

Department of Physics University of Maryland

Physics 299G/499G Syllabus

Spring 2010

Course Title: Superstring/M-Theory: The DNA of Reality? (PHYS299G)
Special Problems in Physics: Seminar in Superstring/M-Theory:
DNA of Reality? (PHYS499G)

Course Description: The goals of this course include for students to acquire an understanding of:

- (a.) the broad principles of theoretical science,
- (b.) the ways theory and mathematics enables fundamental disciplinary research,
- (c.) the use of abstract reasoning to interpret data, formulae, and test hypotheses with scientific rigor,
- (d.) the role that human diversity plays in the practice and history of science,
- (e.) how findings and ideas in science can be applied to explain phenomena and events and influence the larger society,
- (f.) and communicate about science using appropriate oral and written means

Course Webpage: Updates to the course can be found on-line at;

<http://www.physics.umd.edu/courses/Phys299G/>
<http://www.physics.umd.edu/courses/Phys499G/>

Instructor: Sylvester James Gates, Jr., Room 4121 (Physics Building),
telephone: 301-405-6025
electronic mail: GATESS@WAM.UMD.EDU
webpage: <http://www.physics.umd.edu/ep/gates/gates.html>

Hyper-Text: S. J. Gates, Jr, *Superstring/M-Theory: The DNA of Reality*,
<http://www.teach12.com/tttx/coursedeslong2.aspx?cid=1284>
(The Teaching Company, Inc., 2006).

Textbook: B. Zwiebach, *A First Course in String Theory*,
First Ed., Cambridge University Press (499G only).

Lecture/Recitation: Tue & Wed, 3:00-4:15,
Physics Bldg., Rm. 4220.

Office Hours:

Prof. Gates is normally available for scheduled office hours between 02:00 and 03:00 a.m. every Tuesday and Wednesday immediately before class under ordinary circumstances. Students are encouraged to contact Prof. Gates to arrange meetings at other times as desired.

For students with access to electronic mail, inquiries may be sent to the instructor at any time via e-mail.

Reading Assignments:

All reading assignments are required. It may occur that examination problems will be drawn from material not covered in lecture, recitation nor homework.

Mathematical Assignments (499G Only):

For students in PHYS499G who wish to participate in a more mathematical engaged approach to the subject, there will be added additional tutorial time for presentations from the book by Zwiebach as well as notes by Prof. Gates. The 'essays' for those who take this option will include take-home mathematical problems to be turned in along with the written essays. Please indicate to Prof. Gates your desire to pursue this mode of the class. At any time, however, a student can revert to the other mode of PHYS499G by simple informing the instructor.

Grading:

The final grade for the courses will be determined by the following formulae;

$$\begin{aligned} \text{F.G.}(299G) = & \frac{25}{100}(\text{H. W.}) + \frac{35}{100}(\text{Midterm Essay}) \\ & + \frac{40}{100}(\text{Final Essay}) \quad , \end{aligned}$$

$$\begin{aligned} \text{F.G.}(499G) = & \frac{40}{100}(\text{H. W.}) + \frac{30}{100}(\text{Midterm Exam/Essay}) \\ & + \frac{30}{100}(\text{Final Exam/Essay}) \quad , \end{aligned}$$

Essays:

There will be a mid-term essay required during the semester and a final one

at the end of the term. The midterm essay will consist of a paper (5 pages minimum) on a topic chosen by the student and related to the material covered in this class. By two weeks prior to the due date of the essay, all students should have submitted a one page abstract describing their proposed essay topic. For 499G students then mathematical component of the essay will be handed out two weeks prior to the due date.

The final essay will be a paper (10 pages minimum) that will be again mutually agreed upon by the student and the instructor. A detailed outline of the proposed essay must be submitted to the instructors one month prior to the final day of the class. Once more for 499G students then mathematical component of the essay will be handed out two weeks prior to the due date.

Homework:

Homework will be given regularly during the semester. It will be collected, graded and returned to students as quickly as possible. A record will be kept of each student's completed problems. This tally will be used to calculate the homework grade. Homework will consist of a variety of types of activities. A small amount will require some elementary mathematics. There will be essays, web-based research projects, and group assignments.

Late homework will ONLY be accepted with a physician's or other official written note. However, points will be deducted from the grade on late homework at a rate of 10 points/day.

Homework will ONLY be accepted in an electronic format. PDF formatted files are preferable, though others will be considered and accepted, if there are no compatibility problems. At the lowest tech-level, home work can be clearly written out by hand and then any digital camera can be used to create a jpg formatted document. One step higher is to produce your homework as a hand-written document which can then be scanned to a pdf file. The highest quality files can be produced by using LaTeX (or other software) to produce an electronic file ab initio.

A Guide to Doing Homework:

If you wish to have the best possible grades on homework returned, you **must**

- *1. Staple pages together.
- *2. Turn in **neat** homework (points may be deducted otherwise).
- *4. Write mathematical solutions in **pencil** (499G).

*5. **SHOW YOUR WORK!** Solutions or answers turned in without explanation will **NOT** receive full credit (499G).

Disability Support Services:

The UMCP campus offers support in these cases. It is the responsibility of the effected students to contact the Counseling Center, Rm. 0126 Shoemaker Building 301-314-7682 or on-line at <http://www.inform.umd.edu/dss/> in order to take advantage of this assistance. After this contact the course instructor.

Academic Dishonesty:

The University of Maryland has an established policy on academic dishonesty (see the webpage at

<http://www.inform.umd.edu/CampusInfo/Departments/PRES/policies/iii100a.html>).

Students are advised to become familiar with the policy which in part states,

“The University can function properly only if its members adhere to clearly established goals and values. Essential to the fundamental purpose of the University is the commitment to the principles of truth and academic honesty. Accordingly, The Code of Academic Integrity is designed to ensure that the principle of academic honesty is upheld. While all members of the University share this responsibility. The Code of Academic Integrity is designed so that special responsibility for upholding the principle of academic honesty lies with the students.”

Students who infringe upon this UMCP policy will be subject to **severe** sanction.