELATIVITY (PHY408)

PHY 408: Relativity (3 credits)

MW 4:25-5:45

Instructor: Prof.Edward Shuryak

Email

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Office hours: Fridays TBD

Purpose:

This course is designed to introduce you to Einstein's theory of gravity: The general theory of relativity, a.k.a. GR. We will first recap special relativity and learn to express the theory in terms of tensors. We will then learn how to mathematically express concepts of curvature in terms of tensors (known as differential geometry). Once we understand how to quantify curvature we will derive the Einstein field equations. We will then (as time permits) explore several important solutions of the field equations that describe neutron stars, black holes, the expanding universe, and gravitational waves.

What to Expect:

This course will require you to carry out numerous homework assignments that are highly mathematical in nature. Weekly problem assignments will be handed out that will reinforce the material presented during the lecture. This course will involve a lot of mathematics that will be new to you. If you don't like doing quite a lot of math this course is not for you! Some part will use Mathematica to work with vector and tensors in curved coordinates.

Required text:

“A First Course in General Relativity” by Bernard Schutz, second edition

Course Grading and Attendance:

The grading for the course will be based on the completion of weekly homework assignments (1/2) , and a final exam (1/2).

Student Accessibility Support Center (SASC) Statement:

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact the Student Accessibility Support Center (SASC), ECC (Educational Communications Center) Building, room 128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and the staff at the

Student Accessibility Support Center (SASC). For procedures and information go to the following website: <http://www.stonybrook.edu/ehs/fire/disabilities>

Academic Integrity Statement:

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology and Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at

http://www.stonybrook.edu/commcms/academic_integrity/index.html

SPECIAL NOTE REGARDING PLAGIARISM AND DISHONESTY: All instances of suspected plagiarism or academic dishonesty will be brought before the Academic Judiciary Committee. All parties suspected (both the copier and the person who produced the original work) will be held accountable for any instance of plagiarism or dishonesty. You are responsible for protecting the security of your programming assignments by making sure that your directories are not world readable. If you are unsure how to secure your home directory see the instructor immediately.