Prerequisite: LSM2211 Metabolism and Regulation or LSM2232 Molecular Biology or LSM2233 Cell Biology
Workload: 38 lecture hours + 8 tutorial hours.

Course description:
The ability to rationally engineer living cells has been a long-anticipated goal dating back for more than half a century. With the advent of DNA synthesis and genome engineering tools, biological systems can now be systematically designed for a myriad of industrial applications including disease prevention, biochemicals production and drug development. This module aims to provide basic principles to the engineering of biology with emphasis on the design and construction of synthetic gene circuits in living cells. The module also discusses current and emerging applications driven by synthetic biology, and the socio-ethical responsibilities that are required of synthetic biologists. By the end of this module, participants should be able to:
- Describe the principles of synthetic biology
- Design synthetic genetic circuits
- Design research projects on the topic of synthetic biology
- Review the applications and significance of synthetic biology
- Provide perspectives of synthetic biology

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<th>S/N</th>
<th>Topics</th>
<th>Lecture hours</th>
<th>Instructor</th>
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<tr>
<td>1</td>
<td>Introduction to Synthetic Biology</td>
<td>2</td>
<td>A/P Matthew Chang</td>
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<td>2</td>
<td>Principles of Synthetic Biology: Biological, Engineering and Design</td>
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<td>A/P Matthew Chang</td>
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<tr>
<td>3</td>
<td>Principles and Applications of Synthetic Enzymology</td>
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<td>A/P Yew Wen Shan</td>
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<td>4</td>
<td>Cell-free Systems for Synthetic Biology</td>
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<td>5</td>
<td>Microbial Fermentation for Synthetic Biology</td>
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<td>Dr. Chow Yvonne</td>
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<td>Systems and Synthetic Biology</td>
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<td>A/P Sanjay Swarup</td>
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<tr>
<td>8</td>
<td>Computational Modelling for Synthetic Biology</td>
<td>2</td>
<td>A/P Poh Chueh Loo</td>
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<td>9</td>
<td>Synthetic Microbial Cell Factories and the Industrialization of Synthetic Biology</td>
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<td>A/P. Choi Won Jae</td>
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<td>10</td>
<td>Bioprocess Engineering for Synthetic Biology</td>
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<td>A/P Leong Susanna</td>
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<td>11</td>
<td>Current Applications of Synthetic Biology</td>
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<td>Res A/P Ling Hua</td>
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<td>12</td>
<td>Current Issues and Future Direction of Synthetic Biology</td>
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<td>A/P Matthew Chang</td>
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Total lectures: 38 h
Tutorials: 8 h
Total hours: 46 h

TEXT BOOK (Reference books):
2. Synthetic Biology, Tools and Applications/ Huimin Zhao (Editor) / Paperback Edition.
MODE OF ASSESSMENT:
15% CA1 MCQs, 15% CA2 MCQs, 20% Tutorial Participation, 50% Final Exam

MODULE CO-ORDINATORS:
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