Syllabus for bio and microbio essay

UNIVERSITY OF SANTO TOMAS COLLEGE OF SCIENCE Espana Blvd. , Manila 1015 Philippines Tel. Nos. (63-2) 7315728; (63-2) 4061611 local 8224 FAX: (63-2) 7409730 BS BIOLOGY/MICROBIOLOGY COURSE SYLLABUS Course Title: General College Physics Course PHYS201 Abbreviation: No. Of Units: 4 School Year: Semester: Prerequisite Course/s: Class Schedule: Room Assignment: Consultation Schedule: Consultation Room: 2011-2012 1st/2nd Math 101, Math 102 Course Facilitator: Office: Contact No: E-mail: Angelina A. Silverio Rm305 Main Building, UST 09274984965 om Rm 305 Main Building, UST COURSE DESCRIPTION: Physics 201 covers selected fundamental physics concepts and application to life sciences. Topics include mechanics, heat and thermodynamics, wave motion and sound, electricity and magnetism and nuclear physics. COURSE OBJECTIVES: Learning Objectives: 1. 2. 3. 4. State correctly basic physical laws and principles Analyze and solve problems in physics Evaluate and describe technological advances related to physics Apply physics principles in the solution of problems related to life sciences Value Objectives: 1. ccuracy, honesty, critical thinking and reasoning in solving problems 2. positive attitudes towards the study of natural phenomena and their causes 3. Respect for the opinions of others, recognizing the importance of evidence and the use of critical evaluation of differing scientific opinions related to various aspects of physics. 4. Respect for the finite resources of our mother earth and responsible use of technology 5. Scientific thinking and problem-solving techniques 6. Positive attitudes toward themselves, others, learning as a lifelong process, physics and the environment. . Appreciation of role of physics to understand the world and universe in which you live. 8. Gratitude to God for creating the universe GRADUATE ATTRIBUTES: COLLEGE OF

SCIENCE GRADUATE ATTRIBUTES 1. Functional body of knowledge and skills 2. Information literacy 3. Preparedness for life-long learning 4. Logical, critical and creative problem solving skills 5. Communication abilities 6. Teamwork and collaborative skills 7. Commitment to Christian (3= Major, 2= Minor, 1= Minimal, 0= No Focus) LEVEL OF FOCUS 3 3 3 3 3 3 3

ACTIVITIES / ASSESSMENT Graded recitations and board works, quizzes, long examinations Graded recitations and board works, quizzes, long examinations Performance tasks Graded recitations and board works, quizzes, long examinations Recitations, oral and written reports, reflection essays Investigatory group project Reflection essay values 8. Awareness to national concerns and cultural diversity 3 Investigatory group project COURSE ORGANIZATION: Chapter Specific Objective/s Content Outline Activity / Media No. of Hours 1 1. Differentiate vector quantity from scalar quantity 2.

Give examples of vector and scalar quantities 3. Add two or more vectors using the graphical and the analytical methods 4. Resolve a given vector into its horizontal and vertical components 5. Give the negative of a vector and calculate the difference between two vectors 6. Enumerate the different ways of vector multiplication and give examples for each 7. Differentiate cross product from dot product 8. Multiply vectors 1. Define displacement, velocity, acceleration, free fall and projectile motion 2. Differentiate instantaneous velocity from average velocity and calculate each 3.

State the five kinematic equations on motion, explain the symbols used and state the condition Lecture/ Discussion Film Showing Problem Solving

3 ? ? ? ? Vectors and Scalars Addition of Vectors Vector Difference Vector Multiplication 2 ? Motion ? Frame of Reference and Position ? Distance and displacement ? Speed and Velocity ? Acceleration ? Kinematic equations for Uniformly accelerated motion Lecture /Discussion Use of power point Problem Solving Visuals 4 under which each equation can be applied. 4. Solve simple problems on uniformly accelerated motion including free fall. 5.

Calculate an object's velocity at any time given its displacement versus time graph 6. Calculate the acceleration and displacement of an object given its velocity versus time graph. 7. Draw displacement versus time and velocity versus time graphs. 8. Discuss projectile motion. 9. Cite other examples of projectiles. 10. Solve problems on projectile motion. ? Free fall ? Projectile motion ? Graphical analysis motion of 3 1. State and explain Newton's laws on motion. 2. Explain the concept of inertia and give examples. 3. Differentiate between mass and weight. 4. Apply the laws of Newton to simple situations. 5.

Solve problems using Newton's laws 6. Enumerate the different types of friction 7. Explain the laws of friction 8. Solve problems involving friction 1. Define equilibrium, particle and rigid body 2. Distinguish the different types of force systems 3. Compute the equilibrant of a set of forces acting on ? The concept of force ? Fundamental forces ? Newton's laws on motion ? Types of Friction ? Laws on friction Lecture/ Discussion Demonstration Problem Solving Multimedia 4 4 ? ? ? ? ? Force systems Equilibrant Torque Conditions for Equilibrium Center of gravity Lecture/ Discussion Demonstration Problem Solving Multimedia a body 4. Define and compute the torque produce by a force on a body 5. locate the center of gravity of regular and composite

bodies 6. State the two conditions for equilibrium 7. Solve problems using the two conditions for equilibrium ? Application of torque in the human body 5 1. Define work, power, potential energy, and kinetic energy 2. Compute the work done by a constant force or a variable force 3. Compute the work done by graphical method 4. Distinguish between gravitational and elastic potential energy 5. Determine the gravitational and elastic potential energy and kinetic energy 6.

State the law of conservation of mechanical energy and the work-energy theorem and give examples 7. Solve problems on work, energy, and power 1. Explain momentum and impulse 2. Discuss the impulse and momentum theorem 3. carry out calculations using impulse –momentum theorem 4. state the law of conservation of momentum and apply it to some daily life situations 5. enumerate the three ? ? ? ? Work Energy Work Energy Theorem Conservative and Non conservative Forces ? Conservation of Mechanical Energy ? Power Demonstration Lecture Question and Answer Multimedia 3 6 ? Linear Momentum ? Impulse ?

The Impulse-Momentum Theorem ? Conservation of Linear Momentum ? Coefficient of Restitution ? Types of Collisions ? Collisions in Two Dimensions Demonstration Lecture Question and Answer Multimedia 2 types of collision and differentiate one from the others 6. solve problems on collision in one or two dimensions. 7 1. calculate mass density and specific gravity 2. state Archimedes' principle 3. calculate the buoyant force exerted by a fluid on a body 4. calculate the specific gravity of a substance by Archimedes' Principle 5. determine whether a body will float, sink or be partially immersed in a fluid 6. alculate hydrostatic pressure and atmospheric pressure at any

altitude 7. differentiate laminar from turbulent flow 8. state and explain continuity equation and Bernoulli's equation to flow of ideal fluid and blood 9. solve problems on fluid dynamics 1. differentiate heat from temperature 2. convert from one thermometric scale to another 3. enumerate and explain the effects of heat 4. define terms like specific heat, latent heats of fusion, vaporization, and sublimation, coefficients of linear, area and volume expansion ? Mass Density ? Specific Gravity ? Pressure ? Pascal's Principle and Hydrostatic Paradox ?

Archimedes' Principle and Buoyancy ? Continuity Equation ? Bernoulli's Equation ? Determination of Blood Pressure ? Torricelli's Theorem Demonstration Lecture Question and Answer Multimedia 5 8 ? Thermometric Scales ? Thermal Expansion ? Heat and Temperature Change ? Heat and Phase Change ? Methods of Heat Transfer ? Laws of thermodynamics Demonstration Lecture Question and Answer Multimedia 5 5. explain irregular expansion of water 6. solve problems on thermal expansion 7. solve problems on calorimetry with or without change of phase using conservation of energy 8. Explain the different methods of heat transfer. . Solve problems on heat transfer 10. Explain how the human body regulates temperature. 11. State and discuss the laws of thermodynamics 12. Solve problems using the laws of thermodynamics 9 1. Differentiate electromagnetic wave from mechanical wave and give examples for each 2. Differentiate longitudinal waves from transverse waves and give examples for each. 3. Define the following terms: amplitude, wavelength, frequency, period, crest, trough, compression, rarefaction, node and antinode 4. Determine wave velocity in

different media 5. Enumerate and explain the different properties of waves 6.

Explain the phenomena of resonance and Doppler Effect 7. Solve problems using the basic wave equation 8. describe the nature of sound waves and explain Simple Harmonic Motion Mechanical Waves Electromagnetic Waves Basic Wave Equation Velocity of Longitudinal Waves ? Velocity of Transverse Wave in a String ? Water Waves ? Energy Transmission by Waves ? Wave Properties ? Resonance ? The Nature of Sound ? Velocity of Sound ? Wave Properties of Sound ? Shock Waves ? Characteristics of Sound ? Applications of Ultrasound in medicine ? ? ? ? ? Demonstration Lecture Question and Answer Multimedia 4 ow they are produced, transmitted and propagated 9. relate the speed of sound waves to its frequency and wavelength 10. calculate the speed of sound in different media 11. demonstrate and explain reflection, refraction , diffraction and interference of sound 12. discuss the medical applications of ultrasound 10 1. explain the origin of charges on the basis of the structure of an atom 2. explain conduction and induction as means of electrification. 3. state and apply Coulomb's law in solving numerical problems 4. explain Superposition Principle and apply it in solving problems involving several charges. . compare and contrast electric force from gravitational force 6. state and solve problems involving electric fields and Gauss Law 7. map electric fields using lines of force 8. solve problems involving electric fields, potential, potential difference 9. calculate the capacitance of a parallel plate capacitor, capacitors in series, capacitors in parallel and combination of series parallel capacitors 1. define electric current, resistance, electromotive ? The Origin of Electricity ? Charged

Objects and the Electric Force ? Conductors and Insulators ? Charging by Contact and by Induction ?

Coulomb's Law ? Electric Field and Field Lines ? Electric Field Inside a Conductor ? Gauss Law ? Potential Energy ? The Electric Potential Difference ? The Electric Potential Difference Created by Point Charges ? Capacitors and Dielectrics ? Combination of capacitors Demonstration Lecture Question and Answer Multimedia 4 11 ? Electromotive Force and Current Demonstration Lecture 5 force, terminal voltage, and resistivity 2. state Ohm's law 3. analyze and solve problems using Ohm's law, 4. solve problems on power and energy dissipated in an electrical circuit 5. numerate the factors affecting the resistance of a uniform wire and calculate the resistance if one or more than one of these factors are changed. 6. Calculate resistance based on color code 7. draw accurate diagrams for series and parallel connections of resistances calculate equivalent resistance 8. calculate equivalent emf for a combination of cells 9. differentiate terminal voltage from electromotive force 10. differentiate ammeter from a voltmeter and convert a galvanometer to a voltmeter or to ammeter 11. solve complex circuits using kirchhoff's laws 12. explain the importance of a fuse or circuit breaker 13. ompute the cost of electrical energy consumption 14. discuss the biological /physiological effects of current 15. solve RC circuits ? Ohm's Law ? Resistance and Resistivity ? Electric Power ? Alternating Current ? Series Wiring ? Parallel Wiring ? Circuits Wired Partially in Series and in Parallel ? Internal Resistance ? Kirchhoff's Rules ? The Measurement of Current and Voltage ? Capacitors in Series and in Parallel ? RC Circuits ? Safety and Physiological Effects of Current Question and Answer Multimedia 12 1.

explain the difference between AC and DC voltage and current 2. ompute average, instantaneous and root mean square current and voltage 3. compute capacitive and inductive reactance 4. determine the magnitude as well as phase of impedance 5. solve LRC circuits 6. compute resonant frequency 1. Enumerate the different regions in the electromagnetic spectrum and their uses. 2. Determine the energy of an electromagnetic wave 3. discuss the different theories about light 4. illustrate the laws of reflection and solve problems using the laws on reflection 5. locate and describe the types of image formed by a plane and spherical mirrors 6. solve problems on mirrors 1. efine refraction and its effects 7 2. state and explain the laws on refraction 3. define total internal reflection and state the conditions necessary for total internal reflection 4. give applications of total internal reflection 5. differentiate converging from diverging lens 6. characterize the image formed by a converging ? Alternating Current ? Alternating Voltage ? Capacitors and Capacitive Reactance ? Inductors and Inductive Reactance ? Impedance ? LRC AC Circuits ? Resonance Demonstration Lecture Question and Answer Multimedia 4 13 ? Electromagnetic spectrum ? Theories about light ? Laws of reflection ?

Types of mirrors ? Mirror Equation ? Magnification Demonstration Lecture Question and Answer Multimedia 3 14 ? Laws of refraction ? The Index of Refraction ? Snell's Law and Refraction of Light ? Total Internal Reflection ? Lenses ? Image Formation by Lenses ? The Thin Lens Equation and the Magnification Equation ? Lenses in Combination ? The Human Eye Demonstration Lecture Question and Answer Multimedia 4 lens and diverging lens 7. solve problems on refraction and lenses 8. explain lens defects and

their remedies. 7. enumerate the different parts of the eye and its function 8. explain the mechanism of sight 9. xplain some eye defects and ways to correct them 10. compare and contrast the eye and the camera 11. explain how different optical instruments work 12. solve problems on eye defects and optical instruments ? Eye Defects ? Angular Magnification and Magnifying Glass ? The Compound Microscope ? The Telescope ? Lens Aberrations 15 1. Explain the meaning of radioactivity and recognize which nuclides are stable 2. Explain the three types of decay and complete the equation for each radioactive decay. 3. Explain and apply the concept of half-life in solving for activity of radioactive nuclide 4.

Explain the technique of carbon dating. 5. Calculate mass defect and binding energy. 6. Explain nuclear fusion and fission and calculate energy released in each 7. Discuss the biological effects of radiation 8. Discuss the medical uses of radiation ? Nuclear Structure ? The Strong Nuclear Force and the Stability of the Nucleus ? The Mass Defect of the Nucleus and Nuclear Binding Energy ? Radioactivity ? Radioactive Decay and Activity ? Radioactive Dating ? Radioactive Decay Series ? Nuclear Fission and Fusion ? Uses of radiation Demonstration Lecture Question and Answer Multimedia 4 COURSE REFERENCES:

Textbook / Learning Materials References Cutnell, J. D. and Johnson, K. W. (2006). Essentials of Physics. New Jersey: John Wiley and Sons, Inc. Giambatista, A. , Richardson B. M. and Richardson, R. C. (2007). College Physics, 2nd ed. New York: McGraw Hill. Kirkpatrick, L. D. and Francis, G. E. (2010). Physics: A Conceptual Approach, 7th ed. California: Brooks/Cole Cengage Learning. Tippens, P. E. (2007). Physics, 7th ed. , New York:

McGraw Hill. Touger, J. (2006). Introductory Physics: Building Understanding. Asia: John Wiley and Sons, Inc. Young, H. D. , Freedman, R. A. and Ford, A. L. (2009).

Sears and Zemansky's University Physics with Modern Physics, 12th ed. New York: Addison Wesley Extended Readings Enger, E. D. and Smith, B. F. (2009). Are Hybrid Electric Vehicles the Answer? Environmental Science- A Study of Interrelationships, 11th ed. New York: McGraw-Hill, 206. Enger, E. D. and Smith, B. F. (2009). Nuclear Concerns. Environmental Science- A Study of Interrelationships, 11th ed. New York: McGraw-Hill, 218-226. Enger, E. D. and Smith, B. F. (2009). Energy Sources.. Environmental Science- A Study of Interrelationships, 11th ed. New York: McGrawHill, 179-202. Kirkpatrick, L. D. and Francis, G. E. (2010).

Global Positioning System. Physics: A Conceptual Approach, 7th ed. California: Brooks/Cole Cengage Learning, 206. Kirkpatrick, L. D. and Francis, G. E. (2010). Black Holes . Physics: A Conceptual Approach, 7th ed. California: Brooks/Cole Cengage Learning, 208. COURSE POLICIES: ? ? ? ? ? ? ? ? ? ? ? ? ? Strict adherence to UST's policy on academic integrity is expected as stipulated in the Student Handbook. A student caught cheating in a quiz or in preliminary examination will be given a score of zero for that quiz or preliminary examination. Outright failure will be given to a student caught cheating in the final examinations.

Three quizzes and one major departmental examination will be given per grading period. No make-up quiz will be given. If a student missed a quiz the first time, his score for that quiz will be his lowest quiz for the entire

semester. A grade of zero will be given for succeeding missed quiz/quizzes Professionalism is expected of the students in both academic and non-academic matters. Class attendance should be both regular and punctual. A grade of Failure due to Absences (FA) will be given to students who incurred 16 hours of absences or more. Three counts of tardiness of at least 15 minutes is equivalent to one hour absence.

The students should actively participate in classroom discussions. Deadlines for the submission of assignments and projects must be strictly followed. The students should practice collaborative work in group assignments. Consultation with the Professor is strongly encouraged and should be done during his/her consultation time. Passing score is 60%. No remedial examination will be given. Grading System: Grading System: (for 2 grading periods) ? Class standing o Quizzes ? Major exam 50% 10% 40% o Project, essay, recitation, etc Computation of Grade Average Raw Score = (Prelim Grade + Final Grade)