

NATS 2025 NATURAL SCIENCE RESEARCH METHODS

Credit Points 10

Legacy Code 300932

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Description This unit aims to introduce students to the theories and practices underpinning the scientific processes. Students will learn to identify an issue, review the literature to identify gap(s) and formulate a hypothesis or a question to address the gap(s). Students will then explore research methods and designs to safely and ethically conduct an experiment or study to collect data to answer the hypothesis/question. They will also learn to analyse and interpret the data and report on the findings of the research in a written format. The unit is structured so that lectures will provide theoretical expertise and workshops will reinforce student learning with practical experience. This knowledge and skills are essential for stage 3 units and a career in science.

School Science

Discipline Natural and Physical Sciences, Not Elsewhere Classified.

Student Contribution Band HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 2 subject

Equivalent Subjects LGYA 5920 - Research Communities and their Environments NATS 2028 - Research Methods LGYA 6151 - Animal Research

Restrictions Successful completion of 60 credit points at Level 1.

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Identify an issue and formulate research aim and research hypothesis or question
2. Gather, critically evaluate and synthesise information from a range of sources
3. Design and conduct an experiment or study to test a hypothesis or answer a research question
4. Identify and address potential risks and ethics relevant to a research project
5. Collect data, conduct simple analysis, present results of the experiment or study, discuss the findings and draw conclusions
6. Report on a research project in the written format
7. Reflect on practices and experiences for personal and professional development

Subject Content

1. Conceptualising a research project:
- what do You see as A question (theoretical or applied): usually derived from observation in The work place, everyday life, nature, news articles, magazines & journals

- Background reading to confirm that is A Problem worthy of research: introduce students to different types of literature
- Skills to learn: library searches; assessing literature through skim reading of publishers, tittles, abstract, headings/sub-headings & captions
- 2. Locating, reviewing the literature to identify gaps:
 - what is A lit Review, how is It conducted
 - what are gaps and how to identify them (from what is known and unknown)
 - skills to learn: organising own research database, making notes and mind-Mapping to identify themes of what is known, what is not known, and gaps
- 3. Identifying the aim of the research, formulate hypothesis or research question(s):
 - structure of A Hypothesis/ question(s)
- 4. Research methods and research designs:
 - data sources (i.e. Surveys, quantitative, quantitative etc.)
 - data collection tools (i.e. sample size, units of replication etc.)
- 5. Ethical and regulatory frameworks involved in research on humans and animals:
 - Skills to learn: undertaking and documenting risk assessment as appropriate to their proposed research activities; completing an ethical application
- 6. Managing a project:
 - Skills to learn: use of Gantt chart; recording and protecting data
- 7. Types of data and basic methods to analyse data:
 - what statistical test is appropriate for The data?
 - what The data tell You in relation to The Hypothesis or questions ?
 - tools to present results (tables, Graphs, stats)
 - what are your conclusions based on The Hypothesis or questions?
 - how do The conclusions relate to current research literature? are they consistent or expand on The literature? are they inconsistent and why?
 - skills to learn: Integrating Numerical evidence to support arguments
- 8. Academic writing:
 - structure of A research proposal and A research report
 - Reflections for personal and professional development: A framework with guided questions for Reflections

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Item	Length	Percent	Threshold	Individual/ Group Task
Online quiz's	60 multiple choice questions / Short answer questions	30	N	Individual
Mini Literature and Data Review	800 words	25	N	Individual
Applied Project - assessment of the ethical implications of animal numbers	2 forms	20	N	Individual
Report	1,000 words	25	N	Individual

Prescribed Texts

- Statistics Explained: An Introductory Guide for Life Scientists
- Asking Questions in Biology

Teaching Periods