OUTCOMES BASED LEARNING MATRIX

Course: Concepts of Technical Physics I(PHYS 132) Department: Physical Science

At the end of the course, students will be able to: **Students will participate in:** **Faculty will evaluate:**

COURSE OUTCOMES	OUTCOME ACTIVITIES	ASSESSMENT TOOLS
Introduction: - describe the scientific method. - use sci. and eng. notation. - convert between units in various systems using algebraic cancellation of units. -to interpret unit prefixes. -develop graphing skills. -evaluate significant figures. - skillfully use common laboratory instruments to measure length, mass, and time.	- lectures, discussions, and demonstrations. (CT, QS, OC) - reading the textbook, including sample problems. (CT, R, QS) - solving assigned problems. (CT, R, QS) - Measurement Lab (CT, R, QS, TS) - organizing and documenting information in lab reports. (CT, W, QS)	- Tests with emphasis on solving problems (CT, W, QS, R) - Lab performance (CT, QS, TS, R, OC) - Lab reports (W, QS, CT)
Motion in One Dimension: - define and describe displacement, velocity and acceleration. - solve motion problems using equations of motion.	- lectures, discussions and demonstrations. (CT, QS, OC) - reading the textbook, including sample problems. (CT, R, QS) - solving assigned problems. (CT, R, QS) Acceleration Due To Gravity Lab. (CT, R, QS, TS) - organizing and documenting information in lab reports. (CT, W, QS)	- Tests with emphasis on solving problems (CT, W, QS, R) - Lab performance (CT, QS, TS, R, OC) - Lab reports (W, QS, CT)

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Vector Analysis: - find the components of a vector graphically. - add vectors graphically.	- lectures, discussions and demonstrations. (CT, QS, OC) - reading the textbook, including sample problems. (CT, R, QS) - solving assigned problems. (CT, R, QS) - Vector Lab. (CT, R, QS, TS) - organizing and documenting information in lab reports. (CT, W, QS)	- Tests with emphasis on solving problems (CT, W, QS, R) - Lab performance (CT, QS, TS, R, OC) - Lab reports (W, QS, CT)
Motion in Two Dimensions: - analyze motion in a plane using components, including projectile motion and circular motion.	- lectures, discussions and demonstrations. (CT, QS, OC) - reading the textbook, including sample problems. (CT, R, QS) - solving assigned problems. (CT, R, QS) - Projectile Motion Lab (CT, R, QS, TS) - organizing and documenting information in lab reports. (CT, W, QS)	- Tests with emphasis on solving problems (CT, W, QS, R) - Lab performance (CT, QS, TS, R, OC) - Lab reports (W, QS, CT)
Newton's Laws: - to analyze common situations with Newton's First and Third Laws - predict the acceleration of several kinds of motion using Newton's Second Law. These include connected-body problems.	- lectures, discussions and demonstrations. (CT, QS, OC) - reading the textbook, including sample problems. (CT, R, QS) - solving assigned problems. (CT, R, QS) - Newton's Second Law on the Air Track Labs (CT, R, QS, TS)	- Tests with emphasis on solving problems (CT, W, QS, R) - Lab performance (CT, QS, TS, R, OC) - Lab reports (W, QS, CT)
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(continued from previous page) - analyze the forces on a body in translational equilibrium using graphical techniques	(continued from previous page) - Forces In Equilibrium Lab (CT, R, QS, TS) - organizing and documenting information in lab reports. (CT, W, QS)	
Work and Energy: - calculate work done by a variety of forces. - use the Work-Energy Theorem to solve motion problems. - identify which types of energy are present in a given situation, and decide if conditions in a problem indicate that energy is conserved. - apply the concept of power to solve problems involving the rate of work being done or the rate of energy transformation.	- lectures, discussions and demonstrations. (CT, QS, OC) - reading the textbook, including sample problems. (CT, R, QS) - solving assigned problems. (CT, R, QS) - Conservation of Energy Lab (CT, R, QS, TS) - organizing and documenting information in lab reports. (CT, W, QS)	- Tests with emphasis on solving problems (CT, W, QS, R) - Lab performance (CT, QS, TS, R, OC) - Lab reports (W, QS, CT)
Impulse and Momentum: - calculate impulse and momentum. - use impulse and momentum to solve problems involving interactions between objects (e.g., collisions). This includes elastic and perfectly inelastic collisions.	- lectures, discussions and demonstrations. (CT, QS, OC) - reading the textbook, including sample problems. (CT, R, QS) - solving assigned problems. (CT, R, QS) - Ballistic Pendulum Lab. (CT, R, QS, TS) - organizing and documenting information in lab reports. (CT, W, QS)	- Tests with emphasis on solving problems (CT, W, QS, R) - Lab performance (CT, QS, TS, R, OC) - Lab reports (W, QS, CT)

COURSE OUTCOMES	OUTCOME ACTIVITIES	ASSESSMENT TOOLS
Rotational Motion: - describe the basic variables of rotational motion -- angular displacement, velocity and acceleration. Analyze and solve simple problems using Newton's law of gravitation and discuss its relationship to weight and planetary motion. - recognize the analogy between rotational motion and linear motion through the use of a different coordinate system. - analyze and solve rotational motion problems using the rotational forms of equations of motion, Newton's Laws, Conservation of Energy, and Conservation of Angular Momentum	- lectures, discussions and demonstrations. (CT, QS, OC) - reading the textbook, including sample problems. (CT, R, QS) - solving assigned problems. (CT, R, QS) - Centripetal Force Lab, Moment of Inertia Lab. (CT, R, QS, TS) - organizing and documenting information in lab reports. (CT, W, QS)	- Tests with emphasis on solving problems (CT, W, QS, R) - Lab performance (CT, QS, TS, R, OC) - Lab reports (W, QS, CT)
General: - when solving a problem, determine which approach is the appropriate one (Newton's Laws, Conservation of Energy, Conservation of Momentum; linear or rotational cases). - master techniques of algebra.		- Tests with emphasis on solving problems (CT, W, QS, R) - Lab performance (CT, QS, TS, R, OC) - Lab reports (W, QS, CT)