

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

School of Electrical Engineering  
and Telecommunications

**BE (EE) / Biomed E 3727**

**BE in Electrical Engineering/MBiomed E (3727) – New program structure from Year 2006 onwards**

<i>Year 1 – Session 1</i>					
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	

<i>Year 1 – Session 2</i>					
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	
BIOM1010	Engineering in Biology and Medicine		6 hrs/wk	4 uoc	Offered in S2

<i>Year 2 – Session 1</i>					
MATH2069	Mathematics 2A	Pre-requisite: MATH1231	6 hrs/wk	6 uoc	
MATS1101	Engineering Materials and Chemistry		6 hrs/wk	6 uoc	Offered in S1
ELEC2134	Circuits and Signals	Pre-requisite: MATH1231 or MATH1241 Co-requisite: ELEC1111	6 hrs/wk	6 uoc	Offered in S1/S2
ELEC1111	Electrical & Telecommunications Engin.		6 hrs/wk	6 uoc	

<i>Year 2 – Session 2</i>					
MATH2099	Mathematics 2B	Pre-requisite: MATH1231	6 hrs/wk	6 uoc	
GENxxxxx	General Education Courses		6 hrs/wk	6 uoc	Offered in S1/S2
ELEC2133	Analogue Electronics	Pre-requisite: ELEC2134	6 hrs/wk	6 uoc	Offered in S1/S2
BIOM9420	Clinical Laboratory Science		3 hrs/wk	6 uoc	Offered in S2

<b>Year 3 – Session 1</b>					
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
ELEC2141	Digital Circuit Design	Pre-requisite: ELEC1111	6 hrs/wk	6 uoc	Offered in S1
PHPH2121	Principles of Physiology A		6 hrs/wk	6 uoc	

<b>Year 3 – Session 2</b>					
ELEC3105	Electrical Energy	Pre-requisite: ELEC3115 and ELEC2134	5 hrs/wk	6 uoc	Offered in S2
PHPH2221 or BIOM9xxx	Principles of Physiology B or Elective		6 hrs/wk	6 uoc	Offered in S2
ELEC3117	Electrical Engineering Design	Pre-requisite: ELEC2133	5 hrs/wk	6 uoc	Offered in S2
ELEC2142	Embedded Systems Design	Pre-requisite: ELEC2141 and COMP1921	6 hrs/wk	6 uoc	Offered in S2

<b>L2 Electives</b>					
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

<b>L3 Elective courses list</b>					
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 &	5 hrs/wk	6 uoc	Offered in S1

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		COMP2121 or ELEC2142.			

***Year 4 – Session 1***

ELEC3104	Digital Signal Processing	Pre-requisite: ELEC2134	5 hrs/wk	6 uoc	Offered in S1
ELEC4123	Electrical Design Proficiency	Pre-requisite: ELEC 3106/ 3114/ 3104/ 3105/ 3117 (all 3 <sup>rd</sup> year's core courses)	5 hrs/wk	6 uoc	Offered in S1/S2
BIOM9xxx	BIOM9xxx Postgraduate Elective		3 hrs/wk	6 uoc	
Elective	L4 Elective course (see theL4 list below)			6 uoc	

***Year 4 – Session 2***

BIOM5910	Thesis A		5 hrs/wk	6 uoc	Offered in S1/S2
ELEC3114	Control Systems	Pre-requisite: ELEC2134	5 hrs/wk	6 uoc	Offered in S2
ELEC4122	Strategic Leadership & Ethics	Pre-requisite: 120 UOC	5 hrs/wk	6 uoc	Offered in S2
BIOMxxxx	Biomed Elective			6 uoc	

***Year 5 – Session 1***

BIOM5911	Thesis B		5 hrs/wk	6 uoc	Offered in S1/S2
ELECxxxx	L4 Elective course (see theL4 list below)			6 uoc	
BIOMxxxx	Biomed Elective			6 uoc	
ELECxxxx	L4 Elective course (see the L4 list below)			6 uoc	

***Year 5 – Session 2***

BIOM9914	Thesis C or 2 Biom electives			12 uoc	
BIOMxxxx	Biomed Elective			6 uoc	
BIOM9410	Regulatory Requirements of Biomedical Technology		3 hrs/wk	6 uoc	

***L4 Elective courses list***

<b><i>Group 1</i></b>	<b><i>Microelectronics</i></b>				
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
<b>Group 2</b>	<b>Energy Systems</b>				
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
<b>Group 3</b>	<b>Signal Processing</b>				
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
<b>Group 4</b>	<b>Systems and Control</b>				
ELEC4631	Continuous-Time Control System Design	Pre-requisite: ELEC3114	4 hrs/wk	6 uoc	Offered in S1
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
<b>Group 5</b>	<b>Data and Mobile Communications</b>				
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
<b>Group 6</b>	<b>Photonics</b>				
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
<b>Group 7</b>	<b>Business Administration</b>				
ELEC4445	Entrepreneurial Engineering	Pre-requisite: 132 uoc	4 hrs/wk	6 uoc	Offered in S2

### **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 4<sup>th</sup> 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 1<sup>st</sup> 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

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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 - The GE rules are not for the combined degree students**

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.