Specialisation

Photovoltaics and Solar Energy

SOLAAH

The stream includes training in technology development, manufacturing, quality control, reliability and life-cycle analysis, cell interconnection and encapsulation, a range of solar cell applications, system design, maintenance and fault diagnosis, marketing, policy development and the use of other renewable energy technologies. Emphasis is placed on gaining hands-on experience of working with solar energy devices, modules and systems.

Innovative teaching techniques have been developed to enhance the learning environment including the ‘Virtual Production Line’ and ‘Virtual World Solar Car Challenge’. UNSW academics in the photovoltaic field have been consistently ranked amongst the leaders worldwide through international peer review. This team has held the world record for silicon solar cell efficiencies for decades and were responsible for developing the most successfully commercialized new photovoltaic technology internationally throughout the same period. From 2006 onwards we have seen an explosion of interest in the School's technologies from major industry players all around the world.

Second Area of Specialisation

The cross-disciplinary nature of photovoltaics and renewable energy applications necessitates many PV engineers possessing broad engineering backgrounds or else working in teams with other engineers. A good example is the UNSW Solar Car Project involving PV engineers, electronics engineers, control engineers, mechanical engineers, chemical engineers, power engineers, biomedical engineers, computer engineers, and communication engineers. Therefore it is important for photovoltaic engineers to have a broader understanding of other engineering disciplines.

A unique feature of this stream is that in Year 2, students have the opportunity to select a strand to complement their education in Photovoltaics and Solar Energy. Each strand comprises 18 units of credit with the opportunity to subsequently select additional electives in the corresponding area in the final two years, subject to the
approval of the Undergraduate Coordinator. The strands available are listed below and cover areas such as computing, electronics, mathematics, mechanical engineering, civil engineering, physics, chemical engineering, and architecture. Students may also formulate their own strands subject to the approval of the Undergraduate Coordinator.

Selection of a second area of specialisation is subject to the stream rule that states that no more than 60 UOC of first-year level courses may be counted toward the BE (Hons) in Photovoltaics and Solar Energy.

Photovoltaics and Solar Energy is also available as a component of the dual degree programs.
Faculty
Faculty of Engineering

School
School of Photovoltaic and Renewable Engineering

Study Level
Undergraduate

Minimum Units of Credit
168

Specialisation Type
Honours
Available in Program(s)

Program(s) in which this honours is available

Bachelor of Engineering (Honours) - **BE (Hons)**

**3707 Engineering (Honours)**

Faculty: Faculty of Engineering  
Campus: Kensington  
Units of Credit: 192  
Typical Duration: 4 Years
**Specialisation Structure**

Students must complete 168 UOC.

**Level 1 Core Courses**

Students must complete 42 UOC.
Note: Students doing a Computing Strand should take COMP1911.

**ENG1000** | 6 UOC  
Introduction to Engineering Design and Innovation

**MATS1101** | 6 UOC  
Engineering Materials and Chemistry

One of the following:

**MATH1131** | 6 UOC  
Mathematics 1A

**MATH1141** | 6 UOC  
Higher Mathematics 1A

One of the following:

**MATH1231** | 6 UOC  
Mathematics 1B

**MATH1241** | 6 UOC  
Higher Mathematics 1B

One of the following:

**PHYS1121** | 6 UOC  
Physics 1A

**PHYS1131** | 6 UOC  
Higher Physics 1A

One of the following:

**PHYS1221** | 6 UOC  
Physics 1B
Higher Physics 1B

One of the following:

Computing 1A

Computing for Engineers

Level 2 Core Courses

Students must take 36 UOC of the following courses.
Note: Students selecting Mathematics Strand and Physics Strand, and BE/BSc students majoring in 'Mathematics' or 'Physics' should replace MATH2019 with MATH2011 Several Variable Calculus and MATH2121 Theory and Applications of Differential Equations.

Numerical Methods and Statistics

Project in Photovoltaics and Renewable Energy 1

Project in Photovoltaics and Renewable Energy 2

Introduction to Electronic Devices

Applied Photovoltaics

One of the following:

Engineering Mathematics 2D

Engineering Mathematics 2D

MATH2018 6 UOC

MATH2121 6 UOC
**Level 3 Core Courses**

Students must take 18 UOC of the following courses.

- **SOLA3010 | 6 UOC**
  Low Energy Buildings and Photovoltaics

- **SOLA3020 | 6 UOC**
  Photovoltaic Technology and Manufacturing

- **SOLA3507 | 6 UOC**
  Solar Cells

**Level 4 Core Courses**

Students must take 30 UOC of the following courses.

- **ELEC4122 | 6 UOC**
  Strategic Leadership and Ethics

- **SOLA4012 | 6 UOC**
  Photovoltaic Systems Design

- **SOLA4951 | 4 UOC**
  Research Thesis A

- **SOLA4952 | 4 UOC**
  Research Thesis B

- **SOLA4953 | 4 UOC**
  Research Thesis C

- **SOLA5057 | 6 UOC**
  Energy Efficiency
**Discipline Elective**

Students must take 12 UOC of the following courses. Note: Approval of the Undergraduate Coordinator is required for selection of courses from outside the school.

- any level 3 course offered by Faculty of Engineering
- any level 4 course offered by Faculty of Engineering
- any level 3 Photovoltaics and Solar Energy course
- any level 4 Photovoltaics and Solar Energy course

**Level 1 Prescribed Electives**

Students must take at least 12 UOC of the following courses. CHEM1031 and CHEM1041 will only be available to students enrolled in a program which has a Chemistry major.

<table>
<thead>
<tr>
<th>Course</th>
<th>UOC</th>
<th>Description</th>
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<tr>
<td>BABS1201</td>
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<td>Molecules, Cells and Genes</td>
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<td>BIOM1010</td>
<td>6</td>
<td>Engineering in Medicine and Biology</td>
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<tr>
<td>BIOS1301</td>
<td>6</td>
<td>Ecology, Sustainability and Environmental Science</td>
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<tr>
<td>CEIC1000</td>
<td>6</td>
<td>Sustainable Product Engineering and Design</td>
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<tr>
<td>CHEM1011</td>
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<td>Chemistry 1A: Atoms, Molecules and Energy</td>
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<td>CHEM1021</td>
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<td>Chemistry 1B: Elements, Compounds and Life</td>
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<td>CHEM1031</td>
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<td>Higher Chemistry 1A: Atoms, Molecules and Energy</td>
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<tr>
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<td>Higher Chemistry 1B: Elements, Compounds and Life</td>
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<td>CHEM1811</td>
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<td>Engineering Chemistry 1A</td>
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<tr>
<td>CHEM1821</td>
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<td>Engineering Chemistry 1B</td>
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<td>COMP1521</td>
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<td>Computer Systems Fundamentals</td>
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<td>COMP1531</td>
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<td>Software Engineering Fundamentals</td>
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<td>CVEN1701</td>
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<td>ELEC1111</td>
<td>6</td>
<td>Electrical and Telecommunications Engineering</td>
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<tr>
<td>ENGG1100</td>
<td>6</td>
<td>Grand Challenges for Engineering</td>
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<tr>
<td>ENGG1200</td>
<td>6</td>
<td>Undergraduate Special Projects</td>
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<tr>
<td>ENGG1300</td>
<td>6</td>
<td>Engineering Mechanics</td>
</tr>
<tr>
<td>ENGG1400</td>
<td>6</td>
<td>Engineering Infrastructure Systems</td>
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</tbody>
</table>
GEOS1111 | 6 UOC
Fundamentals of Geology

GMAT1110 | 6 UOC
Surveying and Geospatial Engineering

MATH1081 | 6 UOC
Discrete Mathematics

MATS1101 | 6 UOC
Engineering Materials and Chemistry

MINE1010 | 6 UOC
Mineral Resources Engineering

PHYS1231 | 6 UOC
Higher Physics 1B

PSYC1001 | 6 UOC
Psychology 1A

SOLA1070 | 6 UOC
Sustainable Energy

**Strand Electives**

Students may choose up to 18 UOC of elective courses in a particular area of focus (Strand) such as Computing, Electronics, Electric Energy, Communications and Control, Mathematics, Mechanical Engineering, Chemical Engineering, Physics, Faculty of Built Environment or may also formulate their own Strands subject to the approval of the Undergraduate Coordinator.

Note:
- The Strand options listed are subject to change and may not be available every year.
- Strand options are for students commencing the second year of their program; third year students should complete the strand courses they have already
nominated and consult the School Office as required.

ARCH1361  |  6 UOC
Architectural Science and Building Environment 2

BENV1072  |  6 UOC
Design for Energy Efficiency

CEIC2000  |  6 UOC
Material and Energy Systems

CEIC2001  |  6 UOC
Fluid and Particle Mechanics

CEIC2002  |  6 UOC
Heat and Mass Transfer

CODE2170  |  6 UOC
Building Information Modelling

COMP1921  |  6 UOC
Computing 1B

COMP2041  |  6 UOC
Software Construction: Techniques and Tools

COMP2121  |  6 UOC
Microprocessors and Interfacing

COMP2911  |  6 UOC
Engineering Design in Computing

ELEC2133  |  6 UOC
Analogue Electronics

ELEC2134  |  6 UOC
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<td>ELEC3104</td>
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<td>Digital Signal Processing</td>
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<td>ELEC3106</td>
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<td>ELEC3114</td>
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<tr>
<td>Control Systems</td>
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<tr>
<td>ELEC3115</td>
<td>6</td>
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<tr>
<td>Electromagnetic Engineering</td>
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<td>ELEC3117</td>
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<td>Electrical Engineering Design</td>
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<td>ELEC4614</td>
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<td>Power Electronics</td>
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<td>MATH2011</td>
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<td>Several Variable Calculus</td>
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<tr>
<td>MATH2121</td>
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<tr>
<td>Theory and Applications of Differential Equations</td>
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<tr>
<td>MATH3041</td>
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<tr>
<td>Mathematical Modelling for Real World Systems</td>
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<tr>
<td>MATH3101</td>
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<tr>
<td>Computational Mathematics</td>
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<td>Course</td>
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<tr>
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<td>MATH3261</td>
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<td>PHYS3118</td>
<td>6</td>
</tr>
<tr>
<td>TELE3113</td>
<td>6</td>
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</tbody>
</table>
Recommended Level 1 Electives

- ELEC1111 Elec & Telecomm Eng (6 UOC)
- SOLA1070 Sustainable Energy (6 UOC)

Enrolment Disclaimer

You are responsible for ensuring you enrol in courses according to your program requirements. myUNSW enrolment checks that you have met enrolment requirements such as pre-requisites for individual courses but not that a course will count towards your program requirements. Do not assume that because you have enrolled in a course that the course will be credited towards your program.
Additional Information

Professional Recognition

The BE (Hons) in Photovoltaics and Solar Energy is fully accredited by Engineers Australia.
Pre-2019 Handbook Editions

Access past handbook editions (2018 and prior)
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Authorised by Deputy Vice-Chancellor (Academic)
CRICOS Provider Code 00098G
ABN: 57 195 873 179