KLAMATH COMMUNITY COLLEGE

COURSE SYLLABUS

COURSE NAME	COURSE CODE	TERM/YEAR	START DATE	END DATE	LOCATION
GENERAL PHYSICS I (ALGEBRA-BASED)	PHY 201, 201L	2019-20	SEPTEMBER	JANUARY	CROOK COUNTY HIGH SCHOOL

INSTRUCTOR INFORMATION

Jeff Lowenbach

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541-416-6900 ex. 3146

Office Hours M-F: 7:30-8:05 9-00-9:55 3:15-4:00

COURSE DESCRIPTION

Introductory physics (algebra based) for science majors, pre-medical, pre-dental, pre-chiropractic and pre-physical therapy students. Topics include mechanics including statics, forces and motion energy, collisions, circular motion, and rotational dynamics.

Credit Hours –Lecture (4); Lab (1)

Prerequisites – MTH 111

Class Times – M-F 8:05-8:58

COURSE REQUIREMENTS

Course Materials – **College Physics a strategic approach, Third Edition Technology Update -W/MasteringPhysics** Author: Knight, Jones, Field; Edition: 3rd; Published Date: 2015; ISBN: 9780133539677

Computer Requirements –

- All computer requirements will be met using the student Chromebook issued by Crook County High School
- Students will need to have an up-to-date browser and operating system. Students may need some additional software on their computers to take this class. Check the KCC Distance Education webpage for hardware & software requirements.
- Some of the documents in this course will be available to you in PDF form. If you do not have Adobe Acrobat Reader software on your computer, you can download it by going to http://get.adobe.com/reader/ .

COURSE LEARNING OUTCOMES

Upon successful completion of this course, students will be able to:

COGNITIVE SKILLS: *Proficiency in analysis, computation, critical thinking, and problem solving*

- Students will solve problems using the scientific method

COMMUNICATION:

- Students will be able to orally and in written form communicate effectively in scientific method
- Students will be able to orally and in written form work in groups to solve questions

GLOBAL AWARENESS:

Gain a scientific understanding of how and why the universe works the way it does.

INFORMATION:

Students will demonstrate that they have learned facts and theories appropriate to the subject such as:

- Introduction to scientific notation, significant figures, dimensional analysis, scalars and vectors
- Mechanics of position, velocity, acceleration, free-fall, scalars vs. vectors
- Newton's second law, adding and multiplying vectors
- Uniform linear and circular motion
- Conservation of energy
- Linear momentum, torque and angular momentum
- Fluids

GRADING POLICY

Grading Procedures: To earn credit this semester, the student must have a minimum class average of 60%. The grade will be calculated based on points earned in four categories:

- **Major Exams** (65% of grade): Students take one timed test every two-three weeks and approximately two units are covered on each test. Each test consists of approximately 20 multiple choice questions and 2 free response questions.The test is timed and the students have 50 minutes to complete it. They also take free response and multiple choice quizzes throughout the unit. These have also been drawn from old AP questions.

- **Labs Reports** (25% of grade): Graded as purpose, procedure, data, data analysis, error analysis and conclusion.

- **Daily Grades** (10% of grade): Classwork and homework will be assigned. The online homework system Mastering Physics is used as the means of assigning and grading homework problems. Students work through a combination of chapter questions from the Knight text, as well as supplemental problems made by the teacher that are similar to old free-response problems. During each unit, the problems assigned are mostly specific to the unit topic, but may also include review problems.

Your final grade will be based on the total number of points you accumulate in each category. Students are advised to keep track of their points. Students can meet with their instructor before or after class to discuss individual standing. Final Grades are based on total accumulated points:

Grading Scale:

A = 100%-90%
B = 80%-89%
C = 70%-79%
D = 60%-69%
F = 59% & below

LATE WORK POLICY

Instructors have the right to refuse late work and deny make-up exams. Exceptions are considered on an individual basis based on the circumstances of the student, the nature of the assignment, and the instructor's appraisal of the student's previous work. The policy for this class states that no late work will be accepted, and a zero will be assigned for that assignment.

NETIQUETTE

Effective written communication is an important part of online learning. In a face-to-face classroom, body language, verbal responses, and questions help the facilitator and participants communicate with each other. In an online environment, however, misunderstandings can easily occur when participants do not follow basic rules of netiquette (online etiquette). Therefore, please use the following guidelines when communicating in this course:

- Use a descriptive subject line in forum posts.
- Include your name in all e-mails because recipients cannot always tell who you are based on your e-mail address.
- Derogatory comments, ranting, and vulgar language are not acceptable in any form of communication in this course.
- Keep in mind that something you consider offensive may be unintentional.
- Any student who engages in inappropriate and disruptive communication may be dropped from the course, assigned a grade of "F," and be ineligible for a tuition refund.
- If you are concerned about something that appears unacceptable, please inform your instructor.
- Do not use ALL CAPITAL LETTERS in online communication, as doing so indicates you are yelling. Limited use of capitalized words is acceptable when you need to emphasize a point.
- You may use appropriate emoticons/emojis in the forums, chats, and messages.

Course Outline:

The following is a course content outline along with the time spent on each unit. The chapters listed relate to the Knight textbook. Labs for each unit are also listed along with the purpose of each lab.

Physics Principals Outline and Connection to Big Ideas (BI):

Physics Principals	BI 1	BI 2	BI 3	BI 4	BI 5	BI 6
Kinematics – Chapters 1-3 (4 Weeks)			X			
1D kinematics			X			
2D kinematics			X			
Dynamics – Chapters 4-5 (3 Weeks)	X	X	X	X		
Newton's Laws	X	X	X	X		
Gravitation and Circular Motion – Chapter 6 (2 Weeks)	X	X	X	X		
Linear Momentum - Chapters 9 (2 Weeks)			X	X	X	
Impulse			X	X	X	
momentum			X	X	X	
conservation of momentum			X	X	X	
Energy – Chapters 10-11 (3 Weeks)			X	X	X	
work			X	X	X	
energy			X	X	X	
power			X	X	X	
conservation of energy			X	X	X	
Rotational motion – Chapter 7 (3 Weeks)			X	X	X	
rotational kinematics			X	X	X	
torque			X	X	X	
rotational dynamics			X	X	X	
rotational energy			X	X	X	
conservation of angular momentum				X	X	

LABS: OUTLINE OF PHYSICS 1 LABS AND INVESTIGATIONS WITH CORRELATING SCIENCE PRACTICES

Motion in One Dimension

	Lab/*Demo*	Purpose	Science Practices
1	**Constant Velocity**	To derive an equation of motion for an object traveling with a constant velocity. ***Guided Inquiry***	1.4, 2.1, 2.2, 3.3, 4.1, 5.1, 6.1
2	**Constant Acceleration**	To derive an equation of motion for an object traveling with a constant acceleration. ***Guided Inquiry***	1.5, 2.2, 2.5, , 4.2,5.1
3	**Graph Matching**	To predict, sketch, and test *s* vs. *t* and *v* vs. *t* graphs with a CBL for the motion of a student walking across the room.	1.2, 1.5, 2.1, 2.2, 3.1, 4.1, 4.2, 4.3, 5.1, 5.3, 6.1, 6.4, 7.2
4	**Free Fall**	To determine the type of motion exhibited by a freely falling body. ***Open Inquiry***	1.5, 2.2, 2.5, , 4.2,5.1

Motion in Two Dimensions

	Lab/*Demo*	Purpose	Science Practices
5	**Dart Gun**	To determine how range varies with angle, and derive an equation expressing this relationship.	1.4, 2.1, 2.2, 3.3, 4.1, 4.2, 4.3
6	*Monkey and Hunter*	To determine at what angle the hunter must aim his gun so that he will hit a monkey just dropping out of a tree.	3.1,3.2,3.3
7	**Marble Launch I**	To predict the impact point of a marble launched from the top of a table at a horizontal initial angle. ***Guided Inquiry***	1.1, 1.4, 2.1, 2.2, 3.3, 5.1, 6.1

Forces and Newton's Laws

	Lab/*Demo*	Purpose	Science Practices
8	*Tablecloth*	To demonstrate Newton's First Law by pulling a tablecloth out from underneath a set of objects.	3.1
9	*Toilet-Paper Pull*	To demonstrate Newton's First Law: if you pull toilet paper slowly, the paper unrolls, but if you pull quickly, you overcome inertia and tear a sheet of paper off.	3.1
10	**Constant Force**	To determine the type of motion that occurs from the application of a constant force. ***Guided Inquiry***	1.4, 2.1, 2.2, 3.3, 5.1, 5.2, 6.2
11	**Changing Force**	To determine the relationship between the force on an object and the resulting acceleration. Derive an equation expressing this relationship. ***Guided Inquiry***	1.4, 2.1, 2.2, 3.3, 5.1, 5.2, 6.2
12	**Friction Blocks**	To examine the force of friction on a sliding block, especially the relationship between the force of friction and the normal force. ***Guided Inquiry***	1.1, 1.4, 1.5, 2.1, 2.2, 3.1, 4.1, 4.2, 4.3, 5.3, 6.1, 6.4, 7.2
13	**Inclined Plane**	To find the parallel component of weight that pulls a cart down a plane at a certain angle. Derive an equation that relates the weight force, angle, and the parallel component. ***Open Inquiry***	1.4, 2.1, 2.2, 3.1, 4.2, 5.1, 5.2, 6.1, 7.2

Circular Motion and Gravitation

	Lab/*Demo*	Purpose	Science Practices
14	**Flying Toy**	To determine the tension in the string and the centripetal acceleration of the flying toy. ***Open Inquiry***	1.1, 1.2, 1.4, 1.5, 2.1, 2.2, 3.1, 4.1, 4.2, 4.3, 5.3, 6.1, 6.4, 7.2
15	**Stopper Lab**	A. To determine the relationship between the radius of circular motion and the period of circular motion, speed, and acceleration while keeping velocity constant. B. ***Guided Inquiry*** C. To determine the relationship between the acceleration of the stopper and the centripetal force. ***Guided Inquiry***	1.1, 1.4, 2.1, 2.2, 3.3, 4.1, 4.2, 4.3, 4.4, 5.1, 6.1, 6.2, 6.4
16	*Water in the Bucket*	To show that water will not fall out of a bucket that is swung in a vertical circle if the angular velocity of the bucket is large enough.	1.2, 1.5, 2.1, 2.2, 3.1, 4.1, 4.2, 4.3, 5.1, 5.3, 6.1, 6.4, 7.2
17	*Centripetal Force Apparatus*	To demonstrate the properties of centripetal motion using these jars with fishing bobs on both ends of a transverse bar which are rotated about a vertical axis.	1.5, 2.2, 2.5, , 4.2,5.1
18	**Galileo Ramps**	To use ramps raised to different heights to study the acceleration of balls.	1.1, 1.4, 2.1, 2.2, 3.2, 4.1, 5.1, 5.2, 6.2, 7.2
19	**Jupiter's Moons**	To do research on Jupiter and four of its moons. Based on this research, students will mathematically come up with the mass of Jupiter. They will compare this information to the accepted value.	1.1, 1.4, 2.1, 2.2, 3.3, 4.1, 4.2, 4.3, 4.4, 5.1, 6.1, 6.2, 6.4, 7.1

Work, Power, Energy

	Lab/*Demo*	Purpose	Science Practices
20	**Hooke's Law**	To determine the relationship between distance stretched and force. ***Open Inquiry***	1.1, 1.4, 2.1, 2.2, 3.3, 4.1, 5.1, 6.2, 7.2
21	**Roller Coaster Energy**	To use multiple representations to show the kinetic, potential, and total energy for a marble at various positions while it is moving down the ramp and around the loop of a wooden track.	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 3.1, 4.1, 4.2, 4.3, 5.3, 6.1, 6.2, 6.4, 7.2

Impulse and Momentum

	Lab/*Demo*	Purpose	Science Practices
20	**Colliding Pendulum**	To use conservation of momentum to determine the unknown mass of a ball involved in a collision with a ball of known mass.	1.1, 1.4, 2.1, 2.2, 3.3, 4.1, 5.1, 6.2
21	*Roller Blade Momentum*	To demonstrate a combination of explosive collisions and inelastic collisions. Each roller blader gains momentum with each toss and catch of a pillow.	1.1, 1.4, 2.1, 2.2, 3.3, 4.1, 5.1, 6.2
22	*Double Ball Bounce*	To demonstrate conservation of momentum, momentum is transferred to a small ball from a large ball moving upward, causing the small ball to experience a huge change in velocity.	1.1, 1.4, 2.1, 2.2, 3.3, 4.1, 5.1, 6.2

23	**Conservation of Momentum**	To demonstrate conservation of momentum, students will observe seven different collisions using a track and collision carts and make conclusions about momentum conservation in real life situations. ***Open Inquiry***	1.1, 1.4, 2.1, 2.2, 3.3, 4.1, 4.2, 4.3, 4.4, 5.1, 6.1, 6.2, 6.4, 7.2
24	**Bumper Design**	To design a paper bumper that will soften the impact of the collision between a cart and a fixed block of wood. Their designs are evaluated by the shape of an acceleration-versus-time graph of the collision. ***Open Inquiry***	1.4, 2.1, 2.2, 3.1, 3.2, 4.1, 4.2, 4.3, 5.1, 5.2, 5.3, 6.1, 6.2, 6.4, 7.2