B29DR Dynamics and Relativity

**COURSE DETAILS**
Course Code: B29DR
Full Course Title: Dynamics and Relativity
SCQF Level: 9
SCAF Credits: 15
Available as Elective: No

**DELIVERY LEVEL**
Undergraduate: Yes
Postgraduate Taught: No
Postgraduate Research: No

Additional Information:

**COURSE AIMS**
To introduce the basic concepts of advanced classical mechanics.

To establish the transition from classical observables to operators in quantum mechanics.

To provide an understanding of optics and simple optical systems.

**LEARNING OUTCOMES – SUBJECT MASTERY**
Understanding classical dynamics and its application to a wide range of phenomena.

Achieve a critical knowledge and understanding of relativity

Apply the theory of the course topics to problems or situations not previously encountered

**LEARNING OUTCOMES – PERSONAL ABILITIES**
Personal abilities are embedded in the module. The module provides the opportunity to:

- Apply the advanced core knowledge expected of a professional physicist to gain professional level insights,
- Communicate effectively with professional level colleagues
- Interpret, use and evaluate critically a wide range of data to solve problems of both a familiar and unfamiliar nature
- Manage time effectively, work to deadlines and prioritise workloads
- Use a range of ICT skills with on-line materials and web links to support the learning process
- Apply strategies for appropriate selection of relevant information from a wide source and large body of knowledge
- Exercise significant initiative and independence in carrying out learning activities and researching information

**SYLLABUS**
Dynamics

Simple harmonic motion (revision).

Damped and forced harmonic oscillators.

Periodic motion under a central force.

Small oscillations and normal modes in molecules.

Rotational dynamics

Special relativity

The Michelson-Morley experiment

Concept of inertial reference frames; Galilean and relativistic transformations between frames

Time dilation; Length contraction;

Relativistic Doppler effect

Relativistic particle dynamics.

LOCATION AND ASSESSMENT METHODS

<table>
<thead>
<tr>
<th>Ed</th>
<th>SBC</th>
<th>Ork</th>
<th>Dub</th>
<th>Malay</th>
<th>IDL</th>
<th>COLL</th>
<th>ALP</th>
<th>OTH</th>
<th>Method</th>
<th>Weight</th>
<th>Exam Mins</th>
<th>Type</th>
<th>Diet</th>
<th>Synoptic Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Examination</td>
<td>70</td>
<td>180</td>
<td>Assessment</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Coursework</td>
<td>30</td>
<td>180</td>
<td>Assessment</td>
<td>Semester 1</td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Examination</td>
<td>100</td>
<td>180</td>
<td>Reassessment</td>
<td>Semester 3</td>
<td></td>
</tr>
</tbody>
</table>