**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

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 complements 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 are used as real-world examples and problems for the major assignments (refer to Co-requisite). It 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.

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<tr>
<th>S/N</th>
<th>Topics</th>
<th>Lecture hours</th>
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| 1.  | Scientific Thinking, Inquiry & Communication  
What is Science & How is Scientific Knowledge Generated?  
The Scientific Process: From Inquiring & Acquiring to Communicating & Critiquing  
Goals and Ethics in Research  
Scientific Communication & Community  
Planning, Doing and Communicating Your Research Project  
Research Notebook & Reflective Learning Journal | 4 |
From Observations to Questioning  
From Problem Formulation to Hypothesis Generation  
Forms & Functions of ‘Introduction’  
Elements, Style & Language of ‘Introduction’  
Common Pitfalls to Avoid | 4 |
From Inquiring To Searching: Elements of Experiments & Designs  
Elements of Sampling, Measurement & Instrumentation  
Forms & Functions of ‘Materials & Methods’  
Elements, Style & Language of ‘Materials & Methods’  
Common Pitfalls to Avoid | 4 |
| 4.  | Scientific Inquiry Process in the ‘Results’  
From Searching To Finding: Elements of Data  
Organizing, Analyzing & Presenting Data  
Forms & Functions of ‘Results’  
Elements, Style & Language of ‘Results’  
Common Pitfalls to Avoid | 4 |
| 5.  | Scientific Inquiry Process in the ‘Discussion’  
From Finding To Interpreting: Evaluating & Generalizing  
Discussing Strengths & Weaknesses  
Concluding Effectively  
Forms & Functions of ‘Discussion’  
Elements, Style & Language of ‘Discussion’  
Common Pitfalls to Avoid | 4 |
| 6.  | Summarizing, Presenting & Communicating  
Tying Up Loose-ends (Abstract, Front matters & Back matters)  
Summarizing & Presenting Your Research Work  
Pointers for Preparing a Successful Presentation  
Pointers for Good Visual Presentation  
Pointers for Effective Delivery  
Common Pitfalls to Avoid | 4 |
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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</td>
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<td>Research Work</td>
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<td>8.</td>
<td>**Perspectives in Scientific Research &amp; Knowledge Synthesis: A Tree</td>
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<td>in the Forest &amp; A Forest of Trees</td>
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<td>The Inquiring Process</td>
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<td>The Communicating Process</td>
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<td>Life, Science &amp; 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)