



# The University of Trinidad and Tobago

## Course Descriptor Template The University of Trinidad and Tobago

<b>COURSE TITLE</b>	<b>:-</b>	<b>General Physics II</b>			
<b>COURSE CODE</b>	<b>:-</b>	<b>PHYS2</b>			
<b>LEVEL</b>	<b>:-</b>	<b>2</b>	<b>CREDIT POINTS</b>	<b>:-</b>	<b>4</b>
<b>Parent Programme</b>	<b>:-</b>	<b>Bachelors of Education</b>			
<b>Type of Course</b>	<b>:-</b>	<b>Combination of Lecture, and Labs</b>			
<b>Date Validated</b>	<b>:-</b>		<b>Date Modified</b>	<b>:-</b>	

### **TOTAL STUDENT WORKLOAD: 7 hours**

The weekly hours committed to the unit will typically include *5 hours* of formal delivery with students expected to manage directed learning and independent study in support of the course.

The normal weekly workload will be:

<i>Lecture</i>	<i>3 hrs</i>
<i>Tutorial</i>	<i>1 hrs</i>
<i>Laboratory</i>	<i>1 hrs</i>
<i>Directed and independent study</i>	<i>2 hrs</i>

### **PREREQUISITES**

Non

### **DESCRIPTION**

This three (3) credit course covers topics in optics and wave, electricity and magnetism and modern physics. Waves including earthquake waves and sound waves would be studied along with electromagnetic phenomenon. Quantum Mechanics would be introduced here.

### **LEARNING OUTCOMES**

- 1. Knowledge and Understanding**
  - a. Distinguish between longitudinal and transverse waves.**
  - b. Know the principles of electrostatics.**
  - c. Understand the Photoelectric and Compton effects**
- 2. Cognitive skills**
  - d. Calculate refractive index**

- e. Determine the torque on a current carrying loop
  - f. Analyze Blackbody radiation
  - g. Determination of the heat capacity of materials
  - h. Calculate flow rates of liquids
3. **Practical and Professional skills**
- i. Perform the relevant laboratory exercises
4. **Transferable and Key skills**
- j. Appreciate optical prescriptions and background radiation

### AREAS OF STUDY

At the end of each unit, students should understand and appreciate following topics and apply the knowledge gained to situations they encounter in every day life:

#### UNIT 1

- 1. Waves
  - Transverse and longitudinal
  - Wavelength and frequency
  - Speed of a wave
- 2. Superposition and interference
  - Constructive and destructive
  - Phase
  - Standing waves
- 3. Sound waves
  - Speed of sound
  - Frequency and pitch
- 4. Intensity and intensity level
- 5. The Doppler effect
- 6. Beats

#### UNIT 2

- 7. Existence of electromagnetic waves
  - Symmetry arguments
  - Generation of electromagnetic waves
- 8. Propagation of electromagnetic waves
  - Speed
  - Direction of propagation
  - The Doppler effect
- 9. The electromagnetic spectrum
- 10. Energy and momentum in electromagnetic waves
  - Energy density
  - Radiation pressure

### UNIT 3

11. Wave fronts and rays
12. Reflection and mirrors
  - The law of reflection
  - Plane mirrors
  - Spherical mirrors—concave and convex
  - Ray tracing and the mirror equation
13. Refraction and lenses
  - The law of refraction
  - Total internal reflection
  - Reflection
  - Thin lenses—converging and diverging
  - Ray tracing and the thin-lens equation
  - Combinations of lenses
- The lensmaker's equation
14. Superposition
15. Interference
  - Young's two-slit experiment
  - Air wedge
  - Newton's rings
  - Thin-film interference

### UNIT 4

16. Early quantum theory and models of the atom.
  - Discovery and properties of the electron
  - Planck's quantum hypothesis, blackbody radiation, photon theory and the photoelectric effect.
  - Photon , energy , mass and momentum
  - Compton effect, pair production, wave particle duality
  - Wave nature of light, electron microscope
  - Early models of the atom, atomic spectra, Bhor's model, de Broglie hypothesis.

### LEARNING AND TEACHING STRATEGY

Lectures, tutorial sheets, and laboratory exercises.

### ASSESSMENT

#### Assessment Element 1

weighting:	15%
Assignments:	Project Reports and Oral Presentations
special facilities:	Multimedia Projector
time/duration:	15 mins

#### Assessment Element 2

weighting:	20%
Laboratory Exercises:	Three (3) Hard Copy Laboratory Reports
special facilities:	Laboratory

time/duration: 4 hrs each

### Assessment Element 3

weighting: 15%  
 assessment. type: Two (2) Coursework Examinations  
 special facilities: Examination conditions  
 time/duration: 1 hr each

### Assessment Element 4

Weighting: 50%  
 assessment. type: Final Examination  
 special facilities: Examination conditions  
 time/duration: 3 hrs

## ASSESSMENT STRATEGY

Two coursework, laboratory reports and home assignment will be used to assess the students' knowledge of the subject matter during the semester.

## Aggregation & Re-assessment Rules

There is no Must Pass rule for this course. Students must obtain at minimum of 50% overall when all assessments are totaled. Letter grading system (A – F) will be used to report the student's final result.

## INDICATIVE READING

Physics for Scientist and Engineers, 6<sup>th</sup> Edition  
 Serway and Jewett  
 Brooks/Cole

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