



**P Σ Λ K**  
PHYSICS & CHEMISTRY

# Physics

## Preliminary Course

### 2018 Course Outline

# Contents

|          |                                     |          |
|----------|-------------------------------------|----------|
| <b>1</b> | <b>Information about the course</b> | <b>3</b> |
| <b>2</b> | <b>Class times</b>                  | <b>3</b> |
| <b>3</b> | <b>Staff in charge</b>              | <b>3</b> |
| <b>4</b> | <b>Course details</b>               | <b>4</b> |
| <b>5</b> | <b>Course schedule</b>              | <b>5</b> |
| 5.1      | Kinematics . . . . .                | 5        |
| 5.2      | Dynamics . . . . .                  | 5        |
| 5.3      | Waves and Thermodynamics . . . . .  | 6        |
| 5.4      | Electricity and Magnetism . . . . . | 6        |
| <b>6</b> | <b>Homework</b>                     | <b>7</b> |
| <b>7</b> | <b>Assessment tasks</b>             | <b>7</b> |

## 1 Information about the course

|                                    |   |
|------------------------------------|---|
| <b>Year of delivery</b>            | 2018  |
| <b>Course name</b>                 | Preliminary Physics   |
| <b>Level of course</b>             | Year 11   |
| <b>Assumed knowledge</b>           | None  |
| <b>Contact hours per week</b>      | 1 hour 45 minutes   |
| <b>Number of weeks</b>             | 44 weeks  |
| <b>Commencement date</b>           | 07/08/17  |
| <b>Summary of course structure</b> | Kinematics (11 weeks)<br>Dynamics (11 weeks)<br>Waves and Thermodynamics (11 weeks)<br>Electricity and Magnetism (11 weeks) |

## 2 Class times

There are 7 classes currently running for the Preliminary Physics course:

| <b>Day</b> | <b>Time</b>         |
|------------|---------------------|
| Monday     | 5:00 pm - 6:45 pm   |
|            | 6:45 pm - 8:30 pm   |
| Saturday   | 9:00 am - 10:45 am  |
|            | 10:45 am - 12:30 pm |
| Sunday     | 9:00 am - 10:45 am  |
|            | 10:45 am - 12:30 pm |
|            | 4:45 pm - 6:30 pm   |

## 3 Staff in charge

The course authority for the Preliminary Physics course is Miss Yen Nguyen. The tutors for the course are:

- Miss Yen Nguyen
- Mr Edbert Chung
- Mr Jason Sivieng

All staff members can be contacted via email.

## 4 Course details

The Preliminary Physics course aims to give students a basic understanding of the principles of physics that govern the world on both a microscopic and macroscopic level. Students studying this course will gain an understanding of scalar and vector quantities, Newton's laws of motion, classical mechanics, waves, thermodynamics and electromagnetism. There is a strong emphasis on problem solving and practical investigations in the Preliminary Physics course. The main topics covered in each module of the Preliminary Physics course are given below:

|  |  |
|--|--|
| <p><b>Module 1<br/>Kinematics</b></p>                    | <ul style="list-style-type: none"> <li>• Motion in a Straight Line: Scalar and vector quantities, average and instantaneous velocity, relative velocity, equations of motion</li> <li>• Motion on a Plane: Resolving vectors, vector addition, relative positions and motions of two objects on a plane</li> </ul>   |
| <p><b>Module 2<br/>Dynamics</b></p>                      | <ul style="list-style-type: none"> <li>• Forces: Newton's laws of motions, net forces, equilibrium</li> <li>• Forces, Acceleration and Energy: Friction, objects on an inclined plane, law of conservation of mechanical energy, average power</li> <li>• Momentum, Energy and Simple Systems: Law of conservation of momentum, impulse, elastic and inelastic collisions</li> </ul>   |
| <p><b>Module 3<br/>Waves and<br/>Thermodynamics</b></p>  | <ul style="list-style-type: none"> <li>• Wave Properties: Mechanical and electromagnetic waves, transverse and longitudinal waves, properties of a wave</li> <li>• Wave Behaviour: Reflection, refraction, diffraction, superposition, progressive and standing waves, resonance</li> <li>• Sound Waves: Pitch, loudness, fundamental and harmonic frequencies, beats, the Doppler effect</li> <li>• Ray Model of Light: Refractive index, total internal reflection, Snell's law, inverse square law</li> <li>• Thermodynamics: Temperature, thermal equilibrium, specific heat capacity, energy transfer, latent heat</li> </ul> |
| <p><b>Module 4<br/>Electricity and<br/>Magnetism</b></p> | <ul style="list-style-type: none"> <li>• Electrostatics: Electric fields, interactions between charged objects, moving charges in an electric field</li> <li>• Electric Circuits: Ohm's law, power, series and parallel circuits, Kirchoff's current law, Kirchoff's voltage law</li> <li>• Magnetism: Ferromagnetic materials, magnetic fields</li> </ul>   |

## 5 Course schedule

### 5.1 Kinematics

| Lesson | Topic                           |
|--------|---------------------------------|
| 1      | Motion on a Straight Line       |
| 2      | Motion on a Straight Line       |
| 3      | Motion on a Straight Line       |
| 4      | Motion on a Straight Line       |
| 5      | Motion on a Plane               |
| 6      | Motion on a Plane               |
| 7      | Motion on a Plane               |
| 8      | Motion on a Plane               |
| 9      | Motion on a Plane               |
| 10     | Kinematics Module Exam          |
| 11     | Kinematics Module Exam Feedback |

### 5.2 Dynamics

| Lesson | Topic                               |
|--------|-------------------------------------|
| 1      | Forces                              |
| 2      | Forces                              |
| 3      | Forces, Acceleration, Energy        |
| 4      | Forces, Acceleration, Energy        |
| 5      | Forces, Acceleration, Energy        |
| 6      | Forces, Acceleration, Energy        |
| 7      | Momentum, Energy and Simple Systems |
| 8      | Momentum, Energy and Simple Systems |
| 9      | Momentum, Energy and Simple Systems |
| 10     | Dynamics Module Exam                |
| 11     | Dynamics Module Exam Feedback       |

### 5.3 Waves and Thermodynamics

| Lesson | Topic  |
|--------|--|
| 1      | Wave Properties                                |
| 2      | Wave Behaviour                                 |
| 3      | Wave Behaviour                                 |
| 4      | Sound Waves                                    |
| 5      | Sound Waves                                    |
| 6      | Ray Model of Light                             |
| 7      | Ray Model of Light                             |
| 8      | Thermodynamics                                 |
| 9      | Thermodynamics                                 |
| 10     | Electricity and Magnetism Module Exam          |
| 11     | Electricity and Magnetism Module Exam Feedback |

### 5.4 Electricity and Magnetism

| Lesson | Topic  |
|--------|--|
| 1      | Electrostatics                                 |
| 2      | Electrostatics                                 |
| 3      | Electric Circuits                              |
| 4      | Electric Circuits                              |
| 5      | Electric Circuits                              |
| 6      | Electric Circuits                              |
| 7      | Magnetism                                      |
| 8      | Magnetism                                      |
| 9      | Magnetism                                      |
| 10     | Electricity and Magnetism Module Exam          |
| 11     | Electricity and Magnetism Module Exam Feedback |

## 6 Homework

A homework sheet will be provided to students at the end of each lesson. The homework problems have been divided into three separate sections:

- **Foundation:** This section contains problems that are designed to test very basic concepts.
- **Development:** This section is the longest and it contains exam-style questions where students are required to apply their understanding of basic concepts. The problems in this section have marks allocated to them so that students can receive more specific feedback on the quality of their answers. Students who can comfortably solve the problems in this section can expect to do well in the assessment tasks.
- **Extension:** This section is optional as it contains problems that can be extremely difficult. These problems are mainly intended for high achieving students who are aiming to obtain a state rank and/or are studying the Physics Olympiad.

## 7 Assessment tasks

Students will be assessed with assignments, quizzes, module exams and a final exam. These components will contain problems consistent with those you are likely to face in your school assessments. The purpose of these assessments is to ensure students revise their content regularly and to help develop their critical thinking abilities. Students are expected to achieve a mark of at least 50% in all assessment tasks.

Details of each assessment task are given below:

| Assessment Task         | Duration          | Weighting |
|-------------------------|-------------------|-----------|
| Module 1 Exam           | 1 hour 30 minutes | 15%       |
| Module 2 Exam           | 1 hour 30 minutes | 15%       |
| Module 3 Exam           | 1 hour 30 minutes | 15%       |
| Module 4 Exam           | 1 hour 30 minutes | 15%       |
| Final Exam              | 2 hours           | 30%       |
| Assignments and Quizzes | –                 | 10%       |