DEREE COLLEGE SYLLABUS FOR: PY 2225 UNIVERSITY PHYSICS I	
(Updated Fall 2020)	**UK LEVEL 4** **UK CREDITS:20** **US CREDITS: 3/2/4**
PREREQUISITES:	MA 1008 College Algebra MA 2130 Calculus I
CATALOG DESCRIPTION:	An introduction to the classical laws of motion, including kinematics, forces in nature, Newton's laws of motion, conservation of energy and momentum, fluid statics and dynamics, oscillations, waves, thermodynamics and properties of matter. Suggested for students of the life science or engineering programs.
RATIONALE:	This course is designed to accommodate the Physics knowledge a student must have in order to pursue a degree in Life Sciences or Engineering. People who will take this course must have a strong mathematical background as this course is a calculus based one. It is the first of two University Physics courses and gives a student an insight on how an understanding of physics is central to the identification of, and solutions to, some of the key issues facing an increasingly globalised society. They consider how physics contributes to diverse areas in contemporary life, such as biomedical sciences, engineering, renewable energy generation, communication, development of new materials, transport and vehicle safety, an understanding of climate change, and the exploration of the universe.
LEARNING OUTCOMES:	As a result of taking this course, the student should be able to: 1. Acquire a general background in the science of classical physics and understand the difference between an experimental science and other disciplines. 2. Demonstrate knowledge of the relationships between time, displacement, velocity and acceleration, and apply these relationships to problems in everyday one-dimensional and two-dimensional motions. 3. Demonstrate a clear understanding of fundamental laws (Newton's Laws of Motion and Universal Law of Gravitation) and develop the analytical tools required to apply them in a variety of situations. 4. Demonstrate a clear understanding of conservation laws (Conservation of Linear and Angular Momentum, Conservation of Energy Principle) and develop the analytical tools required to apply them in a variety of situations. Unveil the concepts of Waves and Acoustics and present their vast applications in modern technology. 5. Explore the development of classical physics and the insight it led to in the study of fluids, heat, temperature and Thermodynamics as a whole. Show the ability to apply the relevant concepts in practical examples. 6. Apply the scientific method of work in laboratory activities as well as appreciate the effect of experimental uncertainties on lab results.
METHOD OF TEACHING AND LEARNING:	In congruence with the learning and teaching strategy of the college, the following tools are used: ➢ Class lectures, interactive learning (class discussions, group work) video presentations, and practical problems solved in class. ➢ Exercises and primary source documents are assigned as homework, the solutions of which are reviewed in class ➢ Laboratory work (laboratory reports will be required in full or partial format).

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CD-ROMS – Films and/or Field Trips (Science Exhibitions, the Planetarium, the Nuclear Reactor or Accelerators).
Office hours: students are encouraged to make full use of the office hours of their instructor, where they can ask questions, see their exam paper, and/or go over lecture/lab material.
Use of a blackboard site, where instructors are free to post course documents, timely announcements, as well as additional resources.

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<tr><td>ASSESSMENT:</td><td>
Summative:
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<tr><td>First assessment
a) Laboratory report-1 full lab report 10%
b) In-class midterm examination (1-hour), 30%
(Multiple choice, problem solving, short answers, matching, essay questions, combination</td><td>40%</td></tr>
<tr><td>Second assessment
a) Laboratory report-1 full lab report 10%
b) In-class final examination (2-hour, comprehensive), 50%
(Multiple choice, problem solving, short answers, matching, essay questions, combination)</td><td>60%</td></tr>
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Formative:
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<tr><td>1 Diagnostic test (In class or to take home)</td><td>0</td></tr>
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For the course to be considered completed and for the student to earn the right to sit exams ALL experimental work and reports for every single experimental exercise must be handed within defined deadlines. However, only two will be evaluated.

Both Lab Reports are integral part of the course and is compulsory for all students. It enables them to demonstrate the application of their skills and knowledge, and to pursue their personal interests, without the time limitations and other constraints that are associated with written examinations.

The midterm examination tests all learning outcomes of the course as stated above from the beginning of classes until a week before the exam.

The final examination tests all Learning Outcomes and it is comprehensive.
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<tr><td>INDICATIVE READING:</td><td>
REQUIRED READING:
Serway/Jewett - ©2019, Physics for Scientists and Engineers with Modern Physics, Cengage, Latest Edition

RECOMMENDED READING:
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<tr><td>INDICATIVE MATERIAL:
(e.g. audiovisual, digital material, etc.)</td><td>
REQUIRED MATERIAL:

RECOMMENDED MATERIAL:
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<tr><td>COMMUNICATION REQUIREMENTS:</td><td></td></tr>
<tr><td>SOFTWARE REQUIREMENTS:</td><td>Microsoft Word, Excel for Windows.</td></tr>
<tr><td>WWW RESOURCES:</td><td>
www.saunderscollege.com/physics/college
www.krev.com
http://physicsworld.com/
http://scienceworld.wolfram.com/physics/
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	http://arxiv.org/ http://www.physicsclassroom.com/ http://www.physicstoday.org/ http://www.iop.org/ http://phoenix.phys.clemson.edu/tutorials/index.html http://phet.colorado.edu/en/simulations/category/physics http://www.physicslessons.com/iphysics.htm http://surendranath.tripod.com/AppletsJ2.html
INDICATIVE CONTENT:	**Part 1: Mechanics** 1. Units, Physical Quantities, and Vectors 2. Motion Along a Straight Line 3. Motion in Two or Three Dimensions 4. Newton's Laws of Motion 5. Applying Newton's Laws 6. Work and Kinetic Energy 7. Potential Energy and Energy Conservation 8. Momentum, Impulse, and Collisions 9. Rotation of Rigid Bodies 10. Dynamics of Rotational Motion 11. Equilibrium and Elasticity 12. Fluid Mechanics 13. Gravitation 14. Periodic Motion **Part 2: Waves and Acoustics** 15. Mechanical Waves 16. Sound and Hearing **Part 3: Thermodynamics** 17. Temperature and Heat 18. Thermal Properties of Matter 19. The First Law of Thermodynamics 20. The Second Law of Thermodynamics **PY 2225 LAB OUTLINE** Laboratory experiments will be carried out either through set-up applications or/and computer simulations. Indicative activity titles: 1. Lab Safety and Regulations, Communicating Experimental Work (Reports) 2. Experimental uncertainties – Measures of Errors, Graphs, Data Analysis 3. Linear Velocity 4. Vectors – Resultant Force 5. Free Fall – Time Measurement - Reaction Time 6. Projectile Motion 7. Momentum Conservation 8. Simple Pendulum OR Hook’s Law 9. Torques 10. The Buoyant Force 11. Expansion-Contraction OR Pressure – Volume Relation of Gases 12. Heat Capacity of Metals - Specific Heat