

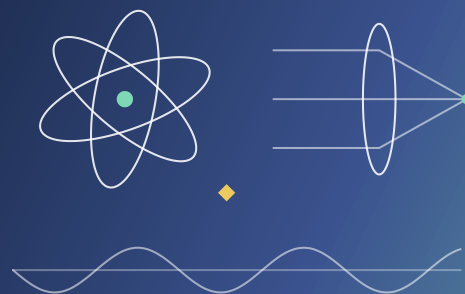
Module code

SPP-3403

Type of module

Undergraduate: Applied Physics – Elective

Renewable Energy



Modular credits

4

Total student
engagement

56 hours

Prerequisite

**SPP-1203 Classical
Mechanics**

Anti-requisite

None

Aims

To familiarise students with a range of modern renewable energy technologies, their underlying physical principles and methods for assessing their performance and environmental impact.

Module learning outcomes (MLO)

On successful completion of this module, a student will be expected to be able to:

MLO 1

Analyse and evaluate the physical principles underlying various renewable energy conversion and storage technologies including photovoltaics, solar thermal, hydro, biomass, wind, fuel cells and batteries.

MLO 2

Evaluate the performance of renewable energy systems and interpret standard test data.

MLO 3

Conduct simple life-cycle assessments for selected renewable energy technologies.

MLO 4

Communicate technical findings effectively by preparing clear analyses, reports and presentations.

Module contents

Overview of current energy mix and energy policy in Brunei	Renewable energy sources with high potential for application in Brunei	Wind energy conversion systems, wind resource analysis, wind farms
Hydroelectric power systems, pumped hydro energy storage	Geothermal generation of electrical power	Wave, tidal and ocean thermal energy
Biomass and biofuels	Active and passive use of solar energy	Solar thermal electrical power generation
Photovoltaic cells	Renewable hydrogen production, 'colours' of hydrogen, safety and uses	Proton exchange membrane and solid oxide fuel cells
Lithium-ion and redox-flow batteries	Energy efficiency, management and conservation	Environmental impact and life-cycle assessment of selected renewable energy technologies

Assessment

60% **40%**
Examination Coursework



■ Examination — 60% ■ Class tests — 20% ■ Assignments — 10% ■ Presentation — 10%

Formative assessment

Weekly discussion and feedback

Summative assessment

COMPONENT	WEIGHTING
Examination	60%
Coursework	40%
Individual	30%
Class tests	20%
Assignments	10%
Group	10%
Presentation	10%

Graduate attributes and skills

Programme learning objectives (PLO) addressed

1	PLO 1 (Core Disciplinary Knowledge)	2	PLO 2 (Critical Thinking and Comparative Analysis)
4	PLO 4 (Numerical and Analytical Competence)	5	PLO 5 (Interdisciplinary Applications, Materials and Sustainability)
6	PLO 6 (Communication and Professionalism)		

Sustainability concept addressed

7	SDG 7 Affordable and Clean Energy
13	SDG 13 Climate Action

Digital skills/software used (not limited to)

- Word processing software (e.g. Microsoft Word)
- Spreadsheet software (e.g. Microsoft Excel)
- Presentation software (e.g. Microsoft PowerPoint)
- Reference management software (e.g. Mendeley)
- Scientific computing and graphing software (e.g. Origin, Python, Wolfram Mathematica, MATLAB)
- Online literature search (e.g. Google Scholar, Elsevier Scopus)
- AI-assisted research and productivity tools (e.g. ChatGPT, Claude, Gemini)

Micro-credentialling option

No

Stackable towards GenBESTARI Undergraduate Degree Programme or other relevant Lifelong Learning Programmes

No

Document details

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