Physics 190 Physics & Engineering Colloquium Fall 2024

Instructor: Daniel Robb
Office: Trexler 375
Email: robb@roanoke.edu
Phone: 375-5250

Class Times: Wednesday 2:20-4:20 (Trexler 372)
Student Office Hrs: M 2-4, Th 2-4
(Make appts at calendly.com/daniel_robb)

Course Description:
An on-going discussion of the differences between physics, engineering, and other sciences, all within the context of problem-solving, disciplinary content, the scientific process, the role and boundaries of science, new discovery and cutting-edge technology, and historical biography.

Textbooks:

- Coursepack of "*Get Ready for Physics*", Edward Adelson, 1st edition (2010), ISBN-13 978-0321556257 [To be purchased at Print Shop in Fintel Library at a cost of $7.50, with debit/credit/Maroon Money]
- "*Six Easy Pieces*", Richard Feynman, 4th edition (2011), ISBN-13 978-0465025275
- "*Physics of the Future*", Michio Kaku, 1st edition (2011), ISBN-13 978-0385530804

Specific Goals of the Course:
1. to prepare for further study of physics or engineering through review of math concepts such as algebra, trigonometry, exponentials and logarithms, and rates of change

2. to consider stimulating perspectives on physics, engineering, and technologies in the future

3. to undergo self-examination to identify your own learning style and most effective study techniques, and which area of STEM you would like to pursue

4. to meet a group of peers who are also interested in physics and engineering, as well as the physics and engineering faculty in the MCSP department

Feedback and Evaluation:
This course is graded "Pass"/"Fail". To determine if you pass the class, I will calculate your grade according to the normal ranges of "A" for 93-100, an "A-" for 90-93, a "B+" for 87-90, a "B" for 83-87, etc. Any grade of a D- or above will be considered as passing. These are the categories and percentages that will be used:

Preparation:	20%
Participation:	40%
Homework:	40%

Preparation will involve my judgement of your having done the reading and any accompanying reflection questions or practice exercises before our class meeting.

Participation will reflect your involvement during class discussions, exercises, and activities.

Homework will consist of exercises based on the reading and the skills being developed. It will be due by the start of the following class.

Policy on Late Work:
Unless you notify me beforehand with a valid excuse, late homework will undergo a 10% deduction per school day that it is not submitted (school days are Monday through Friday). Work submitted after the start of class will be considered one day late.

Academic Integrity:
I will follow the college Academic Integrity policies. Homework problems may be discussed with others, but you should not take the entire solution process from another person, and you must formulate your solution on your own. You may use generative AI tools as a last resort to generate ideas on homework problems but be aware that these tools' solutions are not always fully correct. You must write up solutions on your own in any case. I am contractually obligated to report student(s) if I suspect that they have engaged in academic dishonesty. Lastly, unless otherwise directed, cell phones should be silenced and out of sight during all class periods.

Accessible Education Services (AES):
Accessible Education Services (AES) is located in the Goode-Pasfield Center for Learning and Teaching in Fintel Library. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact Dustin Persinger, Assistant Director of Academic Services for Accessible Education, at 540-375-2247 or by e-mail at aes@roanoke.edu to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Dustin Persinger at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester.

Attendance Policy:
If you are feeling ill, I ask that you inform me via email and not come to class, for your own health and out of consideration for other students in the class. Outside of illness, you are expected to attend every class. Attendance is checked at each class meeting, and you must be in class to engage in the in-class activities which form part of the class participation grade. If you are going to be absent from class for a valid (excused) reason, I must be notified in advance either in person or via email. Your third and each additional unexcused absence will result in a 2-point deduction in your final course grade. Furthermore, you are accountable for all work missed because of any absence. I will provide class materials for a missed class but will not re-teach a missed class during office hours.

PHYS 190 CLASS OUTLINE

#	Date	Topic	Class Visitor	Reading to prepare
1	Aug. 28	Introduction and preview, Force Concept Inventory	***(dates to be determined)***	
2	Sept. 4	Learning styles; "Atoms in Motion"		GRP pp. 1-29, SEP Ch. 1
3	Sept. 11	Orders of magnitude; "Basic Physics"		GRP pp. 57-67; SEP Ch 2
4	Sept. 18	Algebra; "The Relation of Physics to Other Sciences"	Bryan Cobb	GRP pp. 68-79, SEP Ch 3
5	Sept. 25	Measurement; "Conservation of Energy"		GRP pp. 80-90, SEP Ch 4
6	Oct. 2	Geometry/Trigonometry; "The Theory of Gravitation"		GRP pp. 90-100; SEP Ch 5
7	Oct. 9	Exponentials/Logarithms; "Quantum Behavior"	Truong Le	GRP 101-100; SEP Ch 6
8	Oct. 23	Rates of Change; "Future of the Computer"	Fatima	GRP 114-130; POF Ch 1
9	Oct. 30	Work and Energy, "Future of AI: Rise of the Machines"	Rich Grant	GRP 131-142; POF Ch 2
10	Nov. 6	Uncertainty, "Nanotechnology: Everything from Nothing?"	Avijit Sarker	GRP 144-166; POF Ch 4
11	Nov. 13	Wave motion, "Future of Energy: Energy from the Stars"		GRP 167-186; POF Ch 5
12	Nov. 20	"Future of Space Travel: To the Stars"		POF Ch 6
13	Dec. 4	"Future of Humanity: Planetary Civilization"		POF CH 8

Note: You should expect to spend a total of about 6 hours per week on this course.
Note: GRP = "Get Ready for Physics" [coursepack], SEP = "Six Easy Pieces", POF = "Physics of the Future"