Subject Description Form

<table>
<tr><td>Subject Code</td><td>BME5110</td></tr>
<tr><td>Subject Title</td><td>Biomedical Microdevices</td></tr>
<tr><td>Credit Value</td><td>3</td></tr>
<tr><td>Level</td><td>5</td></tr>
<tr><td>Responsible staff & Department/School</td><td>Prof Mo YANG (BME)</td></tr>
<tr><td>Pre-requisite / Co-requisite/ Exclusion</td><td>Nil</td></tr>
<tr><td>Objectives</td><td>The objective of this course is to prepare the students with the knowledge of biomedical microdevices and to introduce the concepts and applications of biomedical microdevices for micro-total analysis systems, drug delivery systems, cellular phenomena observation, stem cell study, bacteria detection, gene delivery system for diagnostics and treatment of human disease.</td></tr>
<tr><td>Intended Learning Outcomes</td><td>Upon completion of the subject, students will be able to:

a. Analyze the design and fabrication of microdevices for biological applications.
b. Integrate the basic knowledge with the applications of biomedical microdevices
c. Discuss the most recent developments in biomedical microdevices research
d. Apply the appropriate techniques and right strategies through case studies in the successful development of biomedical microdevices for medical applications</td></tr>
<tr><td>Contribution to Programme Outcomes (Refer to Part I Section 2)</td><td>Programme Learning Outcome (a): acquire and apply advanced levels of knowledge and skills in BME professions (Teach, Practice, and Measure)</td></tr>
<tr><td>Subject Synopsis/ Indicative Syllabus</td><td>Introduction to biomedical microdevices; Material choices for biomedical microdevices; Fabrication techniques for biomedical microdevices; Silicon based biomedical microdevices; Polymer based biomedical microdevices; Microsensors for biological application; Microactuators for biological application; Microdevices for drug delivery; Microdevcies for cell culture; Microdevcies for stem cell study; Microdevices for bacteria detection, Microdevices for diagnostics.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>Students will learn the knowledge in lectures and labs. They are exposed to various facets of biomedical microdevice research and development. They are also provided with the latest development in the recently emerged field of biomedical microdevices. Students are given assignments and need to make presentations.
<table>
<tr><td rowspan="2">Teaching/learning methodology</td><td colspan="4">Intended subject learning outcomes</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>1. Lectures</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>2. Lab</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
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<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1. Continuous assessment:
a. Assignments</td><td>30%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>b. Individual report and presentation</td><td>30%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>c. Final examination</td><td>40%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="6"></td></tr>
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Continuous assessment will include homework assignments, individual repot and individual presentation.

Homework assignments will be designed to test how the students know the most recent developments in biomedical microdevices in different research areas for the outcomes a, b c and d. Then, the students are required to choose one topic for the recent development of biomedical microdevices. Each student gave individual oral presentation and turned in the individual project paper.

Final examination will be used to designed to test how the students can apply the learned knowledge in biomedical micro devices to design devices for applications.
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<tr><td>Student Study Effort Expected</td><td>
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<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures</td><td>36 Hrs.</td></tr>
<tr><td>▪ Tutorials</td><td>3 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Self-study</td><td>60 Hrs.</td></tr>
<tr><td>▪ Assignments and preparation for presentation</td><td>18 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>117 Hrs.</td></tr>
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<tr><td>Reading List and References</td><td>▪ Microfluidic devices for biomedical applications, Duxford, England ; Cambridge, Massachusetts : Woodhead Publishing ; 2021 ; Second edition</td></tr>
<tr><td>Date of Last Major Revision</td><td>11 June 2022</td></tr>
<tr><td>Date of Last Minor Revision</td><td>20 July 2023</td></tr>
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