DEREE COLLEGE SYLLABUS FOR: PY 2225 UNIVERSITY PHYSICS I	3/2/4
(Updated: Spring 2024)	**UK LEVEL: 4** **UK CREDITS: 20**
PREREQUISITES:	MA 1024 Algebra and Trigonometry **OR** 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. 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. Students 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 physics of the motions around. 2. Demonstrate a clear understanding of fundamental laws and conservation laws and develop the analytical tools required to apply them in a variety of situations. 3. Demonstrate an understanding of rotational motion, celestial motion, wave motion and the motion of fluids and examine their vast applications. 4. Explain the concepts of heat, temperature and thermodynamics and their significant applications. 5. 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 teaching and learning 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). • Optional: 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

<table>
<tr><td></td><td>resources</td></tr>
<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 and long questions)</td><td>40%</td></tr>
<tr><td>Final assessment:
a) Laboratory report-1 full lab report 10%
b) In-class final examination (2-hour, comprehensive), 50%
(Multiple choice, problem solving, short and long questions)</td><td>60%</td></tr>
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Formative:
<table>
<tr><td>Diagnostic test (In class or to take home)</td><td>0%</td></tr>
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The first assessment tests Learning Outcomes 1, 2 and 5.
The final assessment tests Learning Outcomes 1, 2, 3, 4 and 5.
The formative practice sets aim to prepare students for the examinations and ensure that students are actively engaged during the term.

For the course to be considered completed and for the student to earn the right to sit exams ALL experimental work must be completed within defined deadlines. Student work on two selected experiments will be evaluated.

The final grade for this module will be determined by averaging all summative assessment grades, based on the predetermined weights for each assessment.

If students pass the final assessment and averages a course grade of 40 or higher they are not required to resit the first assessment.</td></tr>
<tr><td>INDICATIVE READING:</td><td>REQUIRED READING:
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RECOMMENDED READING:
Other sources, including journal and newspapers' articles, research papers etc. recommended by the instructor throughout the semester.</td></tr>
<tr><td>INDICATIVE MATERIAL:
(e.g. audiovisual, digital material, etc.)</td><td>REQUIRED MATERIAL:
N/A

RECOMMENDED MATERIAL:
N/A</td></tr>
<tr><td>COMMUNICATION REQUIREMENTS:</td><td>Verbal and written skills using academic / professional English</td></tr>
<tr><td>SOFTWARE REQUIREMENTS:</td><td>MS Office and Blackboard CMS</td></tr>
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WWW RESOURCES:	www.saunderscollege.com/physics/college www.krev.com http://physicsworld.com/ http://scienceworld.wolfram.com/physics/ 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:	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
INDICATIVE LAB CONTENT:	**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