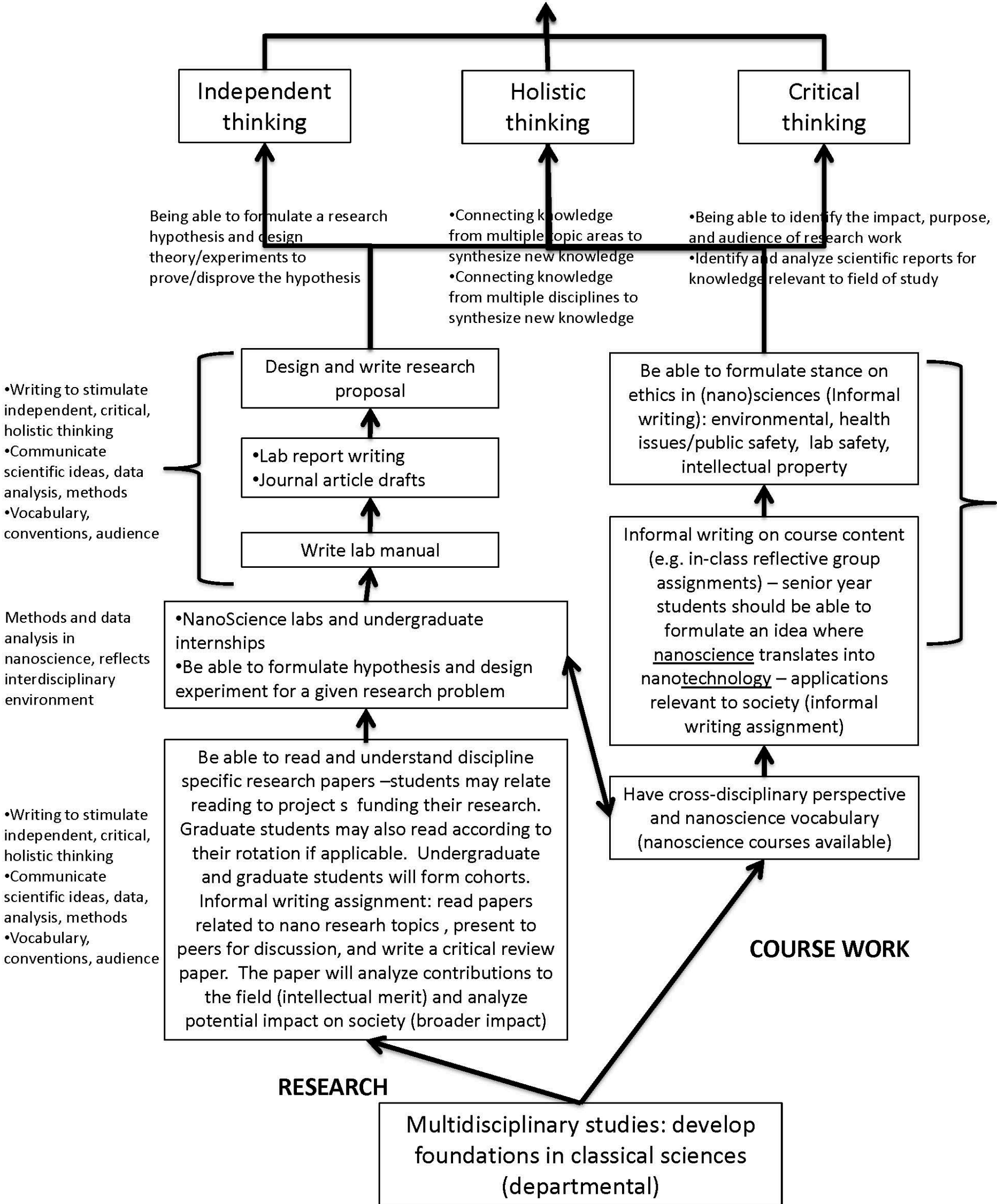


# NanoScience Learning Outcomes



**Independent thinking**

Being able to formulate a research hypothesis and design theory/experiments to prove/disprove the hypothesis

**Holistic thinking**

- Connecting knowledge from multiple topic areas to synthesize new knowledge
- Connecting knowledge from multiple disciplines to synthesize new knowledge

**Critical thinking**

- Being able to identify the impact, purpose, and audience of research work
- Identify and analyze scientific reports for knowledge relevant to field of study

Design and write research proposal

- Lab report writing
- Journal article drafts

Write lab manual

- Writing to stimulate independent, critical, holistic thinking
- Communicate scientific ideas, data analysis, methods
- Vocabulary, conventions, audience

Methods and data analysis in nanoscience, reflects interdisciplinary environment

- NanoScience labs and undergraduate internships
- Be able to formulate hypothesis and design experiment for a given research problem

Be able to read and understand discipline specific research papers –students may relate reading to projects funding their research. Graduate students may also read according to their rotation if applicable. Undergraduate and graduate students will form cohorts. Informal writing assignment: read papers related to nano research topics, present to peers for discussion, and write a critical review paper. The paper will analyze contributions to the field (intellectual merit) and analyze potential impact on society (broader impact)

- Writing to stimulate independent, critical, holistic thinking
- Communicate scientific ideas, data, analysis, methods
- Vocabulary, conventions, audience

Be able to formulate stance on ethics in (nano)sciences (Informal writing): environmental, health issues/public safety, lab safety, intellectual property

Informal writing on course content (e.g. in-class reflective group assignments) – senior year students should be able to formulate an idea where nanoscience translates into nanotechnology – applications relevant to society (informal writing assignment)

Have cross-disciplinary perspective and nanoscience vocabulary (nanoscience courses available)

**COURSE WORK**

**RESEARCH**

Multidisciplinary studies: develop foundations in classical sciences (departmental)