

INTRODUCTION TO THE COURSE

What the Course is About
Who the Course is for
Transdisciplinarity in the Course
A Tentative List of Topics

What the Course is About

Research means different things to different people. So, at the outset, let us clarify what the term 'research' means as we use it in this course, so that we are all on the same page. Research is:

a process that aims to make a contribution to current Academic Knowledge.

The goal of this course is help you:

develop the abilities and conceptual understanding required for research.

We expect that the course would serve to lay the *foundations for research* in any domain of academic knowledge, ranging from mathematics, the physical-biological-human sciences, and the humanities, to domains like medicine, engineering, law, education, management, and architecture.

Who the Course is for

The course has two components. One is the UNDERSTANDING component, which would address clusters of questions like these:

- ~ What is research? What are the components of research?
- ~ How do we come up with research questions? How do we find methodological strategies to look for answers to the questions? How do we implement those strategies? How do we arrive at conclusions on the basis of what we have done? How do we defend/prove/justify those conclusions to establish the outcomes of our research as 'knowledge'?
- ~ What are the differences between research in mathematics, in the physical-biological-human sciences, and in the humanities? What do they have in common?
- ~ What is theoretical research? What is a theory? What is experimental research? What is empirical research? Do all forms of empirical research involve the use of statistics, experimentation, or instruments?

- ~ What is a hypothesis? What is the distinction between correlational hypotheses and causal hypotheses? What is the relation between hypothesis, theory, explanation, law, axiom, conjecture, theorem, and prediction? What is the distinction between models of hypothesis testing and of prediction testing?

If any of these questions strike a chord, read on.

The other component is that of ABILITIES. We will talk about this component shortly.

This 12-week introduction to research for undergraduate students is built around a textbook, together with a weekly one-hour online class. The textbook is written such that anyone who has completed ten years of compulsory school education can follow it. The textbook can also be of value to:

- Master's and PhD students who have to work on research projects and theses.
- Professional researchers who would like to revisit the foundational concepts of research.
- People who may not pursue research but would like to develop their thinking abilities.

Transdisciplinarity in the Course

This course seeks to help learners develop the capacity for *academic inquiry*, leading to the ability to construct and evaluate theories and theoretical positions, including empirical research to test the predictions of theories. This would help you develop general research abilities needed for all academic domains, regardless of the discipline you pursue, and the level at which you pursue it. Hence, the course will be an introduction to *research at a transdisciplinary level*.

What this means is that we will operate at a level beyond that of particular disciplines, where disciplinary boundaries do not exist. To take an example, exploring the *social behaviour of ants* is specific to a discipline, with a narrow scope. Exploring the *social behaviour of insects* has a broader scope. Exploring the *social behaviour of living organisms* approaches the transdisciplinary level. And exploring **collective behaviour in general**, for instance, including that of molecules and of clocks, calls for an even higher level of abstraction along the scale of transdisciplinarity.

Academic inquiry uses different modes or forms, those of the *mathematical, scientific, conceptual, and value inquiries*. Scientific inquiry includes *observational inquiry* and *theoretical inquiry*. 'Value' covers *epistemic, ethical, and aesthetic values*, among others. Conceptual inquiry spans all disciplines and interleaves with all modes of inquiry. The course will deal with most of these forms of inquiry.

The aim is to help learners develop *the capacity to come up with, critically evaluate, and establish theories and theoretical claims*. Specifics such as experimental research, quantitative research, and instrumental research in science are ways of testing predictions of theories. In building and evaluating theories, the perspective here shifts from the concept of *hypothesis testing* to the concept of *prediction testing*.

Thus, the course aims to provide the *foundations on which discipline-specific research abilities can be built*.

A Tentative List of Topics

Here is a list of topics for the twelve chapters that make up the preparatory reading material for the twelve online sessions. As far as possible, we will try to follow this list, but as we proceed, we may need to modify or change the order of the topics.

Chapter 1: What is Research?

Chapter 2: Methodological Strategies

Chapter 3: Clarifying Concepts

Chapter 4: Justifying Claims

Chapter 5: Observational Research

Chapter 6: Correlations and Causes

Chapter 7: Theory Construction 1

Chapter 8: Theory Construction 2

Chapter 9: Modes of Reasoning

Chapter 10: Critical Thinking

Chapter 11: Critical Reading

Chapter 12: Summing up

As we proceed, we may distribute other reading materials that you might find relevant (e.g., how to come up with a research question, how to write a research proposal, how to defend a research claim or a thesis, and so on).

With this, we hope you are ready to embark on a learning journey with us!

Please share your feedback on the course at itr@thing.education