SEMESTER I
LSM3201 RESEARCH AND COMMUNICATION IN LIFE SCIENCES

Pre-requisite(s): Nil
Co-requisite(s): LSM2288, LSM2289, LSM3288 and LSM3289 UROPS in Life Sciences I and II, LSM4199 Final Year Project (FYP).

Workload: 32 lecture hours + 18 tutorial hours

Course description:
This module introduces students to the philosophy, principles and processes of life sciences research and communication. It aims to equip students with the essential knowledge and skills that complement the hands-on research training which students undertake for UROPS or FYP projects. Students registering for this module are required to have an ongoing UROPS or FYP research projects as students’ projects will be used as the real-world examples and problems for the major assignments. The module provides a pedagogical framework that integrates the thinking, doing and communicating processes of scientific inquiry. The module covers the essentials of scientific research including: epistemic thinking & knowledge construction; philosophy of scientific research and ethics; fundamentals of scientific observation, problem formulation and hypothesis generation; elements of experimental designs and execution; good (and bad) practices of data collection, analysis and evaluation; form, function, elements, style and language; peer-review & critique in scientific communication. This module will complement and enhance the experience and quality of undergraduate research training. Class sessions can be adjusted to smaller group or 1-to-1 meetings to facilitate learning interactions and feedback, as needed.

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<tr>
<th>S/N</th>
<th>Topics</th>
<th>Lecture hours</th>
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<tbody>
<tr>
<td>1.</td>
<td>Scientific Thinking, Inquiry &amp; Communication</td>
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<td></td>
<td>What is Science &amp; How is Scientific Knowledge Generated?</td>
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<td>The Scientific Process: From Inquiring &amp; Acquiring to Communicating &amp; Critiquing</td>
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<td>Goals and Ethics in Research</td>
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<td>Scientific Communication &amp; Community</td>
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<td>Planning, Doing and Communicating Your Research Project</td>
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<td>Research Notebook &amp; Reflective Learning Journal</td>
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<td>From Observations to Questioning</td>
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<td>From Problem Formulation to Hypothesis Generation</td>
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<td>Forms &amp; Functions of ‘Introduction’</td>
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<td>Elements, Style &amp; Language of ‘Introduction’</td>
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<td>Common Pitfalls to Avoid</td>
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<td></td>
<td>From Inquiring To Searching: Elements of Experiments &amp; Designs</td>
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<td>Elements of Sampling, Measurement &amp; Instrumentation</td>
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<td>Forms &amp; Functions of ‘Materials &amp; Methods’</td>
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<td>Elements, Style &amp; Language of ‘Materials &amp; Methods’</td>
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<td>4.</td>
<td>Scientific Inquiry Process in the ‘Results’</td>
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<td>From Searching To Finding: Elements of Data</td>
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<td>Organizing, Analyzing &amp; Presenting Data</td>
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<td>Forms &amp; Functions of ‘Results’</td>
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<td>Elements, Style &amp; Language of ‘Results’</td>
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<td>5.</td>
<td>Scientific Inquiry Process in the ‘Discussion’</td>
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<td>From Finding To Interpreting: Evaluating &amp; Generalizing</td>
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<td>Discussing Strengths &amp; Weaknesses</td>
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<td>Concluding Effectively</td>
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<td>Forms &amp; Functions of ‘Discussion’</td>
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<td>6.</td>
<td>Summarizing, Presenting &amp; Communicating</td>
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<td>Tying Up Loose-ends (Abstract, Front matters &amp; Back matters)</td>
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<td>Summarizing &amp; Presenting Your Research Work</td>
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<td>Pointers for Preparing a Successful Presentation</td>
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<td>Pointers for Good Visual Presentation</td>
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<td>Pointers for Effective Delivery</td>
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<td>7.</td>
<td><strong>Peer Review &amp; Critiquing</strong></td>
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<td>What is the Purpose of Peer-Review?</td>
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<td>Critiquing the Research Problem, Research Question and Hypothesis</td>
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<td>Formulation;</td>
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<td>Critiquing the Experimental Design, Execution, Analysis and</td>
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<td>Conclusion/Generalization;</td>
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<td>Critiquing the Communication, Writing and Presentation of the Research Work</td>
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<td>8.</td>
<td><strong>How to Know &amp; How to Make Known: Life, Science and Beyond</strong></td>
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<td>What is truth, knowledge and science?</td>
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<td>How to know &amp; how to make known?</td>
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<td>How to move on from here to beyond?</td>
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Total lectures: 32 h
Tutorials: 18 h
Total hours: 50 h

**TEXT BOOK** (Reference books):
3. Other reference materials will be provided in class.

**MODE OF ASSESSMENT:**
70% Assignments (Assembling, writing & critique of Introduction, M&M, Results & Discussion sections; IVLE online exercises & participations) + 10% Quiz + 10% (Outline Construction of Research Project & Abstract writing) + 10% Oral Presentation

**NO FINAL EXAMINATION.**

**MODULE CO-ORDINATOR & LECTURER:**
Dr Lam Siew Hong (Tel: 6516-7379; E-mail: dbslsh@nus.edu.sg)