

IIT Mandi  
Proposal for a New Course

Course Number: RM 510

Course Name: Research Methodology

Credit: 1-0-0-1

Prerequisites: None

Students intended for: MS/PhD

Elective or Core: Core

Semester: Even

**Preamble:**

The research methodology (RM) course is a compulsory course taken by all research scholars (M.S. and Ph.D. students) of IIT Mandi. The objective of the course is to introduce students to research. This includes practices leading to a successful thesis, ethical issues like plagiarism, writing and presentation skills for effectively communicating the research outcome etc.

It is anticipated that the many of the topics covered in the RM course is of general interest to all research scholars, be it from humanities, sciences or engineering. A small number of School-/discipline- specific topics can also be included.

**Course Outline:**

The course consists of 14 contact hours, which are divided as follows:

- 7 hours of general lectures, which are common to all scholars.
- 3 hours of school-/discipline- specific lectures, which run in parallel.
- 4 hours for practice exercise, again common for all scholars.

**Course Modules:**

Each topic below represents one lecture.

- **Introduction:** What is research, how research has benefited human society
- **Literature survey:** What is it? Why is it needed? How to do a literature survey, how to read a research paper, use of tools like Google Scholar, CiteSeer etc.
- **Ph.D degree and thesis:** What are the objectives, and what are not. What is the role of the advisor and the scholar?
- **Things that may help a research scholar:** for example, maintain a daily routine, attend talks in other areas, go for others' Ph.D. seminars, maintain physical fitness, time management etc.
- **Research ethics:** plagiarism, academic dishonesty, a few case studies
- **Writing:** How to write good papers, and research proposals
- **Presentation:** How to make good presentations
- **School-specific lecture 1**
- SHSS: Theory (broad topics, specific to the discipline of the student)
- SBS: Important sources of literature - journals and conferences of RSC, ACS, AMS, IOP, APS, ScienceDirect, use of different reference tools

- SCEE: Important sources of literature - journals and conferences of ACM, IEEE etc.
- SE: Intellectual property rights
- **School-specific lecture 2**
- SHSS: Practice (broad topics, specific to the discipline of the student)
- SBS: Introduction to software like ChemDraw, SolidWorks - 1
- SCEE: Using computing tools: HPC cluster, LaTeX, Matlab, producing figures and plots
- SE: Good practices for numerical simulations
- **School-specific lecture 3**
- SHSS: Writing (broad topics, specific to the discipline of the student)
- SBS: Introduction to software like ChemDraw, SolidWorks - 2
- SCEE: Reproducible research in computer science and electrical engineering
- SE: Good practices for experimental methods
- Writing a research proposal and making presentation. Each student will prepare a 3-page proposal and give a 10-minute presentation on it.
- **Exercise 1**
- **Exercise 2**
- **Exercise 3**
- **Exercise 4**

Note on abbreviations:

SHSS: School of humanities and social sciences

SBS: School of basic sciences

SCEE: School of computing and electrical engineering

SE: School of engineering

**Text Books:**

**Reference Books:**

- Richard Hamming, "You and your research", Bell Communications Research Colloquium Seminar, 1986 (Transcription available online.)
- Cone, J.D. & Foster, S.L. (2006). Dissertations and theses from start to finish. Washington, DC, APA.
- Galvin, J.L. (2009). Writing literature reviews: A guide for students of the social and behavioral sciences (4th ed.). Glendale, CA: Pyrczak.
- Gilpin, A.A. (2000). A guide to writing in the sciences. Toronto, Canada: U. Toronto Press.
- Gustavii, B. (2003). How to write and illustrate a scientific paper. New York, NY, Cambridge University Press.
- Babbie, E.R. (2010). The practice of social research. Belmont, CA: Wadsworth.