

## Subject Description Form

<b>Subject Code</b>	BME41118
<b>Subject Title</b>	<b>Capstone Project</b>
<b>Credit Value</b>	6
<b>Level</b>	4
<b>Prerequisite</b>	BME21111 Biomedical Engineering Research and Design Studies I BME31139 Biomedical Engineering Research and Design Studies II
<b>Objectives</b>	This is a final year 2-semester subject on independent critical studies. This subject builds on particularly the previous subjects of “BME21111 Biomedical Engineering Research and Design Studies I” and “BME31139 Biomedical Engineering Research and Design Studies II” in the preceding years. This subject will provide an opportunity for each student to carry out an independent project on a topic relevant to Biomedical Engineering. The process will demand each student to integrate a number of different subject matters to which he/she has been previously exposed in the programme. Students should have formulated a meaningful research question in Year 3 and, in Year 4, be ready to gain personal experience in attempting to find some appropriate answers to their own questions, given a definite amount of time and resources.
<b>Intended Learning Outcomes</b>	Upon completion of the subject, students will be able to: <ul style="list-style-type: none"> <li>a. Integrate the subjects learned;</li> <li>b. Write a report to present and discuss the results to the team of project supervisors and to their own fellow students;</li> <li>c. Reflect the ability to apply the knowledge learned before to the independent study;</li> <li>d. Deliver an oral presentation of the project and to provide appropriate answers to the questions.</li> </ul>
<b>Contribution to Programme Outcomes (Refer to Part I Section 10)</b>	<ul style="list-style-type: none"> <li>▪ Programme Outcome 1: Demonstrate an ability to apply knowledge of mathematics, science, and engineering appropriate to the Biomedical Engineering (BME) discipline. (Practice and Measure)</li> <li>▪ Programme Outcome 2: Demonstrate an ability to design and conduct BME experiments, as well as to analyze and interpret data. (Practice and Measure)</li> <li>▪ Programme Outcome 3: Demonstrate an ability to design a system, component, or process relevant to BME to meet desired needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. (Practice</li> </ul>

	<p>and Measure)</p> <ul style="list-style-type: none"> <li>▪ Programme Outcome 4: Demonstrate an ability to identify, formulate, and solve BME problems. (Practice and Measure)</li> <li>▪ Programme Outcome 5: Demonstrate an ability to understand the impact of BME solutions in a global and societal context, especially the importance of health, safety and environmental considerations to both workers and the general public. (Practice and Measure)</li> <li>▪ Programme Outcome 6: Demonstrate an ability to critically evaluate research and professional literature, and understand the principles and practice of conducting research in clinical and industrial environments relevant to BME. (Practice and Measure)</li> <li>▪ Programme Outcome 7: Demonstrate an ability to use the techniques, skills, and modern engineering tools necessary for BME practice. (Practice and Measure)</li> <li>▪ Programme Outcome 8: Demonstrate an ability to use the computer/IT tools relevant to the BME discipline along with an understanding of their processes and limitations. (Practice and Measure)</li> <li>▪ Programme Outcome 10: Demonstrate an understanding of professional and ethical responsibility. (Practice and Measure)</li> <li>▪ Programme Outcome 11: Demonstrate an ability to communicate effectively and advise clients, professional colleagues and other members of the community. (Practice and Measure)</li> <li>▪ Programme Outcome 12: Demonstrate an ability to recognize the need for, and to engage in life-long learning. (Practice and Measure)</li> <li>▪ Programme Outcome 13: Demonstrate an understanding of contemporary issues. (Practice and Measure)</li> </ul>
<p><b>Subject Synopsis / Indicative Syllabus</b></p>	<p>The project can be a topic either on design or on research. Possible project areas include:</p> <ul style="list-style-type: none"> <li>▪ Bioinstrumentation</li> <li>▪ Biomaterials</li> <li>▪ Biomechanics</li> <li>▪ Prosthetics and Orthotics</li> <li>▪ Rehabilitation Engineering / Assistive Technology</li> <li>▪ Other Biomedical Engineering relevant topics</li> </ul>

<b>Teaching and Learning Methodology</b>	<p>Tutorial &amp; Independent Project Study – Student can work on a single project or team up with other students to form a group. Each student in the group will be working on a related project area but with different objective(s)/ foci. Each student will be guided by a project supervisor who would meet with the student on a weekly basis. The project supervisor will monitor the progress of the student, point out relevant references and resources to the student, and if necessary, assist the student to focus and keep him/her on track. The methods that each student may employ to complete his/her project would of course vary from project to project. It could be empirical data collection, involving physical experiments or interviews with some forms of questionnaires. It could also be some form of theoretical analysis or design some clinical evaluation devices and even construction of prototypes.</p>																																												
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	<table border="1" data-bbox="451 638 1450 1079"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> </tr> </thead> <tbody> <tr> <td>Proposal</td> <td>10%</td> <td>√</td> <td></td> <td>√</td> <td></td> </tr> <tr> <td>Progress</td> <td>10%</td> <td>√</td> <td></td> <td></td> <td>√</td> </tr> <tr> <td>Written report</td> <td>50%</td> <td>√</td> <td>√</td> <td>√</td> <td></td> </tr> <tr> <td>Oral presentation</td> <td>30%</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>Total</td> <td>100%</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p><i>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</i></p> <p>The students will be assessed on their general understanding of the subject matter and the background literature, the clarity of their objectives, the appropriateness of the methodology, the validity of the data collected, and the relevance of the conclusions to their data; or for a design project, the innovativeness, practicality as well as the cost-effectiveness of the design. Assessments will also be made on the process of project execution (interim and final) in both the written reports and the oral presentations.</p>					Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				a	b	c	d	Proposal	10%	√		√		Progress	10%	√			√	Written report	50%	√	√	√		Oral presentation	30%	√	√	√	√	Total	100%				
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<b>Student Study Effort Expected</b>	Class contact:																																												
	<ul style="list-style-type: none"> <li>▪ Tutorial</li> </ul>		26 Hrs.																																										
	<ul style="list-style-type: none"> <li>▪ Data collection and data analysis</li> </ul>		130 Hrs.																																										
	Other student study effort:																																												
	<ul style="list-style-type: none"> <li>▪ Literature review and report writing</li> </ul>		96 Hrs.																																										

	Total student study effort	252 Hrs.
<b>Reading List and References</b>	▪ Journal papers from the BME discipline.	
<b>Date of Last Major Revision</b>	14 July 2014	
<b>Date of Last Minor Revision</b>	05 July 2018	