

# Bachelor of Science (Nanotechnology)

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The Bachelor of Science (Nanotechnology) is a three-year degree jointly offered by 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 post-graduate programs within UOW research units.

This course has a materials chemistry focus with possible elective subjects in physics, engineering (e.g. mechatronics) and biology. Four elective subjects give 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 three specially designed subjects that are mainly research oriented and combine lectures, laboratory and project work. This will give 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. Students are exposed to the possibilities that nano-science has to offer from the first year. From their first year onwards students work alongside researchers in leading research Institutes and develop their laboratory skills and understanding of this emerging field.

## **BSc (Nanotechnology) Course Structure**

### **Year 1**

		<b>cps</b>	<b>Session</b>
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
	<b>Total for major at 100-level</b>	<b>48</b>	

### **Year 2**

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 electives chosen In consultation with the Course Coordinator. The following are recommended:*

CHEM214	Analytical and Environmental Chemistry	6	2
MATE204	Mechanical Behaviour and Fracture	6	2

<b>BSc (Nanotechnology) Course Structure</b>		<b>cps</b>	<b>Session</b>
MATH212	Applied Mathematical Modelling	6	2
PHYS215	Vibrations, Waves and Optics	6	2
ENGG152	Engineering Mechanics	6	2
ENGG154	Engineering Design for Innovation	6	2
BIOL103	Molecules, Cells and Organisms	6	2
STAT252	Statistics for the Natural Sciences	6	2
<i>Or other subjects approved by the Course Coordinator</i>			
<b>Total for major at 200-level</b>		<b>48</b>	

### **Year 3**

#### **Core**

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

*Plus two electives chosen in consultation with the Course Coordinator. The following are recommended:*

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
PHYS305	Quantum Mechanics	6	1
PHYS363	Advanced Photonics	6	2
PHYS396	Electronic Materials	6	2
ENGG251	Mechanics of Solids	6	1
MATE291	Engineering Computing and Laboratory Skills	6	1
MECH215	Fundamentals of Machine Component Design	6	2
BIOL213	Principles of Biochemistry	6	1
BIOL214	The Biochemistry of Energy and Metabolism	6	2

*Or other subjects approved by the Course Coordinator*

**Total for major at 300-level** **48**

**Degree Total** **144**

**Honours**

If the required academic standard is attained, the BSc (Nanotechnology) student may transfer to the Bachelor of Nanotechnology fourth Honours year. This consists of special coursework plus a research project. Refer to the BNanotechnology course information in Section 7.3.