

PHYS 2B Course Outline as of Fall 2001**CATALOG INFORMATION**

Dept and Nbr: PHYS 2B Title: GENERAL PHYSICS LEC

Full Title: General Physics Lecture

Last Reviewed: 4/22/2019

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	17.5	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

Catalog Description:

Electricity and magnetism, light, atomic and nuclear physics.

Prerequisites/Corequisites:

Phys 2A and not open to students enrolled in or who have completed Phys 4C.

Recommended Preparation:**Limits on Enrollment:****Schedule of Classes Information:**

Description: Electricity & magnetism, light, atomic & nuclear physics. (Grade or P/NP)

Prerequisites/Corequisites: Phys 2A and not open to students enrolled in or who have completed Phys 4C.

Recommended:

Limits on Enrollment:

Transfer Credit: CSU;UC. (CAN PHYS 3B+PHYS 2B=PHYS4)(PHYS 3B+PHYS 3A+PHYS 2B+PHYS 2A=PHYS SEQ A)

Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	Area		Effective:	Inactive:	
	C	Natural Sciences	Spring 1982		
CSU GE:	Transfer Area		Effective:	Inactive:	
	B1	Physical Science	Spring 1982		
IGETC:	Transfer Area		Effective:	Inactive:	
	5A	Physical Sciences	Spring 1982		
CSU Transfer:	Transferable	Effective:	Spring 1982	Inactive:	Fall 2021
UC Transfer:	Transferable	Effective:	Spring 1982	Inactive:	Fall 2021

CID:		
CID Descriptor:PHYS 100S	Algebra/Trigonometry-Based Physics: AB	
SRJC Equivalent Course(s):	PHYS20 AND PHYS20L AND PHYS21 AND PHYS21L OR PHYS20A AND PHYS20B	
CID Descriptor:PHYS 110	Algebra/Trigonometry-Based Physics B	
SRJC Equivalent Course(s):	PHYS21 AND PHYS21L OR PHYS20B	

Certificate/Major Applicable:
Not Certificate/Major Applicable

COURSE CONTENT

Outcomes and Objectives:

Upon completion of the course, the student should be able to:

1. Define the concepts of electrical charge, electric field strength, magnetic field strength, potential difference, resistivity, resistance, capacitance, inductance, impedance & give units used to express each of these quantities.
2. Solve problems using Coulomb's Law.
3. Sketch electric field lines & equipotential surfaces for various configurations of charge & solve problems involving electric fields & potential difference.
4. Explain what a dielectric is & solve problems involving calculations of capacitance, voltage across capacitors, charge stored in capacitors & energy stored in capacitors for various combinations of capacitors, & for capacitors with & without dielectrics.
5. Solve problems using Ohm's Law & involving calculations of resistance, current, voltage & power.
6. Determine the equivalent resistance of combinations of resistors in series & parallel & use Kirchhoff's rules to calculate voltages & currents.
7. Solve problems involving alternating current RLC circuits including resonance.
8. Describe the structure & properties of materials that are electrical conductors, electrical insulators, semiconductors, & ferromagnetic materials.
9. Sketch magnetic field lines for various configurations of permanent

magnets & for current carrying wires & loops & solve problems involving the magnetic force on moving charged particles & on current carrying wires.

10. Calculate the magnetic field due to long straight current carrying wires & due to current carrying loops.
11. State Lenz's Law & apply it to induced currents.
12. Explain the operation of moving coil meters, motors, generators & transformers, & the production of back emf & eddy currents.
13. Describe the electromagnetic waves & their production, & list the types of radiation included in the electromagnetic spectrum in order of increasing or decreasing wavelength or frequency.
14. Give a value for the speed of light in a vacuum, state the approximate wavelength range of the visible spectrum, & arrange a list of color in order of their wavelengths or frequencies.
15. Explain the refraction of light at the interface between 2 transparent media & the concept of index of refraction; write the equation for Snell's Law & use it in problem solving; explain the concepts of total internal reflection & the critical angle.
16. Explain the real, virtual, erect & inverted as they apply to images formed by mirrors & lenses; describe the image forming properties of convex & concave spherical mirrors & of converging & diverging thin spherical lenses; do calculations involving object distances, image distances, focal lengths & magnifications of mirrors & lenses.
17. Describe the optical configurations of & image formation by the camera, the eye, telescopes & microscopes.
18. Explain the formation of a double slit interference pattern, single slit diffraction pattern & spectra by diffraction gratings, & solve problems involving interference & diffraction of light.
19. Distinguish between unpolarized & polarized light & explain how polarized light can be produced.
20. State the postulate on which the theory of special relativity is based; describe the effects of relativistic time dilation, length contraction, & mass increase; & solve problems involving these effects as well as energy & momentum at relativistic speeds.
21. Describe the photoelectric effect & explain the concepts of work function & threshold frequency or wavelength.
22. Explain what a photon is; solve problems involving the wavelength, frequency, energy & momentum of photons; & describe the wave-particle duality of light & matter.
23. Explain & describe electron energy levels using the Bohr model of the atom; describe the processes of emission & absorption of photons by orbital electrons; use the Bohr model to calculate electron energy levels & frequencies or wavelengths of emitted or absorbed light.
24. Explain the concept of quantum numbers, state the Pauli exclusion principle, & explain the structure of the periodic table.
25. Define terms involving atomic nuclei such as atomic number, mass number, nucleon, isotope & atomic weight; calculate nuclear binding energies.
26. Explain why some atomic nuclei are radioactive; define the concept of a half-life & use it in problem solving; describe the various modes of radioactive decay.
27. Describe what happens in nuclear fission & fusion & explain the

release of energy in each of these processes.

28. Write equations for the nuclear processes of radioactive decay, fission, fusion, & nuclear transmutation; calculate mass differences & energy released in each of the processes; & indicate conservation laws which are applicable to these interactions.

Topics and Scope:

Topics covered include:

1. Electric forces and fields.
2. Electric potential.
3. Direct current circuits.
4. Magnetism.
5. Electromagnetic induction.
6. Alternating current and electronics.
7. Electromagnetic waves.
8. Properties of light.
9. Optical devices.
10. Interference, diffraction, polarization of light.
11. Special relativity.
12. Early quantum physics.
13. Atomic structure and the emission of light.
14. Nuclear physics.

Assignment:

1. No less than twelve sets of homework problems
2. Zero to fifteen quizzes
3. No less than three mid-term exams
4. Final exam.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.

Writing
0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, Quizzes, Exams

Problem solving
15 - 35%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None

Skill Demonstrations
0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Multiple choice, PHYSICS PROBLEMS TO SOLVE

Exams
65 - 85%

Other: Includes any assessment tools that do not logically fit into the above categories.

None

Other Category
0 - 0%

Representative Textbooks and Materials:
Physics by Cutnell & Johnson, 5th edition, Wiley, 2000