What is Research

- Developing a new/original technique, observation, algorithm, theory, ...
- Continuing an original work done by others, esp. the Supervisor
- Providing an original technique, ... in an unoriginal but competent piece of work
- Developing several small original ideas, methods, and algorithms, ...
- Showing originality in testing somebody else's ideas.
- Finding a counter-example or fallacy in somebody else's ideas.

Doing Research

- Select a Supervisor (Active and Experienced)
- Select an Area
- Select a Problem
- For $i = 1$ to n
  1. Read between lines, Discuss, Understand
  2. Develop Ideas
  3. Analyse, Design, Simulate, Experiment
  4. next i
- Write papers, Submit Progress Reports, Go to Conferences
- Write a Thesis

Thesis

- Final Document
- Record of Your Achievements
- Reviewed by the Supervisor and Experts
- Archived in the University Library/ ShodhGanga Repository

Organization of the Thesis

Follow the Guidelines of the University

1. Front Matter
2. Main Body
3. Back Matter

Main Body

1. **I**ntroduction
2. **Li**terature Survey
3. **M**ethod
4. **Re**sults
5. **D**iscussion of Results

Remember ILiMReD ILMRD

Introduction: Chapter 1

Main Theme = WHY

1. Broad area of your problem (2-3 para)
2. *Your Problem* (2 para.)
3. Current state of this problem in global scenario (2 para.)
4. Approach taken (1 para.)
5. Highlight of Results (2 para.)
6. *Your Contributions* (1 para.)
7. Organization of this Thesis (1 para.)

Remember: Introduction should have structure of a *funnel.*

Literature Survey: Chapter 2

Main Theme = WHO

- Discuss works of others working in areas similar to your problem.
- Chronological or Important first.

Method: Chapter 3, . . .

Main Theme = HOW

- Basic Theory
- Your Approach in Solving
- Your Analysis, derivations, theorems, proofs, . . .
- Your Case-Study, Your Choice of Data, Your Programs, Simulations . . .
- Your Experiments: Lab or Numerical

You need for good research

- Solid analysis
- Analysis+Simulation based on good data
- Analysis+Lab Experiments
- Analysis + Simulation + Experiments

Results: Chapter $N-3$

Main Theme = WHAT

- Results out of Analysis, Simulation and Experiments
- Graphs, Charts, Tables of Data

Discussion: Chapter $N-2$

Main Theme = So WHAT

- Interprete your results not paraphrase
- Do not extrapolate
- Use numbers not adjectives
- Follow standards

Chapter $N-1$ = Future Works (a few paragraphs)
Chapter N = Conclusion or Summary (a few paragraphs)

Front Matter

- Cover page from the University
- Page with Certification and Signatures
- Title Page
- Dedication
- Acknowledgement and Thanks
- Abstract (500 words)
- Table of Content
- List of Figures
- List of Tables
- List of Acronyms used

Back-Matter

- List of References
- Appendix 1, 2, . . . with long derivations and calculations
- Codes written

Thesis Submission

Follow all the guidelines of the Department and the University

- Get plagiarism checked
- Fill up the forms
- Submit the thesis.

After Thesis Submission

- Thesis is sent to reviewers selected by the authority
- Wait for reviews
- Loop for revisions and submissions
- If comments are positive then thesis defence is arranged by the University.