

Bachelor of Nanotechnology

Coordinators of Degree Program:

In the School of Chemistry:

Marc in het Panhuis (Room 18.130, Telephone 4221 3155)

In the School of Mechanical, Materials and Mechatronic Engineering:

Professor Geoff Spinks (Room 1.111, Telephone 4221 3010)

This interdisciplinary Honours degree in Nanotechnology is a joint offering from the Faculties of Engineering and Science. The degree targets the emerging field of nano-materials, molecular machines and nano-science.

The course draws on major research strengths at UOW including: the Intelligent Polymer Research Institute, the Institute for Superconducting and Electronic Materials, the BlueScope Steel Metallurgy Centre, and the ARC Centre for Nanostructured Electromaterials. One of the main aims is to produce high quality graduates to feed into postgraduate programs within UOW research units.

This course has a materials chemistry focus with possible elective subjects in physics, engineering (e.g. mechatronics) and biology. There are a total of five elective subjects giving students scope to match the course to their interests whilst retaining a core focus on molecular design and characterization of materials at the nano-dimension. The course includes four specially designed subjects that are mainly research oriented and combine lectures, laboratory and project work. This gives students from first year onwards a taste of where leading research in nanotechnology is heading.

Nanotechnology is set to revolutionize Materials Science/Engineering in the 21st Century. It is already impacting on our lives in areas such as Health and Communications. Students will acquire a firm foundation in materials chemistry and engineering which will enable them to find careers in a wide range of industries and research settings. In addition, the prime focus on the use of nano-scale technologies and molecular architecture will give graduates an edge in the market as more industries implement some of the advances in the nanotechnology revolution. The degree has a high research project component and a major thesis in 4th year. Students are exposed to the possibilities that nano-science has to offer from the first year. From their first year onwards students will work alongside researchers in leading research Institutes and develop their laboratory skills and understanding of this emerging field.

Nanotechnology Course Structure		cps	Session
Year 1			
CHEM101	Chemistry 1A	6	1
CHEM102	Chemistry 1B	6	2
MATH187/141	General Mathematics 1A Part 1 / 1C Part 1	6	1
MATH188/142	General Mathematics 1A Part 2 / 1C Part 2	6	2
ENGG153	Engineering Materials	6	1
NANO101	Current Perspectives in Nanotechnology	6	2
PHYS141	Fundamentals of Physics A	6	1
PHYS142	Fundamentals of Physics B	6	2
Total for major at 100-level		48	
Year 2			
		cps	Session
CHEM211	Inorganic Chemistry II	6	1
CHEM212	Organic Chemistry II	6	1
CHEM213	Molecular Structure, Reactivity and Change	6	2
MATE201	Structure and Properties of Materials	6	1
NANO201	Research Topics in Nanotechnology	6	2
PHYS205	Advanced Modern Physics	6	1

Plus two of the following electives:

Materials Chemistry Stream

CHEM214	Analytical and Environmental Chemistry	6	2
MATE204	Mechanical Behaviour and Fracture	6	2
Physics Stream			
MATH212	Applied Mathematical Modelling	6	2
PHYS215	Vibrations, Waves and Optics	6	2
Mechatronics Stream			
ENGG152	Engineering Mechanics	6	2
ENGG154	Engineering Design for Innovation	6	2
Other subject options			
BIOL103	Molecules, Cells and Organisms	6	2
STAT252	Statistics for the Natural Sciences	6	2
Total for major at 200-level		48	
Year 3		cps	Session
CHEM301	Advanced Materials and Nanotechnology	8	2
CHEM364	Molecular Structure and Spectroscopy	8	1
MATE202	Thermodynamics and Phase Equilibria	6	1
MATE303	Ceramics, Glasses and Refractories	6	2
NANO301	Research Project in Nanomaterials	8	1
<i>Plus two of the following electives:</i>			
Materials Chemistry Stream			
CHEM314	Instrumental Analysis	8	1
CHEM320	Bioinformatics: from Genome to Structure	8	2
CHEM321	Organic Synthesis and Reactivity	8	2
MATE301	Engineering Alloys	6	1
MATE306	Degradation of Materials	6	2
Physics Stream			
PHYS305	Quantum Mechanics	6	1
PHYS363	Advanced Photonics	6	2
PHYS396	Electronic Materials	6	2
Mechatronics Stream			
ENGG251	Mechanics of Solids	6	1
MATE291	Engineering Computing & Laboratory Skills	6	1
MECH215	Fundamentals of Machine Component Design	6	2
Other electives:			
BIOL213	Principles of Biochemistry	6	1
BIOL214	The Biochemistry of Energy & Metabolism	6	2
Total for major at 300-level		48	

Year 4		cps	Session
MATE302	Polymeric Materials	6	1
MATE411	Advanced Materials	6	1
NANO401	Major Project Thesis in Nanotechnology	24	A
MATE412/PHYS396	Electronic Materials	6	2
<i>Plus one elective from the General Schedule</i>		6	
Total for major at 400-level		48	
Degree Total		192	

AWARD OF HONOURS FOR THE BNanotech DEGREE

Honours is awarded on completion of the fourth year on academic performance assessed by calculating a weighted average mark for all 300 level and 400 level subjects. The weighting reflecting the level of the subject will be 1 for 300 level and 4 for 400 level subjects.

The approved ranges of marks for the award of Honours grades is:

Honours Class I	80 to 100%
Honours Class II, Division 1	72.5 to less than 80%
Honours Class II, Division 2	65 to less than 72.5%
Pass degree	50 to less than 65%

The regulations governing the award of Honours and the formula used for the calculation of the final grade is set out in the Course Rules in the University's Online Course Handbook: www.uow.edu.au/handbook

Postgraduate Studies

Students completing the BNanotechnology degree would be eligible to undertake higher degree (MSc/PhD) studies in Nanotechnology, particularly in the Intelligent Polymer Research Institute in which a number of academic staff from Chemistry and Materials Engineering are engaged.

Bachelor of Nanotechnology (Advanced)

Students entering with at least 90 UAI or equivalent, can enrol in the Bachelor of Nanotechnology (Advanced) degree. See Section 7.4 for details. Students can transfer to the Bachelor of Nanotechnology (Advanced) degree from the BSc Nanotechnology) or the Bachelor of Nanotechnology after completing 72 credit points of study if they have obtained a distinction average.