

The University of New South Wales
The University of New South Wales

School of Electrical Engineering
and Telecommunications

Recommended BE in EE Program (3640)

BE in Electrical Engineering (3640) – New program structure from Year 2006 – Recommended EE Program

| Year 1 – Session 1 | | | | | |
|---------------------------|--|--|----------|-------|--|
| MATH1131 or MATH1141 | Mathematics 1A or Higher Mathematics 1A | | 6 hrs/wk | 6 uoc | |
| PHYS1131 | Higher Physics 1A | | 6 hrs/wk | 6 uoc | |
| COMP1911 or COMP1917 | Computing 1 or Higher Computing 1 | | 6 hrs/wk | 6 uoc | |
| ENGG1000 | Introduction to Engineering Design and Innovation | | 6 hrs/wk | 6 uoc | |

| Year 1 – Session 2 | | | | | |
|---------------------------|--|-------------------------------------|----------|-------|------------------|
| MATH1231 or MATH1241 | Mathematics 1B or Higher Mathematics 1B | Pre-requisite: MATH1131 or MATH1141 | 6 hrs/wk | 6 uoc | |
| PHYS1231 | Higher Physics 1B | Pre-requisite: PHYS1131 | 6 hrs/wk | 6 uoc | |
| COMP1921 or COMP1927 | Data Structures and Algorithms or Higher Data Structures & Algorithms | Pre-requisite: COMP1911 or COMP1917 | 6 hrs/wk | 6 uoc | |
| ELEC1111 | Electrical & Telecommunications Eng. | | 6 hrs/wk | 6 uoc | Offered in S1/S2 |

| Year 2 – Session 1 | | | | | |
|---------------------------|---------------------------|---|----------|-------|------------------|
| MATH2069 | Mathematics 2A | Pre-requisite: MATH1231 | 6 hrs/wk | 6 uoc | |
| ELEC2141 | Digital Circuit Design | Pre-requisite: ELEC1111 | 6 hrs/wk | 6 uoc | Offered in S1/S2 |
| ELEC2134 | Circuits and Signals | Pre-requisite: MATH1231 or MATH1241 Co-requisite: ELEC1111 | 6 hrs/wk | 6 uoc | Offered in S1/S2 |
| GENxxxxx | General Education courses | | | 6 uoc | |

| Year 2 – Session 2 | | | | | |
|---------------------------|---------------------------|--------------------------------------|----------|-------|------------------|
| MATH2099 | Mathematics 2B | Pre-requisite: MATH1231 | 6 hrs/wk | 6 uoc | |
| ELEC2142 | Embedded Systems Design | Pre-requisite: ELEC2141 and COMP1921 | 6 hrs/wk | 6 uoc | Offered in S1/S2 |
| ELEC2133 | Analogue Electronics | Pre-requisite: ELEC2134 | 6 hrs/wk | 6 uoc | Offered in S1/S2 |
| GENxxxxx | General Education courses | | | 6 uoc | |

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| Year 3 – Session 1 | | | | | |
|---------------------------|--|--------------------------------------|----------|-------|---------------|
| ELEC3115 | Electromagnetic Engineering | Pre-requisite: PHYS1231 and MATH2069 | 5 hrs/wk | 6 uoc | Offered in S1 |
| ELEC3106 | Electronics | Pre-requisite: ELEC2133 and ELEC2141 | 5 hrs/wk | 6 uoc | Offered in S1 |
| ELEC3104 | Digital Signal Processing | Pre-requisite: ELEC2134 | 5 hrs/wk | 6 uoc | Offered in S1 |
| Elective | L3 Elective course (see the L3 list below) | | 5 hrs/wk | 6 uoc | |

| Year 3 – Session 2 | | | | | |
|---------------------------|--|--------------------------------------|----------|-------|---------------|
| ELEC3105 | Electrical Energy | Pre-requisite: ELEC3115 and ELEC2134 | 5 hrs/wk | 6 uoc | Offered in S2 |
| ELEC3114 | Control Systems | Pre-requisite: ELEC2134 | 5 hrs/wk | 6 uoc | Offered in S2 |
| ELEC3117 | Electrical Engineering Design | Pre-requisite: ELEC2133 | 5 hrs/wk | 6 uoc | Offered in S2 |
| Elective | L3 Elective course (see the L3 list below) | | 5 hrs/wk | 6 uoc | |

| L2 Electives | | | | | |
|---------------------|--------------------------------------|-------------------------------------|----------|-------|-------------------|
| ELEC2145 | Real Time Instrumentation | Pre-requisite: COMP1911 & ELEC2134 | 5 hrs/wk | 6 uoc | Offered in S2 |
| ELEC2146 | Engineering Modelling and Simulation | Pre-requisite: COMP1911 & ELEC2134 | 5 hrs/wk | 6 uoc | Offered in S2 |
| COMP2041 | Software Construction | Pre-requisite: COMP1921 or COMP1927 | 5 hrs/wk | 6 uoc | Offered in S1 & 2 |

| L3 Elective courses list | | | | | |
|---------------------------------|---|--|----------|-------|---------------|
| TELE3118 | Network Technologies | Pre-requisite: ELEC2142 | 5 hrs/wk | 6 uoc | Offered in S1 |
| TELE3113 | Analogue and Digital Communications | Pre-requisite: ELEC2134 | 5 hrs/wk | 6 uoc | Offered in S2 |
| TELE3119 | Trusted Networks | Pre-requisite: TELE3118 | 5 hrs/wk | 6 uoc | Offered in S2 |
| MATH3411 | Information, Codes and Ciphers | | | 6 uoc | |
| MATH3101 | Computational Mathematics | Pre-requisite: MATH2069 & MATH2099 | 5 hrs/wk | 6 uoc | Offered in S1 |
| MATH3121 | Mathematical Methods and Partial Differential Equations | Pre-requisite: MATH2069 & MATH2099 | 5 hrs/wk | 6 uoc | Offered in S2 |
| MATH3161 | Optimization | Pre-requisite: MATH2069 & MATH2099 | 5 hrs/wk | 6 uoc | Offered in S1 |
| MATH3201 | Dynamical Systems and Chaos | Pre-requisite: MATH2069 & MATH2099 | 5 hrs/wk | 6 uoc | Offered in S1 |
| MATH3261 | Fluids, Oceans and Climate | Pre-requisite: MATH2069 & MATH2099 | 5 hrs/wk | 6 uoc | Offered in S2 |
| COMP3211 | Computer Architecture | Pre-requisite: COMP2021 & COMP3222 ELEC2041 | 5 hrs/wk | 6 uoc | Offered in S2 |
| COMP3231 | Operating Systems | Pre-requisite: COMP1921 or COMP1927 & COMP2121 or ELEC2142. | 5 hrs/wk | 6 uoc | Offered in S1 |

| Year 4 – Session 1 | | | | | |
|---------------------------|--|--|----------|-------|------------------|
| ELEC4120 | Thesis A | Pre-requisite: ELEC3117 and 120 UOC | 4 hrs/wk | 6 uoc | Offered in S1/S2 |
| ELEC4123 | Electrical Design Proficiency | Pre-requisite: all 3 rd year's core courses | 5 hrs/wk | 6 uoc | Offered in S1/S2 |
| Elective | L4 Elective course (see the L4 list below) | | | 6 uoc | |
| Elective | L4 Elective course (see the L4 list below) | | | 6 uoc | |

| Year 4 – Session 2 | | | | | |
|---------------------------|--|-------------------------|----------|-------|------------------|
| ELEC4121 | Thesis B | Pre-requisite: ELEC4120 | 5 hrs/wk | 6 uoc | Offered in S1/S2 |
| ELEC4122 | Strategic Leadership and Ethics | Pre-requisite: 120 uoc | 5 hrs/wk | 6 uoc | Offered in S2 |
| Elective | L4 Elective course (see the L4 list below) | | | 6 uoc | |
| Elective | L4 Elective course (see the L4 list below) | | | 6 uoc | |

| L4 Elective courses list | | | | | |
|---------------------------------|--|-------------------------|----------|-------|---------------|
| Group 1 | Microelectronics | | | | |
| ELEC4601 | Digital and Embedded Systems | Pre-requisite: ELEC3106 | 4 hrs/wk | 6 uoc | Offered in S2 |
| ELEC4602 | Microelectronics Design and Technology | Pre-requisite: ELEC3106 | 4 hrs/wk | 6 uoc | Offered in S2 |
| ELEC4603 | Solid-State Electronics | Pre-requisite: ELEC2133 | 4 hrs/wk | 6 uoc | Offered in S1 |
| ELEC4604 | RF Electronics | Pre-requisite: ELEC3106 | 4 hrs/wk | 6 uoc | Offered in S1 |
| | | | | | |
| Group 2 | Energy Systems | | | | |
| ELEC4611 | Power System Equipment | Pre-requisite: ELEC3105 | 4 hrs/wk | 6 uoc | Offered in S1 |
| ELEC4612 | Power System Analysis | Pre-requisite: ELEC3105 | 4 hrs/wk | 6 uoc | Offered in S2 |
| ELEC4613 | Electrical Drive Systems | Pre-requisite: ELEC3105 | 4 hrs/wk | 6 uoc | Offered in S2 |
| ELEC4614 | Power Electronics | Pre-requisite: ELEC2133 | 4 hrs/wk | 6 uoc | Offered in S1 |
| | | | | | |
| Group 3 | Signal Processing | | | | |
| ELEC4621 | Advanced Digital Signal Processing | Pre-requisite: ELEC3104 | 4 hrs/wk | 6 uoc | Offered in S1 |
| ELEC4622 | Multimedia Signal Processing | Pre-requisite: ELEC3104 | 4 hrs/wk | 6 uoc | Offered in S2 |
| ELEC4623 | Biomedical Instrumentation, Measurement and Design | Pre-requisite: ELEC3104 | 4 hrs/wk | 6 uoc | Offered in S2 |
| | | | | | |
| Group 4 | Systems and Control | | | | |
| ELEC4631 | Continuous-Time Control System Design | Pre-requisite: ELEC3114 | 4 hrs/wk | 6 uoc | Offered in S1 |

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|----------------|--|-------------------------|----------|-------|---------------|
| ELEC4632 | Computer Control Systems | Pre-requisite: ELEC3114 | 4 hrs/wk | 6 uoc | Offered in S2 |
| ELEC4633 | Real Time Engineering | Pre-requisite: ELEC3114 | 4 hrs/wk | 6 uoc | Offered in S1 |
| | | | | | |
| Group 5 | Data and Mobile Communications | | | | |
| TELE4651 | Wireless Communication Technologies | Pre-requisite: TELE3113 | 4 hrs/wk | 6 uoc | Offered in S2 |
| TELE4652 | Mobile and Satellite Communication Systems | Pre-requisite: TELE3113 | 4 hrs/wk | 6 uoc | Offered in S2 |
| TELE4653 | Digital Modulation and Coding | Pre-requisite: TELE3113 | 4 hrs/wk | 6 uoc | Offered in S1 |
| TELE4642 | Network Performance | Pre-requisite: TELE3118 | 4 hrs/wk | 6 uoc | Offered in S1 |
| | | | | | |
| Group 6 | Photonics | | | | |
| PHTN4661 | Optical Circuits and Fibres | Pre-requisite: ELEC3115 | 4 hrs/wk | 6 uoc | Offered in S1 |
| PHTN4662 | Photonic Networks | Pre-requisite: TELE3113 | 4 hrs/wk | 6 uoc | Offered in S2 |
| | | | | | |
| Group 7 | Business Administration | | | | |
| ELEC4445 | Entrepreneurial Engineering | Pre-requisite: 132 uoc | 4 hrs/wk | 6 uoc | Offered in S2 |

Notes:

- This model allows students to take two L3 electives and four L4 electives, thus providing the depth and breadth required for an Electrical Engineering Degree.
- L3 courses may be drawn from other schools and faculties as well as Telecommunications and Photonic Engineering core courses.
- L4 electives are provided from the six disciplines within the School.
- One L3 course may be substituted by a L2 elective.

Rules governing substitutions, pre-requisites and student exchanges

To suit the special abilities or needs of individual students a limited number of course substitutions are permitted within each program. Any such substitution must have prior approval of the Head of School.

- Substitutions must be of at least the same length and level as the prescribed course.
- Core courses may not be substituted with other courses.
- Substitution is not normally permitted if it unduly restricts the range of courses studied to only one area of specialisation.
- Progression to 'next level' courses is not permitted without satisfying the nominated pre-requisites.
- In the case of a combined degree program, accreditation of any course in more than one program is not permitted.
- Prior School consent is required for any accredited substitution. This includes any courses taken from other schools at the student's own initiative.
- Substitution is not normally permitted in the first two years of the program.
- Substitution of one postgraduate course within the School is permitted, provided a similar course is not offered at the undergraduate level.
- Student exchanges are permitted, and students are encouraged to organise their exchange in the second session of their third year in order to simplify the process of accrediting substitutions.

Rules Governing Elective Courses

L3 and L4 electives provide the breadth and the depth required for an Electrical, Telecommunications and Photonic Engineering Degree. These electives are provided from the six disciplines within the School. In addition, L3 electives include courses from other Schools. Students must have completed at least 36 units of credit of 4th year core and L4 elective courses in order to satisfy the requirements for graduation. Therefore students should choose their L3 and L4 electives accordingly.

Note: Students are not permitted to count more than 60 units of credit (excluding the 12 units of general education courses) of 1st year courses towards the degree, as the required breadth and depth of the Electrical/Telecom/Photonics engineering program would not be obtained otherwise.

Industrial Training

All students are required to undertake mandatory industrial training. Each student is personally responsible for arranging and completing the full 60 days compulsory industrial training prescribed as part of the requirements for the award of the degree. Industrial training should be concurrent with enrolment and is best accumulated in the summer recesses at the end of the second and third years of the program, but it must be completed before graduating. Industrial training should be in the area of engineering design and/or project work, but limited credit may be given for work of a non-engineering nature. It is preferable that all 60 days be completed with one or two organisations. Students should, in general, work with professional engineers and take an active part in their work in the design of equipment, solving of engineering problems, or any other work that is relevant to the profession of Engineering.

Students are required to submit a written report on their industry placements, typically 2000-3000 words, describing the organisation of the Company, summarising the work done and the training received. The report must be accompanied by certification of their industrial placement by a senior company representative.

Industrial Training will be assessed as a compulsory part of the course ELEC4122 Strategic Leadership and Ethics. Students must complete the industrial training requirement in order to receive a completed assessment for this course, but the industrial training assessment does not affect the mark received for ELEC4122.

General Education Rules

In order to effectively broaden students' non-technical skills and knowledge, the students must complete 12 UOC of general education, normally in the form of four 3 UOC courses from four different schools. However, one 6 UOC course (e.g. a language) from a single school may be taken providing the further two 3 UOC courses are taken from different schools. The School maintains a list of courses that cannot be taken by students towards their 12 UOC general education quota. These courses are technical in nature and overlap with the core program content.

General education courses must be taken at UNSW. Exemptions are not given for students taking such courses from other institutions or educational organizations without prior consent from the School. Credit for general education courses taken at other institutions before commencing studies at UNSW will not be permitted. The exception to this rule is advanced standing students who have completed suitable substitutes as deemed acceptable by the School.

Transfer from Other Programs/Advanced Standing Students/Mid-Year Entry

The introduction of year 1 (L1), year 3 (L3) and year 4 (L4) electives accommodates students who are transferring from another program, are advanced standing or are in mid-year entry, as it allows them to complete required number of units of credit within the stipulated time of the normal program.