



# Course Introduction

## Lecture 0.1

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Wilkes Community College

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# About Me

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NASA's Jet Propulsion Laboratory  
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Ph.D. – Atmospheric Sciences  
M.S. – Engineering Physics  
M.A. – Mathematics  
B.S. – Physics & Mathematics



$y = g(x)$

Secant Lines

$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$

$f(x) = \lim_{h \rightarrow 0} \frac{(x+h)^2 - x^2}{h}$

$= \lim_{h \rightarrow 0} \frac{x^2 + 2xh + h^2 - x^2}{h}$

$= \lim_{h \rightarrow 0} \frac{2xh + h^2}{h}$

$\frac{g(x+h) - g(x)}{h} = \lim_{h \rightarrow 0} \frac{h(2x + h)}{h}$

# Question: What is Physics?

# Defining Physics

A science that deals with matter and energy and their interactions.

(Merriam-Webster)

The branch of science concerned with the nature and properties of matter and energy. The subject matter of physics, distinguished from that of chemistry and biology, includes mechanics, heat, light and other radiation, sound, electricity, magnetism, and the structure of atoms.

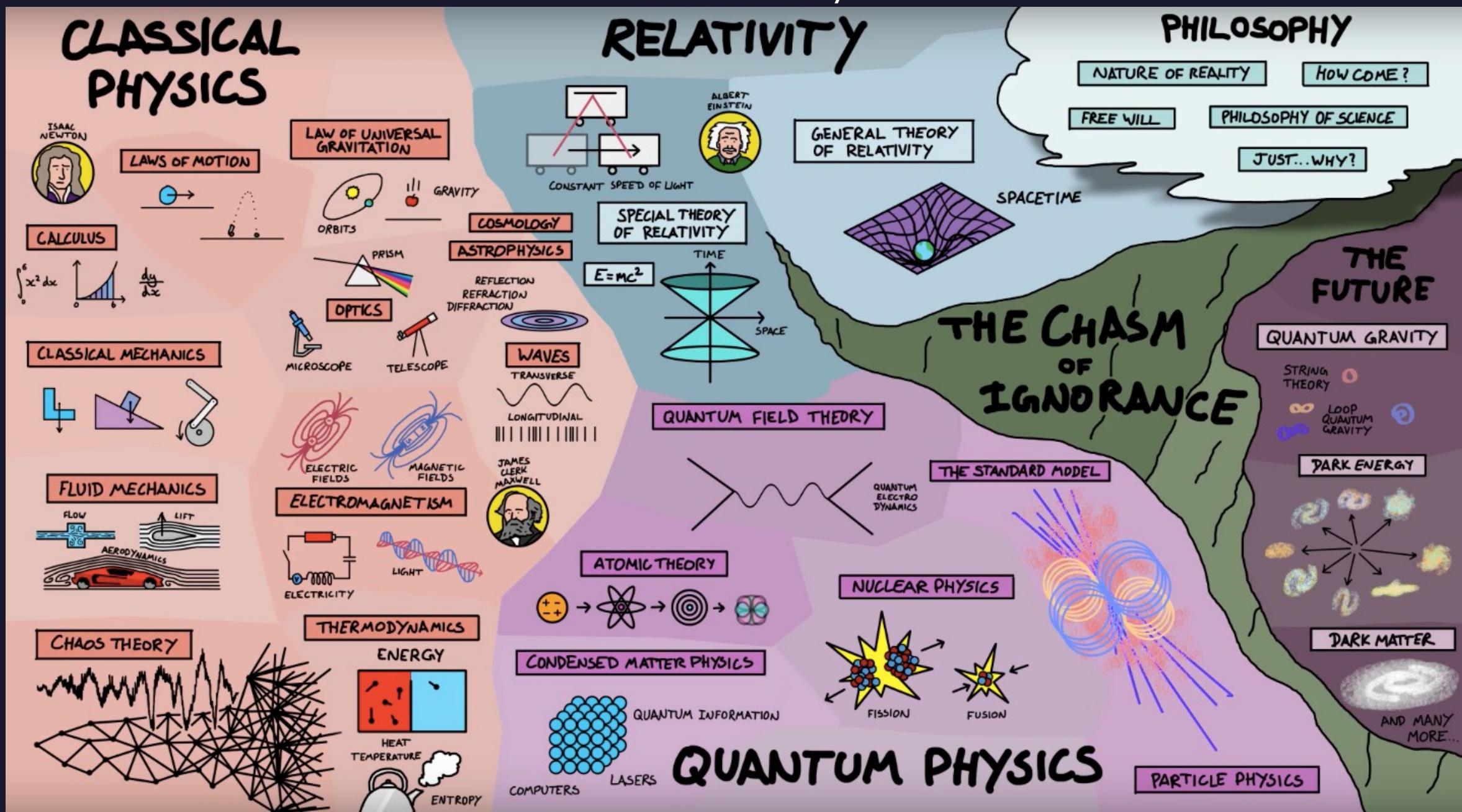
(Oxford Languages)

Science that deals with the structure of matter and the interactions between the fundamental constituents of the observable universe. In the broadest sense, physics (from the Greek *physikos*) is concerned with all aspects of nature on both the macroscopic and submicroscopic levels. Its scope of study encompasses not only the behaviour of objects under the action of given forces but also the nature and origin of gravitational, electromagnetic, and nuclear forcefields. Its ultimate objective is the formulation of a few comprehensive principles that bring together and explain all such disparate phenomena.

(Encyclopedia Britannica)

Interactions with objects (matter) and *how they interact* (mechanics, heat, light, sound, electricity, magnetism, etc.)

# The Branches of Physics



# Wilkes Community College

# PHY 251 - General Physics I

Lecture: 3, Lab: 3, Credits: 4

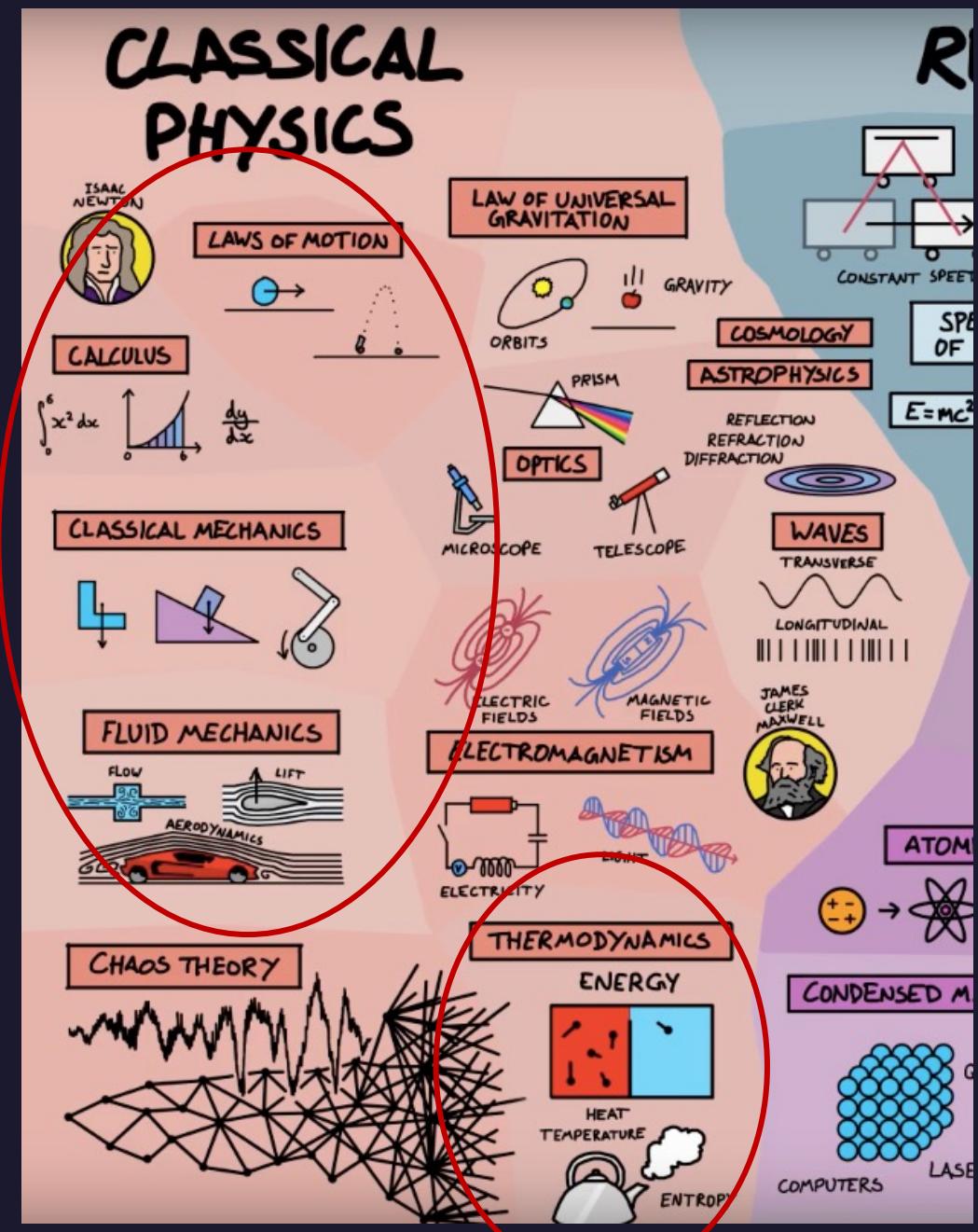
Prerequisite: MAT 271; Corequisite: MAT 272

This course uses calculus-based mathematical models to introduce the fundamental concepts that describe the physical world. Topics include units and measurement, vector operations, linear kinematics and dynamics, energy, power, momentum, rotational mechanics, periodic motion, fluid mechanics, and heat. Upon completion, students should be able to demonstrate an understanding of the principles involved and display analytical problem-solving ability for the topics covered.

Approved for transfer as a general education course in Natural Science and a Universal General Education Transfer Component course in Natural Science.

From the course description:

- Units and Measurement
- Vector Operations
- Linear Kinematics and Dynamics
- Energy
- Power
- Momentum
- Rotational Mechanics
- Periodic Motion
- Fluid Mechanics
- Heat



# Instructor Contact

- There is a 3 hour time difference between us. (I'm 3 hours behind!)
- Late evenings work best for office hours.
- I can respond to emails throughout the day.



## 2 Course Information

**2.1 Class Meeting Times & Location:** This is an asynchronous online course. There are no class meeting times. The instructor is available via email and Zoom. Log in to Moodle for instructional materials, assignments and due dates. Regular participation online in Moodle is required. In this format, students must take initiative in their own learning.

([Click here for an explanation of asynchronous online courses.](#))

**2.2 Enrollment Verification Activity:** Students must log in and complete the enrollment verification activity by 08/25. Otherwise, you will be dropped from the course.

**2.3 Withdrawals:** The last day to withdraw without penalty is 11/14.

**2.4 Skills Needed:** Basic algebra and calculus skills, access and familiarity with Microsoft Word and Excel (or equivalents), familiarity with programming/scripting. More importantly, bring a positive attitude and willingness to learn! Any lacking technical skills can be addressed as needed.

**2.5 Prerequisites:** MAT 271 [Calculus I]

**2.6 Co-requisites:** MAT 272 [Calculus II]

**2.7 Course Description:** This course uses calculus-based mathematical models to introduce the fundamental concepts that describe the physical world. Topics include units and measurement, vector operations, linear kinematics and dynamics, energy, power, momentum, rotational mechanics, periodic motion, fluid mechanics, and heat. Upon completion, students should be able to demonstrate an understanding of the principles involved and display analytical problem-solving ability for the topics covered.

**(Hours:** Lecture 3, Lab 3. **Credits:** 4. This course will transfer to a university.)

## App Store Preview

This app is available only on the App Store for iPhone and iPad.

**iScanner: PDF Scanner App** (4.4)

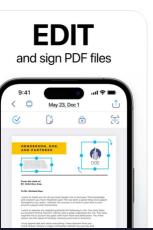
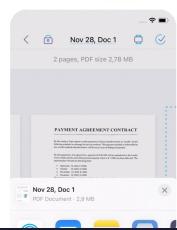
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### 3 Required Materials

#### 3.1 Learning Management System: Moodle

**3.2 Textbook:** Not required. Texts will be provided in PDF form.

**3.3 Required Software:** Microsoft Word, Microsoft Excel, R/RStudio, WolframAlpha (or equivalents), access to a scanner or smartphone app capable of creating PDFs (for example, see the [iScanner](#) app).

- The R scripting language and RStudio are freely available for download.

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- WolframAlpha is a free online computational search engine.  
Download R/RStudio [here](#). Visit WolframAlpha [here](#).



# Grading

## 4 Grade Distribution

**Final Grades:** This course follows Wilkes Community College's common 10-point grading scale.

Letter Grade	Number Grade
A	90-100
B	80-89
C	70-79
D	60-69
F	$\leq 59$

Table 1: Letter grade assignment for this course.

**Assignment Weighting:** Misc. Assignments 10% Problem Sets 25%, Labs 30%, Final Exam 35%

## 5 Course Policies

### 5.1 Submitting Assignments

This course will not have interactive assignments in Moodle. Instead, assignments will be posted as PDFs and students will be expected to complete assignments by hand. To submit assignments, students may type their work in a word processor with a built-in equation editor (e.g.- Microsoft Word), scan their work, use a smartphone app to take pictures of their work aggregate the pages into a single PDF. **Students must check the quality of scanned documents. If it can't be read, it will not be graded.**

### 5.2 Late Work

It is expected that all students adhere to the deadlines that accompany the assignments, problem sets, and labs in this course. Timely submission of assignments ensures that the instructor can provide meaningful assessment and feedback. If a student finds that an extension is needed, the instructor will make reasonable arrangements. **It is the responsibility of the student to contact the instructor BEFORE an assignment's due date if an extension is needed.** Otherwise, un-submitted assignments will receive a zero. Emergencies will be dealt with on a case-by-case basis.

### 5.3 Extra Credit

There are no extra credit opportunities in this course.

### 5.4 Resources for Success

Using the following resources is not required; however, successful students will:

- Utilize the tutoring services at Wilkes Community College's Academic Support Center (link [here](#).)
- Work on problem sets and labs in groups (if desired and/or possible)
- Utilize supplemental content on Moodle
- Regularly communicate with the instructor about course content, assignments, and needs

## 5.5 Communication with the Instructor

### 5.5.1 Email

The instructor encourages regular communication concerning course material and assignments; however, **emails are not text messages**. It is expected that your first email be professional and informative. (“Hey, I don’t understand this! lol” is not acceptable email content.) After an initial email explaining your situation/problem/question, the following emails can devolve into short messages.

An example of how to ask for help in an email is given below:

**Subject:** Identify the class, unit/problem set, overall issue

⟨ Insert Salutation ⟩,

- 1) I am having an issue with... (*I can respond faster if you give me details.*)
- 2) I have tried... (*let me know what you've already tried. I can build off of your previous attempts!*)
- 3) Can I schedule a time to meet with you to discuss this? (*Let me know how I can help!*)

⟨ Insert sign-off ⟩,

Your name here

## 5.6 Instructor's Expectations of Each Student

As a student, it is important to remember that **classes are NOT obstacles that must be overcome by any means necessary**. Classes present **opportunities to learn new things** and instructors serve as **resources to broaden and refine your knowledge**. Courses like Chegg.com and CourseHero.com may provide you with answers to problem sets but they minimize actual learning. Furthermore, paying tuition does not entitle you to a passing grade. Paying tuition entitles you to an opportunity to demonstrate learning. What you do with this opportunity is your decision. The expectation in this course is that students will:

- take responsibility for their own learning.
- adhere to the course schedule, turning in all assignments by their due dates. (Section [5.8](#))
- proactively use the resources provided by the instructor. (Section [5.4](#))
- quickly communicate any obstacles to learning that arise throughout the semester. (Section [5.5](#))
- check their email *at least* once per day.
- put forth honest effort when completing assignments without using Chegg.com, CourseHero.com, other homework repositories, or old copies of assignments!
- ensure their access to the required software for the course. (Section [3](#))

## **5.7 Requesting Accommodations for Disabilities**

Wilkes Community College is committed to providing reasonable accommodations to students with disabilities. To receive accommodations, you must register with the Office of Disability, Inclusion, & Diversity (ODID) (instructions can be found here: <https://www.wilkescc.edu/odid/>). An interactive meeting should occur discussing accommodations needed to access the curriculum. You should register early to ensure your accommodations are in place the first day of classes.



# Doing Physics

- Physics is all about translating scenarios to symbols.
- There is a general method that can be followed to approach almost any physics problem:
  1. Model – Simplify the situation with a model that captures the essential features.
  2. Visualize – Put in the effort to represent the problem graphically and pictorially.
  3. Use the visualizations to develop a mathematical representation. Solve for the unknown.
  4. Asses the result. Does the answer have proper units? Does it make physical sense?

