



Writing a Research Paper in Engineering

Research paper writing is an important part of any engineering program. This practice helps graduate students get their work acknowledged by experts in the same research area. For undergraduate students, it serves as training for writing technical reports and proposals which will be necessary when working in industry.

Engineering research papers essentially consist of following sections: abstract, introduction, methodology, results and discussion, summary and conclusions, acknowledgements, and references. While each professor might have their own specific requirements, the basic structure of engineering papers remains the same.

Technical documents are generally formatted in the same way, so if your professor doesn't give you specific instructions, you should think about following these guidelines:

- Single spaced
- Left justification (full justification might be required for journal articles)
- Paragraphs should be indented (hit the tab key)
- One-inch margins, unless your report needs to be bound

Papers should be written in a coherent manner. This means that each paragraph and section should relate to preceding paragraph and section. When you're writing, you will also want to follow these style guidelines:

- Avoid abstract language (really, quite, severely, very)
- Avoid overusing pronouns, particularly it, these, and this
- Avoid imprecise or subjective terms (fast, slow, tall, small)
- Avoid words that have no precise meaning
- Write using the active voice
- Eliminate empty/wordy phrases (*there is/are* and *it is*). These are indirect phrases and tend to be unclear and wordy. Direct statements, on the other hand, are clear and concise.

Your reports will likely have the following sections. With the exception (perhaps) of the abstract, these sections are usually required in every report.

Paper section	What it's for	How to use it
Abstract	Provide a summary of the paper objectives, methodology and major outcomes.	This section should be used to describe the problem statement, research objectives and methodology to achieve the desired results in one paragraph.
Introduction	To provide details about the research topic, work done already, and to establish a reason why you chose a particular method to address the shortcomings of previous work.	You should use “funnel approach” which means start from the broader aspect of the research topic and narrow it down to the specific objectives of your research. This can be achieved by doing a literature review. Highlight the similarities and differences of your work from work the previously completed. This section should have a citation for each argument and data to demonstrate the authenticity of the information provided.
Methodology	To explain the experimental methods and/or analytical techniques used in the research.	You should describe each step of the research methodology in the correct order. If a standard procedure was followed, cite it. If you used a new or modified method, then it should be explained in such a way that anyone can repeat the procedure by following the explanation.
Results and Discussion	To present the results and discuss the findings.	You should first present your result and describe the trends. Then discuss and explain the results with the help of theory (books) and published literature.
Summary and Conclusion	To summarize the entire paper and present the conclusions.	The paper should be summarized in 1 or 2 paragraphs by describing need of the research, what was the objectives and what research methodology was

		followed to achieve the objectives. Afterwards, present the conclusions one by one in bullet form.
Acknowledgements	To acknowledge the facilitators.	You should thank any funding agencies for financial support, your university for providing the lab space, or the professor who supervised the work. This is only necessary for publications, and is not required in undergraduate papers.
References	Should list all the sources consulted when writing the paper.	This will be beneficial in displaying the extent of literature review has been done by you and to verify any information provided.