Semester/Term & Year: Fall, 2020  
Sem. Start: 09/08/20  
Sem. End: 12/10/20

Instructor: Levon Davtyan

Platforms:  
eCampus/Blackboard Collaborate Ultra  
Microsoft Teams

E-mail Address  
LDavtyan@dcccd.edu
Division Office and Phone Number:  
Sabine Hall, S-205, 972-238-6248

Credit Hours: 4.00

Online Lecture/Lab Sessions:  
Tuesday/Thursday 05:00pm – 07:00pm*)

Course Number  
PHYS 1405
Section Number  
81892

Course Title: Elementary Physics I

Course Description

Conceptual survey of topics in physics, including the fundamentals of motion, forces, energy, and momentum, atomic nature of matter and thermodynamics. Intended for liberal arts and other non-science majors, but science majors with weak physics background may wish to use this as an introduction to physics principles.

Course Prerequisites

- College level ready in Reading.
- Two years of high school algebra or equivalent.

*) Time for sessions could be adjusted.
Course Objectives/Learning Outcomes
The objective of the study of a natural sciences component of a core curriculum is to enable the student to understand, construct and evaluate relationships in the natural sciences and to enable the student to understand the bases for building and testing theories. The exemplary educational objectives are:

- To understand and apply method and appropriate technology to the study of natural sciences.
- To recognize the differences between scientific qualitative and quantitative methods, to communicate findings, analyses, and interpretations both orally and in writing.
- To demonstrate knowledge of the major issues and problems facing modern science, including issues that touch upon ethics, values, and public policies.
- To demonstrate knowledge of the interdependence of science and technology and their influence on, and contribution to, modern culture.

Core Courses

Intellectual Core Competencies
The six intellectual competencies required by THECB are:

- **READING:** Reading at the college level means the ability to analyze and interpret a variety of printed materials—books, articles and documents. A core curriculum should offer students the opportunity to master both general methods of analyzing printed materials and specific methods for analyzing the subject matter of individual disciplines.
- **WRITING:** Competency in writing is the ability to produce clear, correct and coherent prose adapted to purpose, occasion, and audience. Although correct grammar, spelling and punctuation are each a sine qua non-in any composition, they do not automatically ensure that the composition itself makes sense or that the writer has much of anything to say. Students need to be familiar with the writing process including how to discover a topic and how to develop and organize it, how to phrase it effectively for their audience. These abilities can be acquired only through practice and reflection.
- **SPEAKING:** Competence in speaking is the ability to communicate orally in clear, coherent and persuasive language appropriate to purpose, occasion and audience. Developing this competency includes acquiring poise and developing control of the language through experience in making presentations to small groups, to large groups and through the media.
- **LISTENING:** Listening at the college level means the ability to analyze and interpret various forms of spoken communication.
- **CRITICAL THINKING:** Critical thinking embraces methods of applying both qualitative and quantitative skills analytically and creatively to subject matter in order to evaluate arguments and to construct alternative strategies. Problem solving is one of the applications of critical thinking, used to address an identified task.
- **COMPUTER LITERACY:** Computer Literacy at the college level means the ability to use computer-based technology in communicating, solving problems and acquiring information.
Core-educated students should understand the limits, problems and possibilities associated with the use of technology and should have the tools necessary to evaluate and learn new technologies as they become available.

**Perspectives in the Core Curriculum**

The objective of disciplinary studies within a core curriculum is to foster multiple perspectives as well as to inform and deliver content. An imperative of a core curriculum is that it contains courses that help students attain the following perspectives:

1. Establish broad and multiple perspectives on the individual in relationship to the larger society and world in which he or she lives, and to understand the responsibilities of living in culturally and ethnically diversified world.
2. Stimulate a capacity to discuss and reflect upon individual, political, economic, and social aspects of life to understand ways in which to be a responsible member of society.
3. Recognize the importance of maintaining health and wellness.
4. Develop a capacity to use knowledge of how technology and science affect their lives.
5. Develop personal values for ethical behavior.
6. Develop the ability to make aesthetic judgments.
7. Use logical reasoning in problem solving and
8. Integrate knowledge and understand the interrelationships of the scholarly disciplines.

**Course Outline**

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Dates</th>
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</thead>
<tbody>
<tr>
<td>Ch. 1</td>
<td>Introduction to Science</td>
<td>9/8</td>
</tr>
<tr>
<td>Ch. 2</td>
<td>Newton’s First Law of Motion - Inertia</td>
<td>9/15</td>
</tr>
<tr>
<td>Ch. 3</td>
<td>Linear Motion</td>
<td>9/15</td>
</tr>
<tr>
<td>Ch. 4</td>
<td>Newton’s Second Law of Motion</td>
<td>9/22</td>
</tr>
<tr>
<td>Ch. 5</td>
<td>Newton’s Third Law of Motion - Vectors</td>
<td>9/29</td>
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<tr>
<td><strong>Exam #1 Ch. 1-5</strong></td>
<td></td>
<td><strong>10/6</strong></td>
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<tr>
<td>Ch. 6</td>
<td>Momentum</td>
<td>10/13</td>
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<tr>
<td>Ch. 7</td>
<td>Energy</td>
<td>10/20</td>
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<tr>
<td>Ch. 8</td>
<td>Rotational Motion</td>
<td>10/27</td>
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<tr>
<td><strong>Exam #2 Ch. 6-8</strong></td>
<td></td>
<td><strong>11/3</strong></td>
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<tr>
<td>Ch. 9</td>
<td>Gravity</td>
<td>11/10</td>
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<tr>
<td>Ch. 10</td>
<td>Projectile and Satellite Motion</td>
<td>11/17</td>
</tr>
<tr>
<td><strong>Exam #3 Ch. 9-10</strong></td>
<td></td>
<td><strong>11/24</strong></td>
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<tr>
<td>Ch. 11</td>
<td>The Atomic Nature of Matter</td>
<td>12/1</td>
</tr>
<tr>
<td>Ch. 15</td>
<td>Temperature, Heat and Expansion</td>
<td>12/8</td>
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**Comprehensive Final Exam:** date and time will be posted at some point later.
Required/Recommended Materials


Physics, High School, OpenStax (downloadable from openstax.org)

Homework: instructions how to login and do it online will be provided in class.
Virtual labs: associated materials will be posted on eCampus in advance

Grading System:

10% Homework
20% Labs
65% Exams (including Final Exam)
5% Online Attendance

Grading Scale:

A = 90% to 100%
B = 80% to 89%
C = 70% to 79%
D = 60% to 69%
F = Less than 60%

Exams and Assignments: There will be a maximum of four Exams including comprehensive Final Exam. Lab assignments should be completed using online simulators.

Attendance Policy: To be successful students must attend all scheduled online live sessions and actively participate, be accessible and prompt to communicate with instructor via emails or Microsoft Teams.

Classroom Policies:
Regular classroom policies should be observed – proper etiquette, no food, drink, cell phones, etc. during live sessions.

Please avoid disturbing the learning environment. Keep your microphones mute unless time when you are asking questions. Use chats for more specific, private, and not urgent communications. If you joined live session, please restrict wireless activity to emergencies.
Students are responsible for withdrawing from the class if they will not be completing the course. The instructor cannot do this for you.
Most often the best way to learn a subject is to try and explain it to someone else. Working homework problems and lab reports in groups is recommended.

The following note is valid for my class as well:

“A Note on Cheating: I expect and demand that everything you do in this class will be your own work. Studies have shown that increasing numbers of college students think that cheating is acceptable, and it simply is not. Claiming someone else's work as your own is plagiarism, and
both the college and I have a very low tolerance for it. Please take pride in your work and be honest. Note that this does not forbid students from working together. If you are doubtful about where the line is between collaboration and plagiarism, talk to me, and we will work it out before you turn things in.” (by James Heath, ACU)

**Course Drop Date:**
See the Dallas College website.

**Academic Progress:** students are encouraged to discuss academic goals and degree completion with their instructors. Specific advising is available throughout the semester as well on the college website.

**Institution Policies:** please check: [https://www.dcccd.edu/pages/default.aspx](https://www.dcccd.edu/pages/default.aspx)

**Fall 2020 / Physics 1405 Virtual Lab Schedule**

<table>
<thead>
<tr>
<th>Availability Dates</th>
<th>Experiment Number/manual</th>
<th>Lab Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/10</td>
<td>1</td>
<td>Lab 1: Measurements</td>
</tr>
<tr>
<td>9/17</td>
<td>2</td>
<td>Lab 2: Linear Motion</td>
</tr>
<tr>
<td>9/24</td>
<td>3</td>
<td>Lab 3: Forces</td>
</tr>
<tr>
<td>10/1</td>
<td>4</td>
<td>Lab 4: Newton’s 2nd law</td>
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<tr>
<td>10/8</td>
<td>5</td>
<td>Lab 5: Friction</td>
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<tr>
<td>10/15</td>
<td>6</td>
<td>Lab 6: Conservation of Momentum</td>
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<tr>
<td>10/22</td>
<td>7</td>
<td>Lab 7: Kinetic Energy and Potential Energy</td>
</tr>
<tr>
<td>10/29</td>
<td>8</td>
<td>Lab 8: Projectile Motion</td>
</tr>
<tr>
<td>11/5</td>
<td>9</td>
<td>Lab 9: Centripetal Acceleration</td>
</tr>
<tr>
<td>11/12</td>
<td>10</td>
<td>Lab 10: Equilibrium</td>
</tr>
<tr>
<td>11/19</td>
<td>11</td>
<td>Lab 11: Spring Elasticity</td>
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<tr>
<td>11/26</td>
<td>12</td>
<td>Lab 12: Specific Gravity</td>
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<tr>
<td>12/3</td>
<td>13</td>
<td>Lab 13: Latent Heat and Specific Heat</td>
</tr>
</tbody>
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Note: The guidelines and days in this syllabus are subject to change, deletion, or amendment at the discretion of the instructor.

Do not try to solve problems by looking up equations. That works seldom.
You are expected to derive an equation for each problem. The derivations are based on definitions and relationships and involve algebra, geometry, and trigonometry.

The concepts you should know for every physics class:

- Vectors
- Displacement
- Velocity
- Acceleration
- Momentum
- Force
- Work
- Energy
- Power
- Temperature
- Heat