

# Bioengineering Systems

<b>Year and Campus:</b>	2010																																		
<b>Coordinator:</b>	Dr David Grayden Department of Electrical and Electronic Engineering																																		
<b>Contact:</b>	<a href="mailto:grayden@unimelb.edu.au">grayden@unimelb.edu.au</a> (mailto:grayden@unimelb.edu.au)																																		
<b>Overview:</b>	<p>Students who complete the Bioengineering Systems major will be able to rigorously integrate the fundamental mathematics of systems modelling with biology, chemistry and physics in the formulation and solution of problems involving biomedical systems. More specifically, core skills and knowledge that will be developed include: fundamental scientific comprehension that will lead to accurate mathematical modelling of biological and engineering systems, analytical and abstract thinking, problem-solving and design skills, ability to carry out laboratory experiments to confirm possible solutions to complex problems. At all levels of this major, we will ensure the development of excellent communication skills that enable our graduates to deliver complex scientific information in a clear and concise fashion. The Bioengineering Systems major will open up pathways for students leading to accredited professional or scientific research careers in biomedical engineering (through further study in the Master in Engineering (Biomedical)), applied mathematics, applied science, teaching, management and finance.</p>																																		
<b>Objectives:</b>	Students completing the program should be able to apply their engineering decision making and modeling skills to a wide range of real-life biomedical systems.																																		
<b>Structure &amp; Available Subjects:</b>	<p>This major consists of:</p> <ul style="list-style-type: none"> <li># 50 credit points at the third year level</li> </ul> <p>In order to complete this major, students have to complete the following pre-requisite requirements:</p> <ul style="list-style-type: none"> <li># 37.5 credit points at the first year level and</li> <li># 25 credit points at the second year level</li> </ul>																																		
<b>Subject Options:</b>	<p><b>First Year:</b></p> <p>* Engineering Systems Design 2 subject to approval (currently Engineering Systems Design 1)</p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>MAST10006 Calculus 2</td> <td>Semester 1, Semester 2</td> <td>12.50</td> </tr> <tr> <td>MAST10007 Linear Algebra</td> <td>Summer Term, Semester 1, Semester 2</td> <td>12.50</td> </tr> <tr> <td>ENGR10003 Engineering Systems Design 2</td> <td>Summer Term, Semester 2</td> <td>12.50</td> </tr> </tbody> </table> <p><b>Second Year:</b></p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>COMP20005 Engineering Computation</td> <td>Semester 1, Semester 2</td> <td>12.50</td> </tr> <tr> <td>MAST20029 Engineering Mathematics</td> <td>Summer Term, Semester 1, Semester 2</td> <td>12.50</td> </tr> </tbody> </table> <p><b>Third Year:</b></p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>BMEN30005 Biomechanics and Biotransport</td> <td>Semester 1</td> <td>12.50</td> </tr> <tr> <td>BMEN30006 Fundamentals of Biosignals</td> <td>Semester 1</td> <td>12.50</td> </tr> <tr> <td>BMEN30007 Biocellular Systems Engineering</td> <td>Semester 2</td> <td>12.50</td> </tr> </tbody> </table>		Subject	Study Period Commencement:	Credit Points:	MAST10006 Calculus 2	Semester 1, Semester 2	12.50	MAST10007 Linear Algebra	Summer Term, Semester 1, Semester 2	12.50	ENGR10003 Engineering Systems Design 2	Summer Term, Semester 2	12.50	Subject	Study Period Commencement:	Credit Points:	COMP20005 Engineering Computation	Semester 1, Semester 2	12.50	MAST20029 Engineering Mathematics	Summer Term, Semester 1, Semester 2	12.50	Subject	Study Period Commencement:	Credit Points:	BMEN30005 Biomechanics and Biotransport	Semester 1	12.50	BMEN30006 Fundamentals of Biosignals	Semester 1	12.50	BMEN30007 Biocellular Systems Engineering	Semester 2	12.50
Subject	Study Period Commencement:	Credit Points:																																	
MAST10006 Calculus 2	Semester 1, Semester 2	12.50																																	
MAST10007 Linear Algebra	Summer Term, Semester 1, Semester 2	12.50																																	
ENGR10003 Engineering Systems Design 2	Summer Term, Semester 2	12.50																																	
Subject	Study Period Commencement:	Credit Points:																																	
COMP20005 Engineering Computation	Semester 1, Semester 2	12.50																																	
MAST20029 Engineering Mathematics	Summer Term, Semester 1, Semester 2	12.50																																	
Subject	Study Period Commencement:	Credit Points:																																	
BMEN30005 Biomechanics and Biotransport	Semester 1	12.50																																	
BMEN30006 Fundamentals of Biosignals	Semester 1	12.50																																	
BMEN30007 Biocellular Systems Engineering	Semester 2	12.50																																	

	BMEN30008 Biosystems Design	Semester 2	12.50
<b>Links to further information:</b>	<p>Those students entering the Bachelor of Biomedicine without VCE Specialist Mathematics can complete the Bioengineering Systems major by completing:</p> <p>620-154 Calculus 1 in first year instead of 620-156 Linear Algebra</p> <p>620-156 Linear Algebra in second year instead of 620-293 Engineering Mathematics</p> <p>620-293 Engineering Mathematics in third year instead of 480-302 Fundamentals of Biosignals</p>		
<b>Notes:</b>	<p>Students wanting to take a Bioengineering Systems major must select:</p> <ul style="list-style-type: none"> <li># 800-001 Engineering Systems Design 1;</li> <li># 620-155 Calculus II; and</li> <li># 620-156 Linear Algebra</li> </ul> <p>in 1st year instead of:</p> <ul style="list-style-type: none"> <li># 620-168 Experimental Design and Data Analysis,</li> <li># Maths; and</li> <li># Physics</li> </ul>		
<b>Related Course(s):</b>	Bachelor of Biomedicine		