

Attachment B: Clean energy courses and electives

Selected university pathways, entrance requirements and electives

Table 1: Undergraduate and Postgraduate renewable energy pathways and entrance requirements for international students

| Universities | Qualification | IELTS requirement |
|-------------------------------------|---|-------------------|
| Curtin University | Bachelor of Engineering (Honours) (Energy Engineering) | 6.0 |
| Curtin University | Energy Futures Specialisation (MBA) | 6.5 |
| Curtin University | Master of Science (Minerals and Energy Economics), Master of Business Administration | 6.5 |
| Curtin University | Master of Professional Engineering (Emerging Power Systems) | 6.0 |
| Federation University Australia | Master of Engineering Technology (Renewable Energy and Electrical Power Systems) | 6.0 |
| Edith Cowan University | Bachelor of Engineering (Electrical and Renewable Energy) Honours | 6.0 |
| Murdoch University | Master of Renewable and Sustainable Energy | 6.0 |
| Queensland University of Technology | Bachelor of Engineering (Honours) (Electrical and Renewable Power) | 6.5 |
| RMIT | Bachelor of Engineering (Honours) (Sustainable Systems Engineering) | 6.5 |
| RMIT | Master of Engineering (Electrical and Electronic Engineering) | 6.5 |
| RMIT | Master of Engineering (Sustainable Energy) | 6.5 |
| University of Newcastle | Bachelor of Renewable Energy Engineering (Honours) | 6.0 |
| UNSW | Bachelor of Engineering (Honours) (Renewable Energy) | 6.5 |
| UNSW | Master of Engineering (Renewable Energy) | 6.5 |
| UNSW | Master of Engineering Science (Renewable Energy) | 6.5 |
| Victoria University | Master of Engineering | 6.5 |

Source: Non-exhaustive list of undergraduate and postgraduate pathways obtained from universities and through desktop research. Courses are accurate as of 31 August 2023.

Table 2: Example of undergraduate specialisation units delivered by Universities in Australia

| Unit name | Unit code | University |
|---|-----------|------------------------------------|
| Wind Energy | ENGN4548 | ANU |
| Renewable Energy Principles | ELEN3004 | Curtin |
| Renewable Energy Systems | ELEN4008 | Curtin |
| Sustainable and Renewable Energy | ELEN1002 | Curtin |
| Introduction to Energy Engineering | ENGR2002 | Curtin |
| Sustainable Energy Systems Engineering | ENGR2003 | Curtin |
| Engineering for Sustainable Development | ENEN2000 | Curtin |
| Chemistry for Sustainability | CHEM2008 | Curtin |
| Industrial Chemistry and Achieving Sustainability | CHEM3009 | Curtin |
| Energy Conversion and Sustainable Management | ENGR3006 | Curtin |
| Energy Transport | ENGR3005 | Curtin |
| Energy Governance | BLAW3009 | Curtin |
| Energy Storage | ENGR3002 | Curtin |
| Green Hydrogen Production | PRRE4007 | Curtin |
| Carbon Management | CHEN4020 | Curtin |
| Solar Energy | RSE3141 | Monash University |
| Hydropower | RSE3241 | Monash University |
| Wind engineering* | MEC4459 | Monash University |
| Renewable Electrical Energy Systems | EEET2334 | Monash University |
| Wind and Hydro Power | MIET2497 | Monash University |
| Renewable Energy and Hydrogen Technologies** | MEE40011 | Swinburne University of Technology |
| Hydrogen and Energy Storage | EEE30006 | Swinburne University of Technology |
| Bioenergy | RENE2000 | University of Newcastle |
| Solar and Wind | RENE3000 | University of Newcastle |
| Energy Storage Systems | RENE4000 | University of Newcastle |
| Geothermal, Hydro, Ocean, and Hybrid Systems | RENE3100 | University of Newcastle |

| Unit name | Unit code | University |
|---|-------------|-------------------------|
| Power Electronics and Renewable Energy Systems | ELEC3251 | University of Newcastle |
| Solar Thermal Energy Design | MECH9720 | UNSW |
| Photovoltaic Stand-alone System Design and Installation | SOLA5054 | UNSW |
| Photovoltaic Systems Design | SOLA4012 | UNSW |
| Energy Storage | ENGG4111 | UNSW |
| Renewable Energy | MECH5275*** | USYD |
| Sustainable Energy Systems | ELEC5206*** | USYD |
| Sustainable Energy Systems | NEF4205 | Victoria University |

Source: Non-exhaustive list of specialisation units obtained from universities and through desktop research. Units are accurate as of 31 August 2023.

*This unit is not being offered in 2023, but has been offered in previous years.

**Note that this course is a new unit to be delivered in 2024.

***This unit is currently offered in both undergraduate and postgraduate pathways.

Table 3: List of undergraduate pathways in renewable energy

| University | Course Title | Full-time duration | Degree type |
|-------------------------------------|---|--------------------|--|
| Curtin University | Bachelor of Engineering (Honours) (Energy Engineering) | 4 years | Undergraduate |
| Edith Cowan University | Bachelor of Engineering (Electrical and Renewable Energy Honours) | 4 years | Undergraduate |
| Queensland University Technology | Bachelor of Engineering (Honours) (Electrical and Renewable Power) | 4 years | Undergraduate |
| Queensland University of Technology | Bachelor of Engineering (Honours)/Master of Renewable Energy | 5 years | Undergraduate followed by Postgraduate |
| RMIT | Bachelor of Engineering (Honours) (Sustainable Systems Engineering) | 4 years | Undergraduate |
| University of Newcastle | Bachelor of Renewable Energy Engineering (Honours) | 4 years | Undergraduate |

| University | Course Title | Full-time duration | Degree type |
|------------|--|--------------------|---------------|
| UNSW | Bachelor of Engineering (Honours) (Photovoltaics and Solar Energy) | 4 years | Undergraduate |
| UNSW | Bachelor of Engineering (Honours) (Renewable Energy) | 4 years | Undergraduate |
| UTS | Bachelor of Engineering (Honours) Renewable Energy (Engineering) | 4 years | Undergraduate |

Source: Non-exhaustive list of specialisation units obtained from universities and through desktop research. Units are accurate as of 31 August 2023.

Table 4: List of postgraduate pathways in renewable energy

| University | Course Title | Full-time duration |
|----------------------------------|--|--------------------|
| Australian National University | Master of Engineering in Renewable Energy | 2 years |
| Curtin University | Energy Futures Specialisation (MBA) | 2 years |
| Curtin University | Master of Science (Minerals and Energy Economics), Master of Business Administration | 2.5 years |
| Curtin University | Master of Professional Engineering (Emerging Power Systems) | 2 years |
| Federation University | Master of Engineering Technology (Renewable Energy and Electrical Power Systems) | 2 years |
| Murdoch University | Master of Renewable and Sustainable Energy | 2 years |
| Queensland University Technology | Master of Renewable Energy | 1.5 years |
| RMIT | Graduate Certificate in Sustainable Engineering | 0.5 years |
| RMIT | Master of Engineering (Electrical and Electronic Engineering) | 2 years |
| RMIT | Master of Engineering (Sustainable Energy) | 2 years |
| UNSW | Master of Engineering (Renewable Energy) | 2 years |

| University | Course Title | Full-time duration |
|-------------------------------------|--|--------------------|
| UNSW | Master of Engineering Science (Renewable Energy) | 1.5 to 2 years |
| The University of Western Australia | Masters of Renewable and Future Energy | 1.5 to 2 years |
| Victoria University | Master of Engineering | 2 years |

Source: Non-exhaustive list of postgraduate pathways obtained from universities that had provided input following the university roundtable held on 7 June 2023 and a combination of desktop research. Postgraduate pathways are accurate as of 31 August 2023.

Table 5: Example of postgraduate specialisation units delivered by Universities in Australia

| Unit Name | Unit Code | University |
|---|-----------|---------------------------------|
| Wind Energy | ENG6548 | ANU |
| Unconventional and Renewable Energy Technology Economics | ECON6016 | Curtin |
| Resource Sector Management | MGMT6040 | Curtin |
| Principles of Renewable Energy Sources | ENGIN2103 | Federation University Australia |
| Introduction to Hydrogen Technology | ENGIN5305 | Federation University Australia |
| Renewable Energy Systems | MEC5888 | Monash University |
| Renewable Electrical Energy Systems | EEET2335 | RMIT |
| Photovoltaic Systems | MIET2130 | RMIT |
| Renewable and Solar Fuels | MIET2372 | RMIT |
| Electrical Energy Storage Systems | MIET2131 | RMIT |
| Wind and Hydro Power | MIET2373 | RMIT |
| Power Electronics and Renewable Systems | ELEC6251 | University of Newcastle |
| Renewable Energy Conversion | MECH6760 | University of Newcastle |
| Fundamentals and Design of Electrochemical Energy Storage Systems | MECH3700 | UNSW |

| Unit Name | Unit Code | University |
|--|-----------|---------------------|
| Advanced Photovoltaics | SOLA9101 | UNSW |
| Hybrid Renewable Energy Systems | SOLA9104 | UNSW |
| Mineral Processing | MINE8820 | UNSW |
| Renewable and Distributed Power Generation | EEET5012 | UniSA |
| Power Electronics and Applications | ELEC9204 | USYD |
| Introduction to Sustainable Microgrids | 42090 | UTS |
| Advanced Energy Conversion Systems | 42091 | UTS |
| Advanced Power Electronics | 42092 | UTS |
| Electrical Power Systems, Analysis and Operation | NNM6001 | Victoria University |
| Electric Energy Systems Protection and Communication | NNM6002 | Victoria University |
| Alternative Energy Systems and power Electronics | NNM6005 | Victoria University |

Source: Non-exhaustive list of specialisation units obtained from universities and through desktop research. Units are accurate as of 31 August 2023.

Table 6: List of VET electives within the Renewable Energy sector

| VET Elective | Unit Name | RTO's delivering current unit | Qualification Status | Enrolments | Superseded Unit | Superseded enrolments | RTO's delivering superseded unit |
|--------------|---|-------------------------------|----------------------|------------|-----------------|-----------------------|----------------------------------|
| UEEAS0007 | Assemble, mount and connect control gear and switchgear | 68 | Current | 36 | UEENEEA110A | 3,764 | 56 |
| UEEAS0009 | Mount and wire control panel equipment | 68 | Current | 489 | UEENEEA113A | 4,794 | 56 |
| UEECS0033 | Use engineering applications software on personal computers | 98 | Current | 105 | UEENEEA104A | 25,637 | 61 |
| UEEEC0075 | Troubleshoot single phase input d.c power supplies | 84 | Current | 191 | UEENEEH111A | 5,497 | - |
| UEEEL0016 | Provide advice on effective and energy efficient lighting products | 69 | Current | 57 | UEENEEG181A | 22 | 58 |
| UEEEL0039 | Design, install and verify compliance and functionality of general electrical installations | 63 | Current | 1,380 | UEENEEG105A | 79,103 | 56 |
| UEEEL0046 | Find and repair faults in LV d.c. electrical apparatus and circuits | 70 | Current | - | UEENEEG110A | 476 | 56 |
| UEEEL0055 | Overhaul and repair major switchgear and control gear | 68 | Current | - | UEENEEG129A | 112 | 56 |
| UEEEL0069 | Select and arrange equipment for special LV electrical installations | 70 | Current | 19 | UEENEEG120A | 1,195 | 57 |

| VET Elective | Unit Name | RTO's delivering current unit | Qualification Status | Enrolments | Superseded Unit | Superseded enrolments | RTO's delivering superseded unit |
|--------------|---|-------------------------------|----------------------|------------|-----------------|-----------------------|----------------------------------|
| UEEIC0002 | Assemble, enter and verify operating instructions in microprocessor equipped devices | 85 | Current | 532 | UEENEEI116A | 8,260 | 58 |
| UEEIC0024 | Plan the electrical installation of integrated systems | 79 | Current | 5 | UEENEEI140A | 48 | 57 |
| UEERA0049 | Install and start up single head split air conditioning and water heating heat pump systems | 86 | Current | 1,239 | UEENEEJ105A | 18,511 | 65 |
| UEERE0022 | Solve basic problems in photovoltaic energy apparatus and systems | 26 | Deleted | 2,018 | UEENEEK125A | 15,384 | 57 |
| UEERE0025 | Carry out basic repairs to renewable energy (RE) apparatus | 18 | Deleted | 229 | UEENEEK123A | 2,206 | - |
| UEERE0035 | Install ELV Stand-alone Photovoltaic Power Systems | 16 | Deleted | 219 | UEENEEK134A | 2,029 | - |
| UEERE0046 | Solve Problems in stand-alone Renewable Energy (RE) systems | 16 | Deleted | 222 | UEENEEK128A | 2,058 | - |
| UEERE0048 | Verify compliance and functionality of an extra-low voltage renewable energy installation | 1 | Deleted | - | UEENEEK149A | 3 | - |
| UEERE0049 | Apply safe work practices in the rooftop solar industry | 69 | Current | 14 | New | - | - |

| VET Elective | Unit Name | RTO's delivering current unit | Qualification Status | Enrolments | Superseded Unit | Superseded enrolments | RTO's delivering superseded unit |
|--------------|---|-------------------------------|----------------------|------------|-----------------|-----------------------|----------------------------------|
| UEERE0050 | Identify and isolate multiple supply systems | 15 | Current | - | New | - | - |
| UEERE0051 | Apply electrical principles to renewable energy design | 3 | Current | - | New | - | - |
| UEERE0054 | Conduct site survey for grid connected photovoltaic and battery storage systems | 73 | Current | - | New | - | - |
| UEERE0055 | Conduct site survey for off grid photovoltaic/generating set systems | 10 | Current | - | New | - | - |
| UEERE0056 | Coordinate maintenance of renewable energy (RE) apparatus and systems | 5 | Current | - | UEERE0027 | - | 2 |
| UEERE0057 | Coordinate the design of micro-grid renewable energy systems (Release 1) | 1 | Current | - | New | - | - |
| UEERE0058 | Coordinate the installation, fault finding and repair of micro grid systems (Release 1) | 1 | Current | - | New | - | - |
| UEERE0060 | Design grid-connected battery storage systems | 15 | Current | - | UEERE5001 | 4,646 | 22 |
| UEERE0061 | Design grid-connected photovoltaic power supply systems | 19 | Current | - | UEERE0011 | 1,708 | 31 |

| VET Elective | Unit Name | RTO's delivering current unit | Qualification Status | Enrolments | Superseded Unit | Superseded enrolments | RTO's delivering superseded unit |
|--------------|--|-------------------------------|----------------------|------------|-----------------|-----------------------|----------------------------------|
| UEERE0063 | Design off grid photovoltaic/generating set systems | 9 | Current | - | UEERE0031 | 219 | 17 |
| UEERE0064 | Design renewable energy heating systems | 9 | Current | - | UEERE0030 | 460* | 8 |
| UEERE0067 | Develop engineering solutions to renewable energy (RE) problems (Release 1) | 4 | Current | - | UEERE0033 | 804* | 8 |
| UEERE0069 | Diagnose and rectify faults in renewable energy (RE) control systems | 5 | Current | - | UEERE0034 | 2 | 7 |
| UEERE0070 | Fault find and repair grid connected photovoltaic power supply systems | 7 | Current | - | New | - | - |
| UEERE0071 | Fault find and repair off-grid photovoltaic/generating set systems to an electrical installation (Release 1) | 6 | Current | - | New | - | - |
| UEERE0072 | Inspect grid connected renewable energy systems | 2 | Current | - | New | - | - |
| UEERE0074 | Inspect off-grid renewable energy systems (Release 1) | 1 | Current | - | New | - | - |

| VET Elective | Unit Name | RTO's delivering current unit | Qualification Status | Enrolments | Superseded Unit | Superseded enrolments | RTO's delivering superseded unit |
|--------------|---|-------------------------------|----------------------|------------|---------------------|-----------------------|----------------------------------|
| UEERE0075 | Install and maintain micro hydro energy systems to power conversion equipment | 5 | Current | - | UEERE0037/UEERE0039 | 55 | 4 |
| UEERE0077 | Install battery storage equipment power conversion equipment to grid | 70 | Current | - | UEERE4001 | 4,905 | 26 |
| UEERE0078 | Install battery storage to power conversion equipment | 70 | Current | - | UEERE4001 | 4,905 | 26 |
| UEERE0079 | Install off grid power conversion equipment to electrical installation | 7 | Current | - | New | - | - |
| UEERE0080 | Install photovoltaic power conversion equipment to grid | 72 | Current | - | New | - | - |
| UEERE0081 | Install photovoltaic systems to power conversion equipment | 72 | Current | - | UEERE0016 | 1,766 | 21 |
| UEERE0082 | Maintain renewable energy apparatus | 6 | Current | - | New | - | - |
| UEERE0084 | Manage renewable energy (RE) projects | 1 | Current | - | UEERE0042 | 92 | - |
| UEERE0085 | Plan renewable energy (RE) projects | 1 | Current | - | UEERE0044 | 94 | - |
| UEPOPS064 | Monitor Climatic Conditions for Renewable Energy Production | 6 | Current | - | UEPOPS359 | 76 | - |

| VET Elective | Unit Name | RTO's delivering current unit | Qualification Status | Enrolments | Superseded Unit | Superseded enrolments | RTO's delivering superseded unit |
|--------------|---|-------------------------------|----------------------|------------|-----------------|-----------------------|----------------------------------|
| UEPOPS148 | Operate and monitor local grid operations control room | 5 | Current | - | New | - | - |
| UEPOPS152 | Operate Renewable Energy Generation and Storage systems | 5 | Current | - | New | - | - |
| UETDRIS032 | Solve problems in network equipment | 73 | Current | - | UETDRIS67 | 12,041 | 21 |
| UETDRIS033 | Solve problems in network protection | 70 | Current | - | UETDRIS68 | 4,222 | 10 |
| UETDRSB007 | Install and maintain substation direct current systems | 66 | Current | 4 | UETDRSB23 | 169 | 2 |
| VU22123 | Undertake site assessment for installation of a grid-connected renewable energy generation system | 4 | Current | 497 | - | - | - |
| VU22124 | Design a grid connected photovoltaic energy generation system to meet client requirements | 4 | Current | 277 | - | - | - |
| VU22125 | Design a grid-connected battery storage system to meet client requirements | 4 | Current | 317 | - | - | - |
| VU22744 | Work safely in the solar industry | 14 | Current | 5,599 | - | - | - |

Source: Training.gov.au, NCVET Total VET Activity Data 2023 on 13 September 2023. Where a unit of competency has been deleted, the superseded unit of competency has been included as a reference point.*Indicates that the enrolment numbers are from the previous iteration of the superseded course.