

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.

S/N	Topics	Lecture hours
1.	<u>Scientific Thinking, Inquiry & Communication</u> 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
2.	<u>Scientific Inquiry Process in the 'Introduction'</u> From Observations to Questioning From Problem Formulation to Hypothesis Generation Forms & Functions of 'Introduction' Elements, Style & Language of 'Introduction' Common Pitfalls to Avoid	4
3.	<u>Scientific Inquiry Process in the 'Materials & Methods'</u> 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.	<u>Scientific Inquiry Process in the 'Results'</u> 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.	<u>Scientific Inquiry Process in the 'Discussion'</u> 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.	<u>Summarizing, Presenting & Communicating</u> 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

S/N	Topics	Lecture hours
7.	Peer Review & Critiquing What is the Purpose of Peer-Review? Critiquing the Research Problem, Research Question and Hypothesis Formulation; Critiquing the Experimental Design, Execution, Analysis and Conclusion/Generalization; Critiquing the Communication, Writing and Presentation of the Research Work	6
8.	How to Know & How to Make Known: Life, Science and Beyond What is truth, knowledge and science? How to know & how to make known? How to move on from here to beyond?	2
Total lectures :		32 h
Tutorials :		18 h
Total hours:		50 h

TEXT BOOK (Reference books):

1. Gould JE (2002). Concise handbook of experimental methods for the behavioral and biological sciences. CRC Press. Available as E-book in NUS Library.
2. Glasman-Deal H (2010). Science research writing for non-native speakers of English. Imperial College Press. London, UK. Available as E-book in NUS Library.
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:

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