

## PHYSICS 120 - Fall Semester 2015 - ODU

### **Syllabus –Physics of the 21<sup>st</sup> Century**

Class Meetings: 9:00 a.m. – 9:50 a.m. – Wednesdays

Oceanography & Physics (OCNPS) Building Room 303

Class website: <http://ww2.odu.edu/~skuhn/PHYS120/PHYS120.html>

Coordinator:

Dr. Sebastian E. Kuhn

Eminent Scholar & Professor of Physics

Physical Sciences Building (PSB II), Room 2100J

Phone: 683 – 5804      email: skuhn at odu.edu

Web: <http://www.odu.edu/~skuhn/>

Office hours: Mondays 2:00 – 3:00 p.m. in my office  
and Tuesdays 11 a.m. – 12 noon in the Physics Learning  
Center (lobby 2<sup>nd</sup> floor PSB II); also by appointment

Add'l Instructors:

Dr. Balsa Terzic

Assistant Professor of Physics

Oceanography and Physics Building (OCNPS) 233

Phone: 683-5281      email: bterzic at odu.edu

Web: <https://sites.google.com/a/odu.edu/balsa-terzic1>

Office hours: Tuesdays and Thursdays at 10 a.m.

Dr. Mark Havey

Eminent Scholar & Professor of Physics

Physical Sciences Building (PSB II), Room 2100K

Phone: 683-4612      email: mhavey at odu.edu

Web: <http://www.lions.odu.edu/~mhavey/>

Office hours: Wed 1 – 2 p.m. and by appointment

Dr. Rocco Schiavilla

Eminent Scholar & Professor of Physics

Oceanography and Physics Building (OCNPS) 319

Phone: 683-5852      email: rschiavi at odu.edu

Office hours: Tue 10 a.m. - noon

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Prerequisites:	None
Textbook:	“Chaos” by James Gleick (cheaply available at Amazon; one copy in ODU library); optional books see website
Reading Material:	Announced in class and on the website (visit often!)
Req'd Coursework:	Preparatory reading, attendance and participation (mandatory), mid-semester draft of and abstract for presentation, slides and oral presentation (time commitment: about 3 hours total per week!)
Grading Scheme:	In-class participation (40%) Draft of presentation + abstract = Midterm Exam (20%) Final slides and oral presentation = Final Exam (40%)
Grading Scale:	A: 90-100% A-: 85-90% B+: 80-85% B: 75-80% B-: 70-75% C/C+: 60-70% D/D+ 50-60%

### INTRODUCTION

Physics 120 is a one-hour seminar course to introduce students to contemporary physics. We will discuss examples of forefront research in nuclear physics, optics, non-linear science (chaos), neutrinos, and physics and society.

#### Course Objectives:

- 1) Students will acquire a basic understanding of some forefront research areas in physics through a combination of lectures, preparatory reading and in-class discussions.
- 2) Students will learn how to present information in oral format through an oral presentation to fellow students.

#### Additional Information:

Pre-meeting reading assignments will be given for each class meeting. Each student must prepare a presentation (approx. 10-15 slides) on a topic selected by the student, with advice from one of the instructors. Each student will give an oral presentation on their topic at the end of the semester. Possible topics are listed below.

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### **Note the strict deadlines for the papers/presentations:**

- Sept. 16: You must have chosen a topic for your presentation and met with one of the instructors who has agreed to be your mentor for the topic.
- Oct. 14: You must have completed a first draft **and an abstract** of your presentation and shown it to your mentor (this determines your midterm grade). At the minimum, you must have a title, an outline and a literature list. The slides can be in rough form but must show significant work towards the final presentation.
- Dec. 2: The final slides must be submitted (preferably earlier!) They must be in electronic format (MS Powerpoint, MacOS Keynote, Adobe PDF, etc.). This counts for part of your “Final Exam” grade. Your mentor will give you final feedback for your presentation.
- Dec. 5: This is the official date for our “Final Exam” period (sorry, it’s at 8:30 a.m. on a Saturday!) All students will give their oral presentations on that date. Each presentation should be 10 minutes long and will be followed by 5 min. of questions and answers. The presentations must be well-organized, clear, and in an attractive style; it should contain some significant information/insight on cutting edge research and demonstrate the student’s understanding of this research.

The class fulfills the seminar requirements for the physics major at ODU. Attendance is mandatory. The schedule and topics for each lecture as well as all assignments can be found online at the course website:

<http://ww2.odu.edu/~skuhn/PHYS120/PHYS120.html>

### Suggested Topics for Semester Paper/Presentation

- \* Fundamental Forces
- \* Nuclear Reactions in Stars
- \* Supernovae Explosions
- \* Expansion of the Universe,
- \* Dark Matter and Dark Energy; Cosmological Constant
- \* Gravitational Wave Detectors

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- \* Cosmic Rays, Neutrinos, terrestrial dark matter searches
- \* Laser trapping
- \* Bose-Einstein Condensation
- \* Quantum Computing
- \* Accelerator Optics
- \* The CEBAF accelerator
- \* The Electron-Ion collider
- \* Superconductivity
- \* ...and anything you are interested in (check with one of the instructors)

### Policy on Classroom Etiquette

Please follow the general rules of courtesy and respect. This means: Do **not** come late or leave early, and while in class, refrain from all other activities (including eating and drinking, talking to others, using electronic devices etc.). We reserve the right to ask students to leave if they disrupt the learning experience of their classmates. Attendance is mandatory – missing classes will result in fewer points for the “Participation” part of your grade!

### Policy on Cooperation

We consider it advantageous if students cooperate with each other on assignments and studying. In fact, we encourage students very strongly to meet with each other for regular discussions.

However, we require that each student turn in their own version of each assignment. Your semester presentation must be your own work – of course you can (and should!!!) ask for advice from your mentor. We consider it unethical and a violation of the honor code to paste material in your presentation verbatim from another student, or from a book or online material without proper attribution. All material used (other than informal discussions) must be properly cited.

In this context, we want to remind everyone of the **University policy**: Any official sanction for cheating, including the assignment of a grade of F for a quiz or for a course as a penalty for cheating, will appear on the student's permanent academic transcript.