

PHYS 025, Physics 025

6 credits, 6 hours lecture

Main topics include triangle trigonometry, vector and vector diagrams, space body diagrams, relative velocity, uniform acceleration, Newton's Three Laws, inclined planes, pulley systems, friction, work, power, energy, circular motion, interaction between bodies, and an introduction to waves.

Alberta Education Course Equivalency: Science 10 (Physics) and Physics 20

Prerequisite: Math 10C or equivalent or permission from program chair.

Instructor

Leni Cherian

leni.cherian@keyano.ca**Office Hours through zoom**

Wednesday 1:00 to 2:50 pm
Thursday 1:00 to 2:50 pm
Friday 12:00 to 12:50 pm

Hours of Instruction:- Online Class through Zoom

Tuesday 10:00 - 11:50 am
Thursday 10:00 - 11:50 am
Friday 1:00 - 2:50 pm

Required Resources

Physics 20 "Notes and Problems"- Castle Rock

Scientific calculator

Ruler

Graph paper

Course Outcomes

Upon successful completion of Physics25, students will have acquired a level of competency with the following:

Math Review

- Identify the number of significant digits in the given data.
- Round the number to the required number of significant digits.
- Apply the rules of addition/subtraction and multiplication /division.
- Represent the number in scientific notation with the correct number of significant digits.
- Apply factor unit method in conversion of units within SI system and from SI to imperial system.
- Isolation of a variable in the given equation.
- Solve a right triangle.

Vectors

- Define Vectors and Scalars.
- Compare and contrast scalar and vector quantities.
- Represent a vector in RCS and using 'of' notation.
- Determine the horizontal and vertical components of a vector.
- Perform addition of vectors using tail to tip method and component method.
- Calculating Average Speed and Average Velocity.
- Interpret the motion of one object relative to another.
- Solving relative velocity problems.

Kinematics

- Define speed, distance, position, displacement, velocity and acceleration
- Define and analyze uniform motion and uniform accelerated motion
- Explain a two dimensional motion and analysis
- Analysis of freely falling objects
- Analysis of objects thrown upwards, downwards and dropped
- Analysis of projectiles thrown horizontally and thrown at an angle

Dynamics

- Explain Newton's laws of motion
- Explain that a non- zero net force causes a change in velocity and analysis
- Apply the laws to solve motion problems
- Explain free Body diagram of objects on a horizontal surface and on an incline
- Describe work as transfer of energy

- Solve Work, Power, Potential energy and Kinetic energy problems
- Explain law of conservation of mechanical energy and solve related problems
- Explain work - energy theorem for net force and solve related problems

Circular motion & Universal Gravitation

- Define uniform circular motion.
- Solve speed, centripetal acceleration, centripetal force of objects in a circular path.
- Explain and apply Newton's Universal law of gravitation.

Evaluation

| | |
|------------------------------------|------|
| Unit Assignments | 20% |
| Attendance and Class participation | 10% |
| Unit Tests | 35% |
| Final Exam | 35% |
| Total | 100% |

The minimum pre-requisite for progression is 1.7 (refer to grading system below)

Grading System

| Descriptor | 4.0 Scale | Percent |
|-----------------------------|-----------|----------|
| Excellent | 4.0 | 96 – 100 |
| | 4.0 | 90 – 95 |
| | 3.7 | 85 – 89 |
| Good | 3.3 | 81 – 84 |
| | 3.0 | 77 – 80 |
| | 2.7 | 73 – 76 |
| Satisfactory | 2.3 | 69 – 72 |
| | 2.0 | 65 – 68 |
| Minimum Prerequisite | 1.7 | 60 – 64 |
| Poor | 1.3 | 55 – 59 |
| Minimum Pass | 1.0 | 50 – 54 |
| Failure | 0.0 | 0 – 49 |

Topic Outline

| UNITS | ASSIGNMENTS/ TESTS |
|--|-------------------------------------|
| <p><u>Math Review</u></p> <ul style="list-style-type: none"> • Significant digits & rounding • Scientific notation • Measurements & SI • Unit conversion • Geometry & trigonometry • Equations & constants • Graphing techniques | Assignment- 1 |
| <p><u>Vectors</u></p> <ul style="list-style-type: none"> • Addition & subtraction • Vectors as compass directions • Horizontal & vertical components • Word problems | Assignment - 2 Test-1 |
| <p><u>Kinematics</u></p> <ul style="list-style-type: none"> • Motion & graphing • Basic formulas • Uniform acceleration • Freely falling objects • Kinematics in one & two dimension • Projectile motion | Assignment- 3 and 4 Test - 2 |
| <p><u>Dynamics</u></p> <ul style="list-style-type: none"> • Introduction • Net force • Newton's second law • weight • Newton's third law • Tension in pulley systems • Friction • Forces at angles • Inclined planes • Work, power & energy | Assignment- 5 and 6 Test- 3 |

| | |
|---|--------------------------|
| <u>Circular motion & Universal Gravitation</u> <ul style="list-style-type: none">• Uniform circular motion• Banking of curves• Vertical circular motion• Universal gravitation• Acceleration of gravity• Orbits | Assignment -7 Test- 4 |
|---|--------------------------|

Performance Requirements

Student Responsibilities

It is your responsibility as a student to contact the Office of the Registrar to complete the forms for Withdrawal or Change of Registration, and any other forms. Please refer to the list of important dates as noted in the Academic Schedule in the [Keyano College credit calendar](#). The Keyano College credit calendar also has information about Student Rights and Code of Conduct. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Code of Conduct Policies.

Student Attendance

Class attendance is useful for two reasons. First, class attendance maximizes a student's learning experience. Second, attending class is a good way to keep informed of matters relating to the administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

It is the responsibility of each student to be prepared for all classes. Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and notes that may be due.

Academic Misconduct

Students are considered to be responsible adults and should adhere to principles of intellectual integrity. Intellectual dishonesty may take many forms, such as:

Plagiarism or the submission of another person's work as one's own;

- The use of unauthorized aids in assignments or examinations (cheating);
- Collusion or the unauthorized collaboration with others in preparing work;
- The deliberate misrepresentation of qualifications;
- The willful distortion of results or data;
- Substitution in an examination by another person;

- Handing in the same unchanged work as submitted for another assignment; and
- Breach of confidentiality.

The consequences for academic misconduct range from a verbal reprimand to expulsion from the College. More specific descriptions and details are found in the Student Rights and Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Code of Conduct Policies.

In order to ensure your understanding of the concept of plagiarism, you must successfully complete the online tutorial found on ilearn.keyano.ca. Then print the certificate, sign it, and show it to each of your instructors. Your course work may not be graded until you show this signed certificate.

Specialized Supports

The Student Services department is committed to Keyano students and their academic success. There are a variety of student supports available at Keyano College. Due to the continuing situation with the Covid-19 pandemic, the offered support services will be implemented differently this semester by being provided mostly virtually. In-person service can be requested as needed. All Alberta Health Services guidelines will be followed for in-person appointments—wear a mask, maintain two meters of physical distance, use hand sanitizer, and stay home if you are unwell.

All student services are available during Keyano business hours: Monday to Friday, 8h30-16h30.

The Library has evening and weekend hours. Please check keyano.ca/library for current hours.

Accessibility Services: provides accommodations for students with disabilities. Students with documented disabilities, or who suspect a disability, can meet with a Learning Strategist to discuss their current learning barriers and possible accommodations. Students who have accessed accommodations in the past are encouraged to contact us to request them for the semester. Please note that requesting accommodations is a process and requires time to arrange. Contact us as soon as you know you may require accommodations. For accessibility services supports and to book a virtual appointment, please contact accessibility.services@keyano.ca.

Accessibility Services also provides individual and group learning strategy instruction for all students, as well as technology training and supports to enhance learning. Meet with a Learning Strategist to learn studying and test-taking strategies for online classes. Schedule an appointment with the Assistive Technology Specialist to explore technology tools for learning. Book an appointment today by emailing accessibility.services@keyano.ca

Academic Success Coaching: offers you support and access to resources for your academic success to help you to find the Keys to your Success. The Academic Success Coach will work with you to develop an academic success plan, develop your study and time management skills, and connect you with the right resources here at Keyano.

Academic.success@keyano.ca is the best way to access resources during virtual service delivery.

Wellness Services: offers a caring, inclusive, and respectful environment where students can access free group and individual support to meet academic and life challenges. Mental Health Coordinators offer a safe and confidential environment to seek help with personal concerns. All individual appointments will continue virtually.

Wellness Services welcomes students to participate in any of the virtual group sessions offered throughout the academic year addressing topics including mindfulness and test anxiety.

Individual virtual appointments can be made by emailing wellness.services@keyano.ca.

Library Services: provides students with research and information supports as they engage in their studies. Library staff are available to support you both virtually and in person during the fall semester. For library service supports and inquiries, please email askthelibrary@keyano.ca. Individual support with the Information Librarian will be provided virtually. Appointments can be requested by email or by placing a Book a Librarian request using the online form found [here](#).

Research and Subject Guides are helpful resources when conducting research or addressing your information needs. To view a subject or course specific guide, use the following [Subject Guides link](#)

To access additional research resources, including Citation Guides (APA, MLA, Chicago, or IEEE), go to the [Research Help Library page](#).

Skill Centre: provides academic support services to students registered in credit programs at Keyano College in the form of tutoring, writing support groups, facilitated study groups, workshops and study space. Tutoring services are **free** to Keyano students. Tutoring is available for Math, Writing, English, and Science subject areas.

While most courses are being offered online, the Skill Center will be offering mostly virtual tutoring services and in-person sessions as requested. Please email Skill.centre@keyano.ca to get in contact with our tutoring staff.

For the most up to date information on how to book a tutoring session, please view the [Keyano Skill Centre homepage](#).

E-Learning

Technology and internet will impact your online learning experience. It's important that you are able to watch an online video and other course materials, take online quizzes, and participant in a live class with your instructor and other students.

Keyano College operates in a Windows based environment and having the correct tools for online learning is important. Here's a list of recommended system requirements for Fall 2020.

Internet Speed

Minimum Internet speeds of 5 Mbps.

Recommended Internet speeds of 25 Mbps (especially if you are sharing your internet at home). Check your internet speed with Fast.com

System requirements:

| | |
|--|---|
| <p>Minimum Requirements:</p> <ul style="list-style-type: none"> A Windows 10 computer/laptop Minimum 4GB of RAM. 10GB+ available hard drive storage. Enough available hard drive space to install the Microsoft Office suite (approximately 3GB). Microsoft Office software is free to all Keyano students and employees. Microphone, webcam and speakers. A headset with a microphone is recommended. System updates must be regularly installed. Anti-Virus / Anti-Malware software | <p>Minimum Requirements:</p> <ul style="list-style-type: none"> A Macintosh (V10.14 and above) computer/laptop Minimum 4GB of RAM. 10GB+ available hard drive storage. Enough available hard drive space to install the Microsoft Office suite (approximately 3GB). Microsoft Office software is free to all Keyano students and employees. Microphone, webcam and speakers. A headset with a microphone is recommended. System updates must be regularly installed. Anti-Virus / Anti-Malware software. |
| <p>Recommended Requirements</p> <ul style="list-style-type: none"> 8GB of RAM A method of backing up/synchronizing to local or cloud-based storage such as OneDrive is highly recommended. This is included if you complete the setup of KeyanoMail and download MS Office using your Keyano email for free. | <p>Recommended Requirements</p> <ul style="list-style-type: none"> 8GB of RAM A method of backing up/synchronizing to local or cloud-based storage such as OneDrive is highly recommended. This is included if you complete the setup of KeyanoMail and download MS Office using your Keyano email for free. |
| <p>Chromebooks are not recommended as they are not compatible with testing lockdown browsers. A Microsoft Surface or iPad or iPad Pro may be possible alternatives in some program areas.</p> | |